REVISIONARY TEST PAPER

JUNE 2011

GROUP II

THE INSTITUTE OF COST AND WORKS ACCOUNTANTS OF INDIA

12, SUDDER STREET, KOLKATA-700 016

INTERMEDIATE EXAMINATION

(REVISED SYLLABUS - 2008)

GROUP - II

Paper- 8 : COST AND MANAGEMENT ACCOUNTING

Q. 1. (a) Match the statement in Column 1 with the most appropriate statement in Column 2 :

Column I	*Column II*
By product cost accounting	Management by exception
Balanced score card	Pure finance not included in cost
Under absorbed overheads	Measures divisional performance
Performance of public enterprises	Activity based costing
Differential cost analysis	Performance analysis
Debenture interest	Direct materials
Variance analysis	Decision making
Cost object	Reverse cost method
Primary packing material	Shows profitability and capacity utilisation
Residual income	Supplementary rates

Q. 1. (b) State whether the following statements are True (T) or False (F) :

(i) Incentive systems benefit only workers.

(ii) Job costing is ideal where the products are dissimilar and non-repetitive in nature.

(iii) Service departments usually do not render services to each other.

(iv) Idle time variance is always adverse.

(v) Fixed cost vary with volume rather than time.

(vi) Contract costing is only a variant of job costing.

(vii) Under absorption of overhead results in higher amount of profits.

(viii) Debit balance in administration overhead account represents over absorbed overheads.

(ix) In variable costing, profit fluctuates with sale.

(x) Production budget is prepared before sales budget.

Q. 1. (c) In the following cases one out of four answers is correct. You are required to indicate the correct answer and give reasons for answer :

(i) If the capacity usage ratio of a production department is 90% and activity ratio is 99% then the efficiency ratio of the department is …….. %.

A. 100

B. 120

C. 110

D. 105

(ii) Consider the following data pertaining to the production of a company for a particular month :

Opening stock of raw material	**Rs. 11,570**
Closing stock of raw material	**Rs. 10,380**
Purchase of raw material during the month	**Rs. 1,28,450**
Total manufacturing cost charged to product	**Rs. 3,39,165**

Factory overheads are applied at the rate of 45% of direct labour cost.

The amount of factory overheads applied to production is

A. Rs. 65,025

B. Rs. 94,287

C. Rs. 1,52,624

D. Rs. 60, 654

(iii) In two consecutive periods, sales and profit were Rs. 1,60,000 and Rs. 8,000 respectively in the first period and Rs. 1,80,000 and Rs. 14,000 respectively during the second period. If there is no change in fixed cost between the two periods then P-V ratio must be

A. 20%

B. 25%

C. 30%

D. 40%

(iv) In a factory of ABC Ltd. operating standard cost system, 2,000 kgs. of a material @ Rs. 12 per kg. were used for a product, resulting in price variance of Rs. 6,000 (F) and usage variance of Rs. 3,000 (A). Then standard material cost of actual production was

A. Rs. 20,000

B. Rs. 30,000

C. Rs. 25,000

D. Rs. 27,000

(v) Horizon Ltd. manufactures product BM for last 5 years. The company maintains a margin of safety of 37.5% with overall contribution to sales ratio of 40%. If the fixed cost is Rs. 5 lakh, the profit of the company is

A. Rs. 24.00 laks

B. Rs. 12.50 lakh

C. Rs. 3.00 lakh

D. None of A, B, C

(vi) **The cost-volume-profit relationship of a company is described by the equation y = Rs. 8,00,000 + 0.60x, in which x represents sales revenue and y is the total cost at the sales volume represented by x. If the company desires to earn a profit of 20% on sales, the required sales will be.**

- **A. Rs. 40,00,000**
- **B. Rs. 35,50,000**
- **C. Rs. 24,00,000**
- **D. Rs. 20,00,000**

(vii) **In the reversal cost method, the manufacturing cost of the main product is reduced by —**

- **A. The actual revenue received from the by-product**
- **B. The estimated market value of the by-product**
- **C. The estimated replacement costs of the by-product**
- **D. The standard cost of the by-product**

(viii) **The budgeted annual sales of a firm is Rs. 80 lakhs and 25% of the same is cash sales. If the average amount of debtors of the firm is Rs. 5 lakhs, the average collection period of credit sales**

- **A. 1.5 m**
- **B. 1 m**
- **C. 0.5 m**
- **D. 0.75 m**

(ix) **The hospital is opened for 365 days, but bed occupancy is 25 patients per day in 120 days and 20 beds occupied in another 80 days. Extra beds occupied during the year is 400. The patient-days of the hospital is**

- **A. 4,000**
- **B. 5,000**
- **C. 3,500**
- **D. 4,600**

(x) **ABC Ltd. is having 400 workers at the beginning of the year and 500 workers at the end of the year. During the year 20 workers were discharged and 15 workers left the organization. During the year the company has recruited 65 workers. Of these, 18 workers were recruited in the vacancies of those leaving, while the rest were engaged for an expansion scheme. The labour turnover rate under separation method is :**

- **A. 22.20%**
- **B. 7.78%**
- **C. 4.00%**
- **D. 14.40%**

Q. 1. (d) **Fill in the blanks suitably :**

(i) **_____ cost is the difference in total cost that results from two alternative course of action.**

(ii) **_____ is a must for inter firm comparison.**

(iii) **The most powerful tool used to analyse and interpret the health of an enterprise is _____ .**

(iv) Idle time variance is always _____ .

(v) Generally an item of expense, when identified with a specific cost unit is treated as _____ .

(vi) Contribution earned after reaching BEP is _____ of the firm.

(vii) In 'make or buy' decisions, it is profitable to buy from outside only when the suppliers price is below the firm's own _____ .

(viii) Batch costing method involves two elements viz., _____ cost and _____ cost.

(ix) _____ control becomes more effective in a business with the use of _____ Costing.

(x) Material usage variance is the sum of _____ and _____ .

Answer 1. (a)

Column I	***Column II***
By product cost accounting	Reverse cost method
Balanced score card	Performance analysis
Under absorbed overheads	Supplementary rates
Residual income	Measures divisional performance
Variance analysis	Management by exception
Primary packing material	Direct materials
Performance of public enterprises	Shows profitability and capacity utilisation
Differential cost analysis	Decision making
Debenture interest	Pure finance not included in cost
Cost object	Activity based costing

Answer 1. (b)

(i) **False –** Through Incentive system productivity can be improved by motivating workers. So it is beneficial to workers as well as employers.

(ii) **True –** Under Job costing method, cost of an individual job or work order is ascertained separately. Hence, it is ideal where the products are dissimilar and non-repetitive in nature.

(iii) **False** – Service departments can render services to each other, e.g. boiler house staff can use canteen facility.

(iv) **True** – This variance indicates the loss caused due to abnormal idle time. So, it will be always adverse.

(v) **False** – Fixed cost is fixed for a period. So , it varies with time rather than volume.

(vi) **True** – Contract costing can be termed as an extension of Job costing as each contract is nothing but a job completed.

(vii) **True** – Under absorption of overhead results in higher amount of profits**.**

(viii) **True** – Debit balance in administration overhead account represents over absorbed overheads.

(ix) **True** – In variable costing, profit fluctuates with sale.

(x) **True** – Production budget is prepared before sales budget.

Answer 1. (c)

(i) C- 110%

Efficiency ratio (ER) = Std. hrs. of production ÷ Actual hrs.

Activity ratio (AR) = Std. hrs. for production ÷ Budgeted hrs.

Capacity ratio (CR) = Actual hrs. ÷ Budgeted hrs.

Hence, ER = AR / CR = 99% / 90% = 110%

(ii) A – Rs. 65,025

Raw material used = Op. Stock + Purchases — Cl. Stock

= Rs. 11,570 + Rs. 1,28,450 — Rs. 10,380 = Rs. 1,29,640

Manufacturing Cost = Raw materials used + Direct labour + Factory overhead

Rs. 3,39,165 = Rs. 1,29,640 + Direct labour + 45% of Direct labour

1.45 Direct labour = Rs. 2,09,525

Direct labour = Rs. 1,44,500

The amount of factory overhead = 45% of Rs. 1,44,500 = Rs. 65,025.

(iii) C – 30%

Change in profit = P/V Ratio

Change in sales $= \frac{14,000 - 8,000}{1,80,000 - 1,60,000}$

$= \frac{6,000}{20,000}$

= 0.30 or 30%

(iv) D – Rs. 27,000

Total material cost variance = Material price variance + Material usage variance

= 6,000 (F) + 3,000 (A)

= Rs. 3,000 (F)

Actual material cost = 2,000 × 12 = Rs. 24,000

Hence, the standard material cost of actual production = 24,000 + 3,000 (F)

= Rs. 27,000

(v) C – 3.00 lakhs

Break even sales = Rs. 5 lakhs ÷ 0.40 = Rs. 12.50 lakhs

Total sales $= \frac{12.50}{(1 - 0.375)}$ = Rs. 20.00 lakhs

Hence the profit of the company :

Rs. 20 lakh × 0.375 × 0.40 = Rs. 3.00 lakhs

(vi) A – Rs. 40,00,000

Variable cost = 60% , therefore, contribution to sales ratio = 40% (P/V ratio)

Company's target profit 20% on sales, therefore, revised contribution which covers only fixed cost = 40% - 20% = 20%.

Required sales = fixed cost / revised contribution = Rs. 8,00,000/ 20% = Rs. 40,00,000.

(vii) B – The estimated market value of the by-product

(viii) B – 1 month.

Total annual sales = Rs. 80 lakhs

Total cash sales = 25% of 80 lakhs. = 20 lakhs.

Total credit sales = 75% of 80 lakhs = 60 lakhs

Average amount of debtors = 5 lakhs = 1 months average credit sales.

Therefore, average collection period is 1 month.

(ix) B – 5,000

Patient days in a year

= (25 beds × 120 days) + (20 beds × 80 days) + 400 beds

= 3,000 + 1,600 + 400

= 5,000 patient days

(x) B – 7.78%

$$\text{Average number of workers} = \frac{(400+500)}{2} = 450$$

$$\text{Labour turnover rate under separation method} = \frac{\text{No. of separations during the period}}{\text{Average number of workers during the period}} \times 100$$

$$= \frac{20+15}{450} \times 100$$

$$= 7.78\%$$

Answer 1. (d)

(i) Differential

(ii) Uniform costing

(iii) Ratio analysis

(iv) Adverse

(v) Direct expense

(vi) Profit

(vii) Variable cost

(viii) Set up, carrying

(ix) Budgetary, standard

(x) Mix variance, yield variance

Q. 2. Write short notes on :

(i) Cost Indifference Point

(ii) JIT

(iii) Productivity Audit

(iv) Value analysis

(v) Opportunity cost

Answer 2. (i)

Cost Indifference Point – A cost indifference point is the point at which total cost (Fixed cost and variable cost) of two alternatives under consideration is the same. A company may have two methods available for production and it may so happen that at lower levels of activity one method is suitable up to a particular point and beyond that another method is suitable. The question arises at what level of capacity choice shifts from one production method to another production method. This point is called cost indifference point and at this point total cost is identical for the two alternatives. Cost indifference point will occur at a point where :

Total cost of alternative A = Total cost of alternative B

Cost indifference points are useful in analyzing many types of alternative choice decisions such as choosing between alternative production methods, marketing plans or quality control programmes.

Answer 2. (ii)

JIT – Just in Time (JIT) philosophy was first developed in Japan. Toyota introduced it in 50's and later, other companies in Japan have adopted it.

The overriding feature of JIT is that materials or parts are generated in the exact quantity required and just at the time they are needed. A classic JIT system consists of a series of manufacturing units each delivering to one another in successive stages of production. The amount delivered by each unit to the next unit is exactly what is the needs for the next production period (usually one day). There are no safety margins in the form of buffer stocks, live storage or work-in progress. JIT is a sophisticated approach in eliminating wastage in the process of manufacturing in different stages, say, from the production design stage to the stage of delivery of finished product. JIT is sometimes regarded as an inventory control technique or a purchasing method. It aims at eliminating all activities which do not add 'value' to the product.

Schonberger defines JIT as being 'to produce and deliver finished goods just in time to be sold, sub-assemblies just in time to be assembled into finished goods, fabricated parts in time to go into sub-assemblies and purchased materials just in time to be transformed into fabricated parts'.

Answer 2. (iii)

The productivity audit examines performance as revealed by the productivity ratios. It considers, first of all, actual performance compared with company standards and trends and what other organizations achieve. It then explores the reasons for unsatisfactory performance with the help of checklists under the following headings :

- Poor planning, budgeting and control procedures
- Inefficient methods or systems of work
- Inadequate use of work measurement
- Insufficient mechanization or inadequate plant and machinery
- Poor management

- Poorly motivated employees
- Badly paid employees
- Too many restrictive practices
- Inadequate training
- Excessive waste

Answer 2. (iv)

Value Analysis : It is one of the important tools of modern management in the area of cost reduction. It is also known by other names such as value engineering, value control and product research. Value analysis is the process of systematic analysis and evaluation of various techniques and functions with a view to improve organisational performance. It aims at reducing and controlling the cost of a product from the point of view of its value by analysing the value currently received. It investigates into the economic attributes of value analysis, believes in a planned action to improve performance and thereby, generates higher value in a product and ultimately causes reduction in its cost.

The meaning of the term value may vary from person to person, time to time and place to place. However, in the context of cost reduction and control it refers to the 'use value'.

The reduction in the costs of a product and thus increasing the profitability of a concern is the main advantage of value analysis.

The benefits of value analysis are being derived in many industries, e.g., engineering, building construction and the oil industry. It is being applied to components of a product, finished product and also to be methods of packaging.

The various steps involved in value analysis are;

(i) Identification of the problem;

(ii) Collecting information about the function, design, material, labour, overhead costs, etc., of the product and finding out the availability of the competitive products in the market; and

(iii) Exploring and evaluating alternatives and developing them.

Answer 2. (v)

Opportunity cost is the value of a benefit sacrificed in favour of an alternative course of action. It is the maximum amount that could be obtained at any given point of time if a resource was sold or put to the most valuable alternative use that would be practicable. Opportunity cost of good or service is measured in terms of revenue which could have been earned by employing that good or service in some other alternative uses. Opportunity cost can be defined as the revenue foregone by not making the best alternative use.

Opportunity costs represent income foregone by rejecting alternatives. They are, therefore not incorporated into formal accounting systems because they do not incorporate cash receipts or outflows. Opportunity costs are, however, very relevant when examining alternative proposals or projects. When deciding whether or not to allocate capital to a project it is highly desirable to consider if the money could produce a better or worse return if invested elsewhere.

One foregoes the potential benefits of Alternative A if one applied one's resources to Alternative B, and these foregone benefits constitute the opportunity cost of Alternative B.

Basic Aspects of Cost Accounting :

Q. 3. (a) What principles should govern the determination and revision of piece-rates?

(b) A fire occurred in the factory premises on July 31, 2010. The accounting records have been destroyed. Certain accounting records were kept in another building. They reveal the following for the period June 1, 2010 to July 31, 2010.

	Rs.
Direct materials purchased	**2,50,000**
Work-in-process inventory, 1-6-2010	**40,000**
Direct materials inventory, 1-6-2010	**20,000**
Finished goods inventory, 1-6-2010	**37,750**
Indirect manufacturing costs	**40% of conversion cost**
Sales revenues	**7,50,000**
Direct manufacturing labour	**2,22,250**
Prime costs	**3,97,750**
Gross margin percentage based on revenues	**30%**
Cost of goods available for sale	**5,55,775**

The loss is fully covered by insurance company. The insurance company wants to know the historical cost of the inventories as a basis of negotiating a settlement, although the settlement is actually to be based on replacement cost, not historical cost.

Required :

(i) Finished goods inventory, 31-07-2010

(ii) Work-in-process inventory, 31-07-2010

(iii) Direct materials inventory, 31-07-2010

Answer 3. (a)

Important principles of piece rate determination and revision :

Important principles which should govern the determination and revision of piece rates are as follows:

(i) Different piece rates should be determined for different types of jobs.

(ii) The piece rates determination should give due consideration to factors such as requirement of jobs, conditions under which jobs would be performed, risk involved, efforts involved while working on the job, etc.

(iii) The wage rate should be such that it guarantees a minimum living wage to ensure a satisfactory standard of living.

(iv) It should reduce/stabilize labour turnover on its application.

(v) It should act as an incentive to motivate workers in giving a higher output.

(vi) The wage rate should be able to reduce absenteeism and late coming.

(vii) It should be acceptable to trade unions.

(viii) It should be flexible and capable of being adapted to changed circumstances.

(ix) Piece rates should be revised as and when they are revised by other firms in the industry or there is an increase in the cost of living index.

(x) It may be revised at the end of the contract period as settled between management and workers union.

Answer 3. (b)

Working note :

1. Direct material inventory cost (used during the month)
   = Prime cost – Direct manufacturing labour cost
   = Rs. 3,97,750 – Rs. 2,22,250
   = Rs. 1,75,500

2. Conversion and indirect manufacturing cost

Conversion cost	= (Direct manufacturing cost + Indirect manufacturing cost)
Indirect manufacturing cost	= 40% of conversion cost
Conversion cost	= Direct manufacturing cost +40% of conversion cost
0.60 conversion cost	= Direct manufacturing cost
Conversion cost	= Rs. 2,22,250/0.60 = Rs. 3,70,417/-
Indirect manufacturing cost	= 40% × Rs. 3,70,417 = Rs. 1,48,167/-

3. Cost of goods manufactured :

	Rs.
Cost of goods available for sale	5,55,775
Less : Finished goods 1-06-2010	37,750
Cost of goods manufactured	5,18,025

i. Finished goods inventory on 31-07-2010 :

		Rs.
Sales revenue		7,50,000
Less : Gross margin (30% of revenue)		2,25,000
Cost of goods sold	(a)	5,25,000
Cost of goods available for sale	(b)	5,55,775
Finished goods inventory on 31-07-2010	(b) – (a)	30,775

ii. Finished goods inventory on 31-07-2010 :

	Rs.
Prime cost	3,97,750
Add : Indirect manufacturing cost	1,48,167
Add : Opening work-in-progress on 01-06-2010	40,000
Manufacturing cost	5,85,917
Less : Cost of goods manufactured	5,18,025
Work-in-process inventory on 31-07-2010	67,892

iii. Direct material inventory on 31-07-2010 :

Direct materials inventory on 1-06-2010	20,000
Add : Direct materials purchased	2,50,000
	2,70,000
Less : Direct inventory used during the month	1,75,500
Direct material inventory on 31.07.2010	94,500

Q. 4. (a) A re-roller produced 400 metric tons of M.S. bars spending Rs. 36,00,000 towards materials and Rs. 6,20,000 towards rolling charges. Ten percent of the output was found to be defective, which had to be sold at 10% less than the price for good production. If the sales realization should give the firm an overall profit of 12.5% on cost, find the selling price per metric ton of both the categories of bars. The scrap arising during the rolling process fetched a realization of Rs. 60,000.

(b) Components for an assembly are produced under the control of the production manager. These are assembled and sold under the supervision of the sales manager. The production manager is entitled for a bonus payment for himself at 1/8th and the workers 7/8th of the difference between the notional value and cost of production of the delivered components. The notional value is assessed at Rs. 5,18,500 for the components issued to assembly. The sales manager is entitled to a bonus of 2-1/2% of the profits for himself and 12-1/2% is distributed among his sales staff. The sales during a period amount to Rs. 65,000.

From the under mentioned particulars, detail the calculations involved in arriving at the bonus for both managers and the staff. Find also the impact of such bonus as a percentage of sales.

	Rs.
Raw materials at the beginning of the period	**22,800**
Raw materials at the end of the period	**16,400**
Purchases during the period	**2,48,600**
Wages – Production	**46,200**
Wages – Assembly	**18,100**
Overheads – Production	**2,12,500**
Overheads – Sales	**45,200**
Credit for scrap realized pertaining to components	**8,700**
Work-in-progress of production at the beginning	**12,500**
Work-in-progress of production at the end	**18,200**
Completed assemblies at the beginning	**36,000**
Completed assemblies at the end	**24,030**
Net realization on assemblies sold	**6,50,000**

Answer 4. (a)

Computation of Selling Price :	**Rs.**	**Rs.**
Cost of Materials	36,00,000	
Less: Scrap	60,000	35,40,000
Rolling charges		6,20,000
Total cost		41,60,000
Add Profit (12.5% on cost)		5,20,000
Sales value		46,80,000

Output (effective) = 360 MT + $\frac{9}{10}$ × 40 MT	=	396 MT
Selling price per MT of good output	=	Rs. 46,80,000/396
	=	Rs. 11,818.18
Selling price of defective per MT	=	0.9 × Rs. 11,818.18
	=	Rs. 10,636.36

Answer 4. (b)

Cost of Production of the Components :		**Rs.**
Work-in-progress (opening)		12,500
Raw materials consumed (Opening stock + Purchases – Closing stock)		2,55,000
Wages – Production		46,200
Overhead – Production		2,12,500
Total		5,26,200
Less : Credit for scrap realized		8,700
		5,17,500
Less : Work-in-progress (closing)		18,200
Cost of production excluding bonus	(a)	4,99,300
Notional value		5,18,500
Difference between notional value and cost of production		19,200
Bonus to Production Manager (19,200 × 1/8)		2,400
Bonus to workers (19,200 × 7/8)		16,800
Total bonus	(b)	19,200
Cost of the components delivered	(a + b)	5,18,500

Cost of sales of the Components :		**Rs.**
Cost of the components delivered		5,18,500
Wages – Assembly		18,100
Overheads – Sales		45,200
Completed assembly (opening)		36,000
Total		6,17,800
Less : Completed assembly (closing)		24,030
Cost of sales excluding bonus	(a)	5,93,770
Selling price		6,50,000
Profit (before bonus)		56,230
Bonus to sales manager (56,230 × 2.5/100)		1,406
Bonus to sales staff (56,230 × 12.5/100)		7,029
Total bonus (sales)	(b)	8,435
Cost of sales including bonus	(a + b)	6,02,205
Profit (net)		47,795
Selling price		6,50,000

Impact of Bonus on Sales :

Bonus – Production	19,200
Bonus – Sales	8,435
Total bonus	27,635
Bonus as a % of sales (27,635/6,50,000) × 100	4.25%

Q. 5. (a) The following are information available as per records of ABC & Co., a workshop where work is done by means of five machines of exactly similar types.

Original cost of each machine	**Rs. 1,00,000**
Installation charges on each machine	**Rs. 10,000**
Estimated scrap on each machine	**Rs. 15,000**
Estimated working life for each machine	**10 years**
Estimated working weeks for the shop per annum	**50 weeks**
Estimated working hours for each machine per week	**44**
Maintenance hours per machine	**200**
Setting up time	**5%**
Insurance premium on machine	**1% on original cost**
Power consumption per machine	**20 units per hour**
Rate of power per 100 units	**Rs. 570**
Estimated repairs and maintenance for the shop	**Rs. 11,400 p.a.**
Overhead chargeable to machines	**Rs. 16,260 per half year**
Rent and rates for the shop	**Rs. 3,600 per quarter**
General lighting for the shop	**Rs. 1,800 p.m.**
No. of shop supervisors	**2**
Salary of each supervisor	**Rs. 300 p.m.**
No. of attendants	**2**
Wages etc. of each attendant	**Rs. 240 per week**
Wages etc. of mechanics	**Rs. 190 per month**
Lubricants, cottonwaste, chemicals etc.	**Rs. 120 per week**

Required : Compute the machine hour rate in each of the following alternative cases :

I. If the setting up time is productive and power is used during the setting up.

II. If the setting up time is unproductive and no power is used during the setting up.

(b) List five types of inefficiency in the use of materials that may be discovered as the result of investigating material quantity variances.

Answer 5. (a)

Case I – Statement showing the Computation of Machine Hour Rate

Particulars	Per shop Rs.	Per machine Rs.	Per hour Rs.
A. Standing charges :			
(a) Overheads	32,520	6,504	
(b) Rent etc.	14,400	2,880	
(c) G. Lighting	21,600	4,320	
(d) Salary of supervisor	7,200	1,440	
(e) Wages etc. of attendents	24,000	4,800	
(f) Wages etc. of mechanic	2,280	456	
(g) Lubricants etc.	6,000	1,200	
(h) Insurance premium	5,000	1,000	
Total Standing Charges	1,13,000	22,600	
Standing charges per hour [Rs. 22,600/2,000]			11.30
B. Machine expenses :			
(a) Depreciation $\frac{\text{Rs. } 1,00,000 + \text{Rs. } 10,000 - \text{Rs. } 15,000}{10 \times 2,000}$			4.75
(b) Power $\frac{20 \text{ units} \times \text{Rs. } 5.70 \times 2,000}{2000}$			114.00
(c) Repairs and maintenance [(Rs. 11,400/5)/2,000)]			1.14
C. Machine hour rate			131.19

Case II – Statement showing the computation of Machine Hour Rate

Particulars	Per shop Rs.	Per machine Rs.	Per hour Rs.
A. Standing charges :			
(a) Overheads	32,520	6,504	
(b) Rent etc.	14,400	2,880	
(c) G. Lighting	21,600	4,320	
(d) Salary of supervisor	7,200	1,440	
(e) Wages etc. of attendents	24,000	4,800	
(f) Wages etc. of mechanic	2,280	456	
(g) Lubricants etc.	6,000	1,200	
(h) Insurance premium	5,000	1,000	
Total Standing Charges	1,13,000	22,600	
Standing charges per hour [Rs. 22,600/1,900]			11.89

B.	Machine expenses :			
(a)	Depreciation $\frac{\text{Rs. } 1,00,000 + \text{Rs. } 10,000 - \text{Rs. } 15,000}{10 \times 1900}$			5.00
(b)	Power $\frac{20 \text{ units} \times \text{Rs. } 5.70 \times 1900}{1900}$			114.00
(c)	Repairs and maintenance [(Rs. 11,400/5)/1900)]			1.20
C.	Machine hour rate			132.09

Working note : Calculation of effective productive machine hours

A.	No. of working weeks p.a.	50
B.	No. of working hours per week	44
C.	Total no. of working hours (A × B)	2200
D.	*Less* : maintenance hours	200
E.	Productive machine hours (if set up time is a productive)	2000
F.	*Less* : unproductive set up time @ 5%	100
G.	Productive machine hours (E – F)	1900

Answer 5. (b)

The five types of inefficiency in the use of materials that may be discovered as a result of investigating materials quantity variances are as follows:

1. Purchase of inferior quality of materials.
2. Inefficient labour force leading to excessive utilisation of materials.
3. Defective machines, tools and equipments and bad or improper maintenance leading to breakdowns resulting in excessive usage of materials.
4. Inaccurate technical specifications and slackness in inspection may cause more rejections, resulting in greater requirement of materials for rectification of defects.
5. Faulty material processing.

Q. 6. (a) Explain what is meant by Cost Apportionment and Cost Absorption. Illustrate each with two examples.

(b) Both direct and indirect labour of a department in a factory are entitled to production bonus in accordance with a Group Incentive Scheme, the outlines of which are as follows :

(i) For any production in excess of the standard rate fixed at 10,000 tonnes per month (of 25 days) a general incentive of Rs. 10 per tone is paid in aggregate. The total amount payable to each separate group is determined on the basis of an assumed percentage of such excess production being contributed by it, namely @ 70% by direct labour, @ 10% by inspection staff, @ 12% by maintenance staff and @ 8% by supervisory staff.

(ii) Moreover, if the excess production is more than 20% above the standard, direct labour also get a special bonus @ 5per tone for all production in excess of 120% of standard.

(iii) Inspection staff are penalized @ Rs. 20 per tonne for rejection by customer in excess of 10% of production.

(iv) Maintenance staff are also penalized @ Rs. 20 per hour of breakdown.

(v) From the following particulars for a month work out the production bonus earned by each group :

I. Actual working days : 20

II. Production : 11,000 tonnes

III. Rejection by customer : 200 tonnes

IV. Machine breakdown : 40 hours

Answer 6. (a)

Cost apportionment is the process of charging expenses in an equitable proportion to the various cost centres or departments. This describes the allotment of proportions of overhead to cost centres or departments. It is carried out in respect of those items of cost which cannot be allocated to any specific cost centre or department. For example, the salary of general manager cannot be allocated wholly to the production department, as he attends in general to all the departments. Therefore, some logical basis is selected and adopted for the apportionment of such type of expenses over various departments. Likewise, factory rent can be apportioned over the production and service departments on the basis of the area occupied by each department.

Cost absorption, is the process of absorbing all overhead costs allocated to or apportioned over particular cost centre or production department by the units produced; for example ,the manufacturing cost of lathe centre is absorbed by a rate per lathe hour. Manufacturing costs of groundnut crushing centre can be absorbed by using a Kg. of groundnut oil produced as the basis. The purpose behind the absorption is that expenses should be absorbed in the cost of the output of the given period. For overhead absorption some suitable basis has to be adopted.

Answer 6. (b)

No. of working days during the month : 20

Standard production for 20 days @ 10,000 tonnes per month of 25 days

= (10,000 × 20) ÷ 25 = 8,000 tonnes

Actual production during month = 11,000 tonnes

Excess production during month = 11,000 – 8,000 = 3,000 tonnes

Excess production above 20% of standard = 3,000 – 20% of 8,000 = 3,000 – 1,600 = 1,400 tonnes

Statement showing Bonus earned by each category of staff

Category	General incentive			Special incentive		Penalty amount	Bonus earned
	%	Tonnes	Amount Rs.	Tonnes	Rs.	Rs.	Rs.
Direct labour	70	2,100	21,000	1,400	7,000	-	28,000
Inspection staff	10	300	3,000	-	-	1,800*	1,200
Maintenance staff	12	360	3,600	-	-	800**	2,800
Supervisory staff	8	240	2,400	-	-	-	2,400
Total	100	3,000	30,000	1,400	7,000	2,600	34,400

* Penalty for rejection : 90 tonnes (i.e. 200 tonnes – 110 tonnes) @ Rs. 20 per tone

** Penalty for machine breakdown for 40 hours @ Rs. 20 per hour.

Cost Accounting Methods and Systems :

Q. 7. (a) A product passes through three processes A, B and C, 10,000 units at a cost of Re. 1 were issued to process A. The other direct expenses were :

	Process A Rs.	Process B Rs.	Process C Rs.
Sundry materials	**1,000**	**1,500**	**1,480**
Direct labour	**5,000**	**8,000**	**6,500**
Direct expenses	**1,050**	**1,188**	**1,605**

The wastage of Process A was 5% and Process B was 4%. The wastage of Process A was sold at Re. 0.25 per unit and that of B at Re. 0.50 per unit and that of C at Re. 1.00 per unit. The overhead charges were 168% of direct labour. The final product was sold at Rs. 10.00 per unit, fetching a profit of 20% on sales.

Required : Find the percentage of wastage in Process C.

(b) Why is it necessary to reconcile the Profits between the Cost Accounts and Financial Accounts?

Answer 7. (a)

Process A Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Units introduced	10,000	10,000	By Normal wastage a/c	500	125
To Sundry materials		1,000	By Process B a/c. (t/f)	9,500	25,325
To Direct labour		5,000			
To Direct expenses		1,050			
To Overheads		8,400			
	10,000	25,450		10,000	25,450

Process B Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Process A a/c. (t/f)	9,500	25,325	By Normal wastage a/c.	380	190
To Sundry materials		1,500	By Process C a/c. (t/f)	9,120	49,263
To Direct labour		8,000			
To Direct expenses		1,188			
To Overheads		13,440			
	9,500	49,453		9,500	49,453

Process C Account

Particulars	Units	Rs.	Particulars	Units	Rs.
To Process B a/c. (t/f)	9,120	49,263	By Normal wastage a/c.	456	456
To Sundry materials		1,480	(see working note)		
To Direct labour		6,500	By Sale	8,664	86,640
To Direct expenses		1,605			
To Overhead		10,920			
To Profit		17,328			
	9,120	87,096		9,120	87,096

Working note : Computation of percentage of wastage in Process C

Suppose number of waste units is x

Sales value of waste units = x * Re. 1 = Rs. X

Total cost = Rs. 69,768 – X

Total cost = Cost per unit x No. of units produced

= Rs. 8 (i.e. Rs. 10 – Rs. 2) x (9,120 – X)

= 8 × (9,120 – X)

= 72,960 – 8X

Thus, 69,768 – X = 72,960 – 8X

Or, 8x – X = 72,960 – 69,768

7X = 3,192

X = 456

$$\text{Percentage of wastage} = \frac{100 \times 456}{9,120} = 5\%$$

Answer 7. (b)

When the cost and financial accounts are kept separately, It is imperative that these should be reconciled, otherwise the cost accounts would not be reliable. The reconciliation of two set of accounts can be made, if both the sets contain sufficient detail as would enable the causes of differences to be located. It is, therefore, important that in the financial accounts, the expenses should be analysed in the same way as in cost accounts. It is important to know the causes which generally give rise to differences in the costs & financial accounts. These are :

(i) Items included in financial accounts but not in cost accounts

- Income-tax
- Transfer to reserve
- Dividends paid
- Goodwill / preliminary expenses written off

Pure financial items

- Interest, dividends
- Losses on sale of investments

- Expenses of Co's share transfer office
- Damages & penalties

(ii) Items included in cost accounts but not in financial accounts

- Opportunity cost of capital
- Notional rent

(iii) Under / Over absorption of expenses in cost accounts

(iv) Different bases of inventory valuation

Motivation for reconciliation are:

- To ensure reliability of cost data
- To ensure ascertainment of correct product cost
- To ensure correct decision making by the management based on Cost & Financial data
- To report fruitful financial / cost data.

Q. 8. (a) In order to develop tourism, ABCL airline has been given permit to operate three flights in a week between X and Y cities (both side). The airline operates a single aircraft of 160 seats capacity. The normal occupancy is estimated at 60% through out the year of 52 weeks. The one-way fare is Rs. 7,200. The cost of operation of flights are :

Fuel cost (variable)	**Rs. 96,000 per flight**
Food served on board on non-chargeable basis	**Rs. 125 per passenger**
Commission	**5% of fare applicable for all booking**
Fixed cost:	
Aircraft lease	**Rs. 3,50,000 per flight**
Landing Charges	**Rs. 72,000 per flight**

Required:

(i) Calculate the net operating income per flight.

(ii) The airline expects that its occupancy will increase to 108 passengers per flight if the fare is reduced to Rs. 6,720. Advise whether this proposal should be implemented or not.

(b) Mr. Harry is a Travelling Inspector for the Environment Protection Agency. He uses his own car and the agency reimburses him at Rs. 1.80 per km. Mr. Harry claims he needs Rs. 2.20 per km. just to break-even. A scrutiny of his expenses by the agency reveals the following :

Oil change every 4,800 km.	**Rs. 120**
Maintenance (other than oil) every 9,600 kms.	**1,800**
Yearly insurance (comprehensive with accident benefits)	**4,000**
Cost of car, with an average residual value of Rs. 60,000 and with a useful life of 3 yrs.	**1,08,000**

Petrol is Rs. 5 a ltr. and Harry gets 8 kms per ltr. in his car. When Harry is on the road, he averages 192 kms a day. He works 5-days a week, has 10 days vacation in a year besides 6 holidays and spends 15 working days a month, in the office.

You are required to determine :

i. An equitable rate of reimbursement on the basis of the schedule he presently follows and

ii. The number of kms. A year he would have to travel, to break-even at the current rate of reimbursement.

Answer 8. (a)

No. of passengers 160×60/100 = 96	**Rs.**	**Rs.**
Fare collection 96×7,200		6,91,200
Variable costs:		
Fuel		96,000
Food 96×125		12,000
Commission 5%		34,560
Total variable Costs		1,42,560
Contribution per flight		5,48,640
Fixed costs: Lease	3,50,000	
Landing charges	72,000	4,22,000
Net income per flight		1,26,640
Fare collection 108×6,720		7,25,760
Variable costs:		
Fuel		96,000
Food 108×125		13,500
Commission @ 5%		36,288
Contribution		5,79,972

There is an increase in contribution by Rs. 31,332. Hence the proposal is acceptable

Answer 8. (b)

(i) **Total kilometers covered by Mr. Harry in one year**

Total number of days in one year		365
Less : Vacation	10	
Holidays	6	
Week-ends (52 weeks x 2)	104	
Days spent in office (12 months × 15 days)	180	300
Actual days of travelling in a year		65

Average km in one day = 192

Total kms in 65 days = 192 × 65

Total distance covered = 12,480 kms.

Cost incurred for travelling 12,480 kms.	**Rs.**	
Oil change (120 ÷ 4,800) x 12,480	312	
Maintenance (1,800 ÷ 9,600) x 12,480	2,340	
Yearly insurance	4,000	
Depreciation (1,08,000 – 60,000)/3	16,000	
Cost of petrol (12,480 ÷ 8) × Rs. 5	7,800	
Total cost to break-even	30,452	
Cost per km to break even (30,452 ÷ 12,480)		2.44 per km.

(ii) **Number of kms. Required to be travelled in a year to break-even at Rs. 1.80 per km.**

Fixed cost :	**Rs.**
Yearly insurance	4,000
Depreciation	16,000
Total fixed cost	20,000
Variable cost for covering 9,600 kms.	
Maintenance	1,800
Oil change (120 ÷ 4,800) x 9,600	240
Cost of petrol (9,600 ÷ 8) x Rs. 5	6,000
	8,040

Variable cost per km. = 8,040 ÷ 9,600 = 0.8375

Contribution per km. = Rs. 1.80 – 0.8375 = Re. 0.9625

$$\text{No. of kms. required to break-even} = \frac{\text{Rs. } 20{,}000}{\text{Rs. } 0.9625} = 20{,}779 \text{ km}$$

In order to get contribution of Rs. 20,000, Harry has to travel 20,779 kms.

Q. 9. (a) ABC Co. undertook a contract for construction of a bus stand for a sum of Rs. 1,00,000. The work was started on 1st April, 2009 and the following expenses were incurred :

	Rs.
Plant	**5,000**
Stores	**18,000**
Wages	**16,250**
Sundry expenses	**1,325**
Establishment charges	**2,925**

Materials costing Rs. 3,000 were found to be unsuitable for the contract and were sold for Rs. 3,625. A portion of the plant was scrapped and disposed off for Rs. 575. The value of plant on 31st March, 2010 was Rs. 1,550 and of stores Rs. 850. Cash received on account was Rs. 35,000 respecting 80% of the work certified. The work certified was valued at Rs. 5,475 and this was certified later for Rs. 6,250.

ABC Co. decided to estimate the further expenditure on completion of the contract and to take to the Profit and Loss A/c. for 2009-2010, that portion of the total estimated profit which the work certified bore to the total contract price.

The following estimations were made :

(i) The contract would take further nine months to complete.

(ii) Wages likely to be incurred were Rs. 17,875.

(iii) The cost of store, etc. required in addition to those in stock on 31st Match, 2010 would be Rs. 17,150 and the further sundry expenses of Rs. 1,500 would be incurred.

(iv) Additional plant required would be Rs. 6,250 and the plant would have a residual value of Rs. 750 on completion of the contract.

(v) The establishment charges would cost the same sum per month as in the previous year.

(vi) 2.5% of the total cost of the contract should be kept as reserve for contingencies.

Prepare Contract, Stores and Plant Accounts for the year ended 31st March, 2010 and also show your calculation of the amount credited to Profit and Loss Account for the year.

(b) Discuss briefly the principles to be followed while taking credit for profit on incomplete contracts.

Answer 9. (a)

Contract Account

For the year ended 31st March 2010

Dr. *Cr.*

Particulars	Rs.	Particulars		Rs.
To Stores issued	14,150	By Work-in-progress :		
To Depreciation on plant	2,875	Work certified	43,750	
To Wages	16,250	Work uncertified	5,475	49,225
To Sundry expenses	1,325			
To Establishment charges	2,925			
To Profit and Loss A/c. [See WN (ii)]	5,993			
To Work-in-progress (Reserve)	5,707			
	49,225			49,225

Stores Account

Dr. *Cr.*

Particulars	Rs.	Particulars	Rs.
To Purchases A/c.	18,000	By Bank A/c (Sale of stores)	3,625
To P & L A/c. (Profit on sale)	625	By Contract A/c. (Stores issued/ bal fig.)	14,150
		By Balance c/d	850
	18,625		18,625

Plant Account

Dr. *Cr.*

Particulars	Rs.	Particulars	Rs.
To Bank A/c.	5,000	By Bank A/c (Sale of plant)	575
		By Contract A/c. (bal fig.)	2,875
		By Balance c/d	1,550
	5,000		5,000

Estimated Contract Account

Dr. *Cr.*

Particulars	Rs.	Particulars	Rs.
To Stores (14,150+17,150+850)	32,150.00	By Contractee's A/c	1,00,000.00
To Wages (16,250+17,875)	34,125.00		
To Sundry expenses (1,325+1,500)	2,825.00		
To Depreciation on plant {2,875 + 7,050 (i.e. 1,550 + 6,250 – 750)}	9,925.00		
To Establishment charges (2,925 + 2,193.75)	5,118.75		
To Reserve for contingencies [Refer to WN (i)]	2,157.53		
To Profit	13,698.72		
	1,00,000.00		1,00,000.00

Working notes :

i. Reserve for contingencies $= 84{,}143.75 \times \frac{2.5}{100 - 2.5}$ = Rs. 2,157.53

ii. Profit taken to P&L A/c. $= \text{Total estimated profit} \times \frac{\text{Work Certified}}{\text{Total Contract Price}}$

$= \frac{13{,}698.72}{1{,}00{,}000} \times 43{,}750$ = Rs. 5,993

Answer 9. (b)

Under Contract Accounting it may be noticed that certain contracts are completed, while others are still in progress at the end of a financial year. These incomplete contracts may require a few more years for their completion. The figures of profit made (the excess of credit over the debit items in a contract) on completed contracts can be safely taken to the credit of Profit and Loss Account, but this practice is not being followed in the case of incomplete contracts.

In the case of incomplete contracts the entire profit is not being credited to Profit and Loss Account because some provision is to be made for meeting contingencies and unforeseen losses. There are no hard and fast rules regarding the calculation of figure of profit to be taken to the credit of profit and loss account. However, the following principles may be followed :–

(i) Profit should be considered in respect of work certified and uncertified work should be valued at cost.

(ii) If the amount of work certified is less than 1/4th of the contract price, no profit should be taken to Profit and Loss Account. The entire amount in such contracts should be kept as reserve for meeting out contingencies.

(iii) If the amount of work certified is 1/4th or more but less than 1/2 of the contract price, then 1/3rd of the profit disclosed as reduced by the percentage of cash received from the contractee should be taken to the Profit and Loss Account. The balance should be allowed to remain as a reserve.

(iv) If the amount of work certified is $\frac{1}{2}$ or more of the contract price, then 2/3rd of the profit disclosed as reduced by the percentage of cash received from the contractee, should be taken to the Profit and Loss Account. The balance should be treated as reserve.

(v) If the contract is near completion, the total cost of completing the contract may be estimated if possible. By deducting the total estimated cost from the contract price, the estimated total profit of the contract should be calculated. The proportion of total estimated profit on cash basis, which the work certified bears to the total contract price should be credited to profit and loss account.

(vi) The entire loss, if any, should be transferred to the Profit and Loss Account.

Q. 10. The following figures have been extracted from the Financial Accounts of a Manufacturing Firm for the first year of its operation :

	Rs.
Direct material consumption	**50,00,000**
Direct wages	**30,00,000**
Factory overheads	**16,00,000**
Administrative overheads	**7,00,000**
Selling and distribution overheads	**9,60,000**
Bad debts	**80,000**
Preliminary expenses written off	**40,000**
Legal charges	**10,000**
Dividends received	**1,00,000**
Interest received on deposits	**20,000**
Sales (1,20,000 units)	**120,00,000**
Closing stocks :	
Finished goods (4,000 units)	**3,20,000**
Work-in-progress	**2,40,000**

The cost accounts for the same period reveal that the direct material consumption was Rs. 56,00,000. Factory overheads are recovered at 20% on Prime Cost. Administration overheads are recovered at Rs. 6 per unit produced. Selling and distribution overheads are recovered at Rs. 8 per unit sold.

Required : Prepare the Profit and Loss Statement both as per financial records and as per cost records. Reconcile the profits as per the two records.

Answer 10.

Profit and Loss Account (As per Financial Records)

Dr. *Cr.*

Particulars	Rs.	Particulars	Rs.
To Direct material	50,00,000	By Sales (1,20,000 units)	1,20,00,000
To Direct wages	30,00,000	By Closing stocks :	
To Factory overheads	16,00,000	WIP	2,40,000
To Gross profit c/d	29,60,000	Finished goods (4,000 units)	3,20,000
	1,25,60,000		1,25,60,000
To Administration overheads	7,00,000	By Gross profit b/d	29,60,000
To Selling and distribution overheads	9,60,000	By Dividend received	1,00,000
To Bad debts	80,000	By Interest received	20,000
To Preliminary expenses written off	40,000		
To Legal charges	10,000		
To Net profit	12,90,000		
	30,80,000		30,80,000

Statement of Cost and Profit (As per Cost Records)

Particulars	Rs.
A. Direct material	56,00,000
B. Direct wages	30,00,000
C. Prime Cost (A + B)	86,00,000
D. Factory overheads	17,20,000
E. Gross works cost (C + D)	1,03,20,000
F. *Less* : Closing stock (WIP)	2,40,000
G. Works cost of (1,24,000 units)	1,00,80,000
H. Administration overheads @ Rs. 6 on 1,24,000 units	7,44,000
I. Cost of goods produced (1,24,000 units) (G + H)	1,08,24,000
J. *Less* : Finished goods (4,000 units @ Rs. 87.29)	3,49,160
K. Cost of goods sold (1,24,000 units) (I – J)	1,04,74,840
L. Selling and distribution overheads @ Rs. 8 on 1,20,000 units	9,60,000
M. Cost of sales (K + L)	1,14,34,840
N. Net profit (balancing figure)	5,65,160
O. Sales revenue	1,20,00,000

Reconciliation Statement

Particulars	Rs.	Rs.
A. Profit as per Cost records		5,65,160
B. *Add* : Excess of material consumption	6,00,000	
Over recovery of Factory overhead	1,20,000	
Over recovery of Administration overhead	44,000	
Dividend received excluded from cost accounts	1,00,000	
Interest received excluded from cost accounts	20,000	8,84,000
C. *Less* : Bad debts excluded from cost accounts	80,000	
Preliminary expenses written off excluded from cost a/cs.	40,000	
Legal charges excluded from cost accounts	10,000	
Over recovery of closing stock in cost account (Rs. 3,49,160 – Rs. 3,20,000)	29,160	1,59,160
D. Profit as per Financial records (A + B – C)		12,90,000

Q. 11. (a) The following figures have been extracted from the cost records of a manufacturing company :

Stores :	**Rs.**
Opening Balance	**63,000**
Purchases	**3,36,000**
Transfer from Work-in-progress	**1,68,000**
Issues to Work-in-progress	**3,36,000**
Issues to Repairs and Maintenance	**42,000**
Deficiencies found in Stock taking	**12,600**
Work-in-progress:	
Opening Balance	**1,26,000**
Direct Wages applied	**1,26,000**
Overhead Applied	**5,04,000**
Closing Balance	**84,000**

Finished Products:

Entire output is sold at a Profit of 10% on actual cost of work-in-progress.

Others: Wages incurred Rs. 1,47,000; Overhead incurred Rs. 5,25,000.

Income from investment Rs. 21,000; Loss on sale of Fixed Assets Rs. 42,000.

Draw the stores control account, work-in-progress control account, costing profit and loss account, profit and loss account and reconciliation statement.

(b) Discuss briefly how the following items are to be treated in costs :

(i) Carriage inwards on raw materials

(ii) Storage losses

(iii) Insurance costs on stocks of raw materials

Answer 11. (a)

Stores Ledger Control Account

Particulars	Rs.	Particulars	Rs.
To Balance c/d	63,000	By Work-in-progress	3,36,000
To General Ledger Adjustment A/c	3,36,000	By Overhead A/c	42,000
To Work-in-progress A/c	1,68,000	By Overhead A/c (Deficiency Assumed as Normal)	12,600
		By Balance c/d	1,76,400
	5,67,000		5,67,000

Work-in-progress Control Account

Particulars	Rs.	Particulars	Rs.
To Balance b/d	1,26,000	By Stores Ledger Control A/c	1,68,000
To Stores Ledger Control A/c	3,36,000	By Costing Profits & Loss A/c	
To Work-in-progress A/c	1,26,000	(Finished goods at cost	
To Overhead A/c	5,04,000	Balancing figure)	8,40,000
(applied)		By Balance c/d	84,000
	10,92,000		10,92,000

Costing Profit and Loss Account

Particulars	Rs.	Particulars	Rs.
To Work-in-Progress A/c	8,40,000	By General Ledger	9,24,000
To General Ledger Adjustment A/c (Profit)	84,000	Adjustment A/c Sales (8,40,000 + 84,000)	
	9,24,000		9,24,000

Financial Profit and Loss Account

Particulars		Rs.	Particulars		Rs.
To Opening Stock			By Sales		9,24,000
Stores	63,000		By Income from investment		21,000
WIP	1,26,000	1,89,000	By Closing Stock		
To Purchases		3,36,000	Stores	1,76,400	
To Wages		1,47,000	WIP	84,000	2,60,400
To Overhead		5,25,000	By Loss		33,600
To Loss on sale of fixed assets		42,000			
		12,39,000			12,39,000

Reconciliation Statement

		Rs.
Profit as per Cost Account		84,000
Add: Income from investment		21,000
		1,05,000
Less: Under absorption of overhead	96,600	
Loss on sale of fixed assets	42,000	1,38,600
Loss as per financial account		33,600

Note: Deficiency in stock taking may be treated as abnormal loss and it can be transferred from stores ledger Control Account to Costing Profit and Loss Account. Then consequential changes in accounting entries in overheads Control Account has to be done.

Working Notes:

Overheads Control Account

Particulars	Rs.	Particulars	Rs.
To Stores Ledger Control A/c	42,000	By Work-in-Progress	5,04,000
To Stores Ledger Control A/c	12,600	By Balanced c/d	96,600
To Wages Control A/c Indirect Wages (1,47,000 – 1,26,000)	21,000		
To General Ledger Adjustment A/c	5,25,000		
	6,00,600		6,00,600

Answer 11. (b)

(i) Carriage inwards on raw materials : It represents the expenditure incurred in bringing raw materials to factory from outside. This expense is directly allocated to materials and thus forms a part of the cost of such materials. When this is not practicable and allocation to specific items of materials is difficult, the expense is treated as manufacturing overhead and is charged to cost of production at a predetermined rate. In some of the undertakings the practice is to charge these expenses as a percentage of cost, weight or some other physical unit of material.

(ii) Storage losses : The losses arising out of storage of material can be classified into two categories. The treatment of losses under each category in Cost Accounts is as under:-

(a) Losses due to reasons like evaporation, shrinkage, absorption and moisture, etc. are considered as normal losses. Such losses are absorbed by good production units by inflating the cost of material issued for production.

(b) Losses due to fire, flood, storm, theft etc. are treated as abnormal losses. If these losses are heavy and are not recoverable from the insurance authorities, it is preferred to charge them to Costing Profit and Loss Account.

(iii) Insurance costs on stocks of raw materials : The amount paid as insurance costs (insurance premium) on stocks of raw materials is meant for covering the risk which may arise due to fire, theft, riot etc. The insurance cost is apportioned over different materials on the basis of their value. This cost may be charged directly to the cost of material.

Q. 12. The following figures are extracted from the Trial Balance of Gogetter Co. on 30th September, 2010:

	Rs.	Rs.
Inventories :		
Finished Stock	80,000	
Raw Materials	1,40,000	
Work-in-Process	2,00,000	
Office Appliances	17,400	
Plant & Machinery	4,60,500	
Buildings	2,00,000	
Sales		7,68,000
Sales Return and Rebates	14,000	
Materials Purchased	3,20,000	
Freight incurred on Materials	16,000	
Purchase Returns		4,800
Direct Labour	1,60,000	
Indirect Labour	18,000	
Factory Supervision	10,000	
Repairs and Upkeep of Factory	14,000	
Heat, Light and Power	65,000	
Rates and Taxes	6,300	
Miscellaneous factory expenses	18,700	
Sales commission	33,600	
Sales Travelling	11,000	
Sales Promotion	22,500	
Distribution Deptt—Salaries and Expenses	18,000	
Office Salaries and Expenses	8,600	
Interest on Borrowed Funds	2,000	

Further details are available as follows:

(i)	Closing Inventories :	
	Finished Goods	1,15,000
	Raw Materials	1,80,000
	Work-in-Process	1,92,000
(ii)	Accrued expenses on	
	Direct Labour	8,000
	Indirect Labour	1,200
	Interest on Borrowed Funds	2,000
(iii)	Depreciation to be provided on:	
	Office Appliances	5%
	Plant and Machinery	10%
	Buildings	4%

(iv) Distribution of the following costs:

Hear, Light and Power to Factory, Office and Distribution in the ratio 8:1:1.

Rates and Taxes two-thirds to Factory and one-third to Office.

Depreciation on Buildings to Factory, Office and Selling in the ratio 8:1:1.

With the help of the above information, you are required to prepare a condensed profit and loss statement of Gogetter Co. for the year ended 30th September, 2010 along with supporting schedules of:

(i) Costs of Sales.

(ii) Selling and Distribution Expenses,

(iii) Administration Expenses.

Answer 12.

Profit and Loss Statement of Gogetter Company for the year ended 30th September, 2010

	Rs.	Rs.
Gross Sales	7,68,000	
Less : Returns	14,000	7,54,000
Less: Cost of Sales		7,14,020
Refer to Schedule (i)		
Net Operating Profit:		39,980
Less: Interest on Borrowed Funds,		4,000
Net Profit.		35,980

(i) Schedule of Cost of Sales

	Rs.	Rs.
Raw Material		1,40,000
(Inventory op. Balance)		
Add: Material Purchased	3,20,000	
Freight on Material	16,000	
Less: Purchase Returns	4,800	3,31,200
Less: Closing Raw Material		
Inventories		1,80,000
Material used in production		2,91,200
Direct Labour		1,68,000
Factory Overheads :		
Indirect Labour	19,200	
Factory Supervision	10,000	
Repairs and Factory Upkeep	14,000	
Heat, Light and Power	52,000	
Rates and Taxes	4,200	

	Miscellaneous Factory Expenses	18,700	
	Depreciation of Plant	46,050	
	Depreciation of Buildings	6,400	1,70,550
	Gross Works Cost		6,29,750
Add:	Opening work-in-process Inventory		2,00,000
			8,29,750
Less:	Closing work-in-process Inventory		1,92,000
	Works Cost		6,37,750
Add:	Administration Expenses [See Schedule (iii)]		18,870
	Total Cost of output		6,56,620
Add:	Opening Finished Goods Inventory		80,000
			7,36,620
Less:	Closing finished goods inventory		1,15,000
	Cost of production of goods sold		6,21,620
Add:	Selling and Distribution Expenses [See Schedule (ii)]		92,400
	Cost of Sales		7,14,020

(ii) Schedule of Selling and Distribution Expenses

	Rs.
Sales Commission	33,600
Sales Travelling	11,000
Sales Promotion	22,500
Distribution Deptt.- Salaries and Expenses	18,000
Heat, Light and Power	6,500
Depreciation of Buildings	800
	92,400

(iii) Schedule of Administration Expenses

	Rs.
Office Salaries and Expenses	8,600
Depreciation of Office Appliances	870
Depreciation of Buildings	800
Heat, Light and power	6,500
Rates and Taxes	2,100
	18,870

Q. 13. M & Co. maintains its accounts on a non-integrated basis. Both the Financial Accountant and the Cost Accountant have completed their accounts for the year ended 30th June and a memorandum account reconciling the two profit figures has been prepared.

During the year, Production Overhead has been absorbed in the Cost Accounts at 250% of Direct Wages. It is observed that the Cost Accountant has "shredded" his working papers and data is not available.

You are required to prepare a detailed statement showing how the profit as shown in the Cost Accounts was arrived at. Any difference not explainable through the memorandum account should be taken as difference in the "Administrative Expenses" charged in the two sets of accounts.

The Financial Accountant has prepared the detailed Profit & Loss Account for the year ended 30th June.

Particulars		Rs.	Particulars	Rs.
To Raw Materials consumed —			By Trading Account – cost of	4,74,772
Opening Stock	51,296		goods manufactured c/d	
Add : Purchase	199,334			
Less : Closing Stock	(47,382)	2,03,248		
To Direct Wages		80,072		
To Production Overhead		1,90,680		
To Opening WIP	24,496			
Less : Closing WIP	(23,724)	772		
Total		4,74,772	Total	4,74,772
To Opening Stock fo Fin. Goods		63,890	By Sales	6,25,600
To Cost of Goods manufactured b/fd		4,74,772	By Closing Stock of Finished	65,702
To Gross Profit c/d		1,52,640	Goods	
Total		6,91,302	Total	6,91,302
To Debenture Interest		2,000	By Gross Profit b/d	1,52,640
To Discount Allowed		2,964	By Discount Received	1,790
To Distribution Expenses		16,926		
To Sales Expenses		30,562		
To Administrative Expenses		53,058		
To Net Profit c/d		48,920		
Total		1,54,430	Total	1,54,430

The Memorandum account reconciling the profit shown in Financial and Cost Accounts for the year is as follows —

Particulars	Rs.	Particulars	Rs.
Profit as per Cost Accounts	**1,00,300**	**Profits as per Financial Accounts**	**48,920**
Difference in Stock Valuation :		**Difference in Stock Valuation :**	
Opening Stock of Raw Materials	**320**	**Opening Stock of Work in Progress**	**350**
Closing Stock of Finished Goods	**682**	**Opening Stock of Finished Goods**	**652**
Discount Received	**1,790**	**Closing Stock of Raw Material**	**422**
		Closing Stock of Work in Progress	**296**
		Sales Expenses	**30,562**
		Distribution Expenses	**16,926**
		Debenture Interest	**2,000**
		Discount Allowed	**2,964**
Total	**1,03,092**	**Total**	**1,03,092**

Answer 13.

Cost Sheet is constructed as under

	Particulars	Computation / remarks	Rs.
	Opening Stock of Raw Material	(51296 + 320)	51,616
Add :	Purchases		1,99,334
			2,50,950
Less :	Closing Stock of Raw Material	(47382 + 422)	(47,804)
	Direct Materials Consumed		2,03,146
Add :	Direct Wages	(given)	80,072
	Prime Cost		2,83,218
Add :	Production Overheads	(80072 × 250%)	2,00,180
	Opening Stock of Work-in-Progress	(24496 – 350)	24,146
			5,07,544
Less :	Closing Stock of Work-in-Progress	(23724 + 296)	(24,020)
	Factory Cost		4,83,524
Add :	Administration Overhead	(balancing figure)	**43,558**
	Cost of Production		5,27,082
Add :	Opening Stock of Finished Goods	(63890 – 652)	63,238
			5,90,320
Less :	Closing Stock of Finished Goods	(65702 – 682)	(65,020)
	Cost of Goods Sold		5,25,300
Add :	Selling and Distribution Overheads	(entire SOH is reversed in Reconciliation A/c)	—
	Cost of Sales	(625600 – 100300)	5,25,300
Add :	Profit	(given)	1,00,300
	Sales	(given)	6,25,600

Note : Difference in AOH = 53,058 (as per Financial Books) – 43,558 (as per Cost Books) = **Rs. 9,500.**

Q. 14. The Cost Sheet of J. Enterprises for the year ended 31st March reads as under :

	Particulars		Rs.
	Opening Stock of Raw Materials	96,930	
Add :	Purchase	4,38,000	
Less :	Closing Stock of Raw Materials	(1,06,180)	4,28,750
	Direct Labour		1,36,000
	Direct Expenses		12,000
	Prime Cost		5,76,750
	Production Overheads (50% of Direct Labour)		68,000
Add :	Opening Work in Progress		25,100
Less :	Closing Work in Progress		(39,100)
	Work Cost		6,30,750
Add :	Administration Overheads (75% of Direct Labour)		1,02,000
	Cost of Production		7,32,750
Add :	Opening Stock of Finished Goods		65,400
Less :	Closing Stock of Finished Goods		(76,100)
	Cost of Goods Sold		7,22,050
Add :	Selling and Distribution Overheads (15% of Sales)		1,50,000
	Cost of Salesq		8,72,050
Add :	Profit		1,27,950
	Sales		10,00,000

The Cost Accountant has prepared the following reconciliation account. From this data, you are required to construct the Company's Financial Profit & Loss Account for the above period.

Particulars	Rs.	Particulars	Rs.
Loss as per Financial Books	14,010	Absorption Differences :	
Differences in Stock Valuation :		Production Overheads	13,450
Closing Stock of Raw Materials	7,610	Administration Overheads	10,960
Opening Stock of WIP	870	Bad Debts Written Off	15,390
Closing Stock of WIP	1,830	Preliminary Expenses written off	12,000
Absorption Differences : SOH	9,000	Loss on Sale of Plant item	1,06,130
Interest Received	2,600	Differences in Stock Valuation :	
Profit on Sale of Investments	10,830	Opening Stock of Raw Materials	5,940
Profit as per Cost Records	1,27,950	Closing Stock of Finished Goods	10,830
Total	1,74,700	Total	1,74,700

Answer 14.

Trading and Profit and Loss Account

Particulars	Rs.	Particulars	Rs.
To Opening Stocks —		By Sales (No Change)	10,00,000
Raw materials (96,930 + 5,940)	1,02,870	By Closing Stocks —	
WIP (25,100 – 870)	24,230	Raw Materials (1,06,180 + 7,610)	1,13,790
Finished Goods (No change)	65,400	WIP (39,100 + 1,830)	40,930
To Purchases (No Change)	4,38,000	Finished Goods (76,100 – 10,830)	65,270
To Direct Labour (No Change)	1,36,000		
To Production OH (68,000+13,450)	81,450		
To Gross Profit c/d	**3,60,040**		
Total	**12,19,990**	**Total**	**12,19,990**
To Admin OH (1,02,000 + 10,960)	1,12,960	By Gross Profit b/d	3,60,040
To S & D OH (1,50,000 – 9,000)	1,41,000	By Interest Received	2,600
To Bad Debts w/off	15,390	(only in Fin Books)	
(only in Fin Books)		By Profit on Sale of Investment	10,830
To Preliminary Expenses w/off	12,000	(only in Fin Books)	
(only in Fin Books)		By Net Loss (balancing figure)	**14,010**
To Loss on Sale of Plant	1,06,130		
(only in Fin Books)			
Total	**3,87,480**	**Total**	**3,87,480**

Decision Making Tools :

Q. 15. Three joint products are produced by passing chemicals through two consecutive processes. Output from process 1 is transferred to process 2 from which the three joint products are produced and immediately sold. The data regarding the processes for April, 2009 is given below :

	Process 1	Process 2
Direct material 2,500 kilos at Rs. 4 per kilo	Rs. 10,000	–
Direct labour	Rs. 6,250	Rs. 6,900
Overheads	Rs. 4,500	Rs. 6,900
Normal Loss	10% of input	–
Scrap value of loss	Rs. 2 per kilo	–
Output	2,300 kilos	Joint products
		A – 900 Kilos
		B – 800 Kilos
		C – 600 Kilos

There were no opening or closing stocks in either process and the selling prices of the output from process 2 were :

Joint product A	Rs. 24 per kilo
Joint product B	Rs. 18 per kilo
Joint product C	Rs. 12 per kilo

Required :

(a) Prepare an account for process 1 together with any Loss or Gain Accounts you consider necessary to record the month's activities.

(b) Calculate the profit attributable to each of the joint products by apportioning the total costs from process 2

(i) According to weight of output;

(ii) By the market value of production.

Answer 15.

Working Notes:

(1) Joint Cost of three products under Process 2

	Rs.
By Transfer of output from process-I	20,700
Direct Labour	6,900
Overhead	6,900
Total	34,500

(2) Apportionment of joint cost on the basis of weight of output

Joint Products	Output inKg.	Apportionment of joint cost on the basis of weight of output
A	900	$\frac{\text{Rs. } 34,500}{23} \times 9$ = Rs. 13,500
B	800	$\frac{\text{Rs. } 34,500}{23} \times 8$ = Rs 12,000
C	600	$\frac{\text{Rs. } 34,500}{23} \times 6$ = Rs. 9,000

(3) Apportionment of Joint Cost on the basis of market value of production

Joint Products	Output In Kg.	S.P. (p.u.) Rs.	Sales Revenue Rs.	Apportionment of Joint Cost on the basis of market value of production
A	900	24	21,600	$\frac{\text{Rs. } 34,500}{6} \times 3$ = Rs. 17,250
B	800	18	14,400	$\frac{\text{Rs. } 34,500}{6} \times 2$ = Rs. 11,500
C	600	12	7,200	$\frac{\text{Rs. } 34,500}{6} \times 1$ = Rs. 5,750
			43,200	34,500

(a) Process 1 Account

Particulars	Kg.	Rate per kg.	Amount Rs.	Particulars	Kg.	Rate	Amount per kg. (Rs.)
To Direct material	2,500	4	10,000	By Process 2	2,300	9	20,700
To Direct labour	—	—	6,250	(Refer to Note 1)			
To Overhead	—	—	4,500	By Normal Loss	250	2	500
To Abnormal gain	50	9	450	(10% of input)			
	2,550		21,200		2,550		21,200

Normal Loss Account

Particulars	Kg.	Rate per kg.	Amount Rs.	Particulars	Kg.	Rate	Amount per kg. (Rs.)
To Process I	250	2	500	By Sales	200	2	400
				By Abnormal gain	50	2	100
	250		500		250		500

Abnormal Gain Account

Particulars	Kg. per kg.	Rate	Amount Rs.	Particulars	Kg.	Rate per kg.	Amount (Rs.)
To Normal Loss A/c	50	2	100	By Process I	50	9	450
To Costing Profit and Loss Account			350				
	50		450		50		450

Note : Normal output = 2,500 kg. – 250 kg. = 2,250 kg

Total Cost = Direct material cost + Direct labour cost + Overheads – Recovery from scrap sales

= Rs. 10,000 + Rs. 6,250 + Rs. 4,500 – Rs. 500 = Rs. 20,250

$$\text{Normal cost (p.u.)} = \frac{\text{Rs. } 20{,}250}{2{,}250 \text{ kg}} = \text{Rs. } 9$$

(b) Statement of Profit (attributable to each of the Joint Products according to weight of output and market value of production)

Joint products	Output	S.P. (p.u.)	Sales value	Joint cost apportionment according to		Profit (Loss)	
				Weight of output	Market value of production	Weight of output	Market value of production
Rs.	Kg.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	2	3	2×3 = 4	5	6	4-5 = 7	4-6 = 8
A	900	24	21,600	13,500*	17,250**	8,100	4,350
B	800	18	14,400	12,000	11,500	2,400	2,900
C	600	12	7,200	9,000	5,750	(1,800)	1,450
	2,300		43,200	34,500	34,500	8,700	8,700

** Refer to working note 2*

*** Refer to working note 3*

Q. 16. (a) ML Ltd. is engaged in production of three types of ice-cream products : Coco, Strawberry and Vanilla. The company presently sells 50,000 units of Coco @ Rs. 25 per unit, Strawberry 20,000 units @ Rs. 20 per unit and Vanilla 60,000 units @ Rs. 15 per unit. The demand is sensitive to selling price and it has been observed that every reduction of Re. 1 per unit in selling price, increases the demand for each product by 10% to the previous level. The company has the production capacity of 60,500 units of Coco, 24,200 units of Strawberry and 72,600 units of Vanilla. The company marks up 25% on cost of the product.

The Company management decides to apply ABC analysis. For this purpose it identifies four activities and the rates as follows :

Activity	Cost Rate
Ordering	Rs. 800 per purchase order
Delivery	Rs. 700 per delivery
Shelf stocking	Rs. 199 per hour

Customer support and assistance Rs. 1.10 per unit sold.

The other relevant information for the products are as follows :

	Coco	Strawberry	Vanilla
Direct Material per unit (Rs.)	8	6	5
Direct Labour per unit (Rs.)	5	4	3
No. of purchase orders	35	30	15
No. of deliveries	112	66	48
Shelf stocking hours	130	150	160

Under the traditional costing system, store support costs are charged @ 30% of prime cost. In ABC these costs are coming under customer support and assistance.

Required :

(i) Calculate target cost for each product after a reduction of selling price required to achieve the sales equal to the production capacity.

(ii) Calculate the total cost and unit cost of each product at the maximum level using traditional costing.

(iii) Calculate the total cost and unit cost of each product at the maximum level using activity based costing.

(iv) Compare the cost of each product calculated in (i) and (ii) with (iii) and comment on it.

(b) Discuss the treatment of by-product Cost in Cost Accounting.

Answer 16. (a)

(i) Calculation of Target Cost of Each Product

	Coco	Strawberry	Vanilla
A. Production capacity	60,500	24,200	72,600
B. Selling price after reduction of Rs. 2	Rs. 23.00	Rs. 18.00	Rs. 13.00
C. *Less* : Mark up @ 20% sales	Rs. 4.60	Rs. 3.60	Rs. 2.60
D. Target cost	Rs. 18.40	Rs. 14.40	Rs. 10.40

(ii) Calculation of Total Cost and Unit Cost of Each Product [Using Traditional costing]

	Coco	Strawberry	Vanilla
A. Maximum production capacity	60,500	24,200	72,600
B. Direct Material Cost/unit	8	6	5
C. Direct Labour Cost/unit	5	4	3
D. Total Direct Material Cost [A × B]	4,84,000	1,45,200	3,63,000
E. Total Direct Labour Cost [A × C]	3,02,500	96,800	2,17,800
F. Prime cost [D + E]	7,86,500	2,42,000	5,80,800
G. *Add* : Stores Support Cost [Prime cost × 30%]	2,35,950	72,600	1,74,240
H. Total Cost [F + G]	10,22,450	3,14,600	7,55,040
I. Cost per Unit [H/A]	Rs. 16.90	Rs. 13.00	Rs. 10.40

(iii) Calculation of Total Cost and Unit Cost of Each Product [Using Activity Based Costing]

	Coco	Strawberry	Vanilla
A. Maximum production capacity	60,500	24,200	72,600
B. Direct Material Cost/unit	8	6	5
C. Direct Labour Cost/unit	5	4	3
D. Total Direct Material Cost [A × B]	4,84,000	1,45,200	3,63,000
E. Total Direct Labour Cost [A × C]	3,02,500	96,800	2,17,800
F. Prime cost [D + E]	7,86,500	2,42,000	5,80,800
G. Total Overheads			
Cost of Overheads @ Rs. 800 Per purchase order	28,000	24,000	12,000
Cost of delivery @ Rs. 700 per delivery	78,400	46,200	33,600
Shelf stocking @ Rs. 199 per hour	25,870	29,850	31,840
Customer support and Assistance @ Rs. 1.10 per unit sold	66,550	26,620	79,860
	1,98,820	1,26,670	1,57,300
H. Total Cost [F + G]	9,85,320	3,68,670	7,38,100
I. Cost per unit [H/A]	Rs. 16.29	Rs. 15.23	Rs. 10.17

(iv) Comparison

	Coco	Strawberry	Vanilla
Target Cost/unit	Rs. 18.40	Rs. 14.40	Rs. 10.40
Traditional Cost/unit	Rs. 16.90	Rs. 13.00	Rs. 10.40
ABC Cost/unit	Rs. 16.29	Rs. 15.23	Rs. 10.17
Comment :	Both the costs are with the range of the Target Cost	Traditional Cost is with in the range of Target Cost but ABC Cost exceeds the Target Cost	Both the costs are with in the range of Target Cost

Answer 16. (b)

Treatment of by-product cost in Cost Accounting :

(i) When they are of small total value, the amount realized from their sale may be dealt as follows :

- Sales value of the by-product may be credited to Profit and Loss Account and no credit be given in Cost Accounting. The credit to Profit and Loss Account here is treated either as a miscellaneous income or as additional sales revenue.
- The sale proceeds of the by product may be treated as deduction from the total costs. The sales proceeds should be deducted either from production cost or cost of sales.

(ii) When they require further processing **:**

In this case, the net realizable value of the by product at the split-off point may be arrived at by subtracting the further processing cost from realizable value of by products. If the value is small, it may be treated as discussed in (i) above.

Q. 17. (a) ABC Ltd. Makes and sells a single product. The company's trading results for the year 2010 are as follows :

		Rs. '000
Sales		**3,000**
Direct materials	**900**	
Direct labour	**600**	
Overheads	**900**	**2,400**
Profits		**600**

For the year 2011, the following are expected :

i. Reduction in the selling price by 10%

ii. Increasing in the quantity sold by 50%

iii. Inflation of direct material cost by 8%

iv. Price inflation in variable overhead by 6%

v. Reduction of fixed overhead expenses by 25%.

It is also known that

a) In 2009, overhead expenditure totaled to Rs. 8,00,000.

b) Total overhead cost inflation for 2010 has been 5% more than in 2009.

c) Production and sales volumes have been 25% higher in 2010 than in 2009.

You are required to :

i. Prepare a statement showing the estimated trading results for 2011.

ii. Calculate the break-even point for 2010 and 2011.

iii. Comment on the BEP and profits of the 2010 and 2011.

(b) How does Activity Based Costing support corporate strategy?

Answer 17. (a)

(i) **Statement showing trading results**

	Particulars	2010	2011	
A.	Sales :	3,000	4,050	(3,000 × 150% × 90%)
B.	Less : Variable Costs : Direct material	900	1,458	(900 × 150% × 108%)
	Direct labour	600	900	(600 × 150%)
	Variable overhead	300	477	(300 × 150% × 106%)
	Total variable cost	1,800	2,835	
C.	Contribution [A – B]	1,200	1,215	
D.	Less : Fixed overheads	600	450	(600 × 0.75)
E.	Profit [C – D]	600	765	

(ii)

$$\text{P/V Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100 \qquad \frac{1,200}{3,000} \times 100 = 40\% \qquad \frac{1,215}{4,050} \times 100 = 30\%$$

$$\text{BEP} = \frac{\text{Fixed Cost}}{\text{P/V Ratio}} \qquad \frac{600}{40\%} = 1,500 \qquad \frac{450}{30\%} = 1,500$$

(ii)

Particulars	2010	2011	% change
BEP	1,500	1,500	No change
Fixed overheads	600	450	$\frac{450-600}{600} \times 100 = (25\%)$
P/V Ratio	40%	30%	$\frac{30-40}{40} \times 100 = (25\%)$
Profit	600	765	$\frac{765-600}{600} \times 100 = 27.5\%$

Both fixed cost and P/V ratio have declined by 25% equally. So, BEP sales remains the same.

The contribution is only Rs. 1,215 in 2011 though quantity is increased by 50%. This is due to increase in production cost and decrease in selling price. This is more than made up by decrease in fixed cost so that overall profit has increased by 27.5%.

Working notes : Calculation of variable overheads and fixed overheads

Total overheads for same production in 2010 = 800 × 105% = 840

Variable overheads for 2010 $= \frac{900-840}{125-100} \times 125 = 300$

Fixed overheads for 2010 = 900 – 300 = 600

Answer 17. (b)

Activity based costing supports corporate strategy in many ways such as :

1. ABC system can effectively support the management by furnishing data, at the operational level and strategic level. Accurate product costing will help the management to compare the profits of various customers, product lines and to decide on price strategy etc.
2. It can also encourage management to redesign the products.
3. It can change the method of evaluation of new process technologies, to reduce setup times, rationalization of plant lay out in order to reduce or lower material handling cost, improve quality etc.
4. It will report on the resource spending.
5. ABC analysis helps managers' focus their attention and energy on improving activities and the actions allow the insights from ABC to be translated into increased profits.
6. Accurate information on product costs enables better decisions to be made on pricing, marketing, product design and product mix.
7. Performance base accurate feedback can be provided to cost centre managers.

Q. 18. As a result of change in consumer preference the company of which you are the management accountant finds that certain materials in stock which were bought for Rs. 7,000 a few years ago have not moved for a long time. The current replacement price of these material is Rs. 8,000. If these materials were disposed of by sale, they would fetch a net relisable value of Rs. 4,000 only.

The company has the opportunity of carrying out a one time job (Job 101) which can utilize material and yield a revenue of Rs. 16,000. The additional costs, other than the cost of these materials, chargeable to this will amount to Rs. 14,200. This charge includes the apportionment of general administration overhead amounting to Rs. 3,800, but the incurrence of all other expense is dependent upon the execution of Job 101.

Alternatively, the materials in question could be used as a substitute for other materials in another regular job (Job 208). The materials so replaced will otherwise cost Rs. 6,000. These costs have been included in the viability of Job 208 which is expected to yield an additional net benefit of Rs. 11,000.

The company has thus three alternatives namely :

(i) Use of the material in Job 208.

(ii) Use the material in Job 101 and carry out Job 208 by buying the materials required.

(iii) Sell the materials and carry out Job 208 by buying the materials required.

You are required to :

(a) State with reasons the costs which are irrelevant to the decision of alternative choices.

(b) Evaluate the three alternatives given above by using the concept of :

1. Incremental cost and benefit analysis

2. Opportunity cost and benefit analysis.

(c) State which of the alternative should be accepted by the company.

Answer 18.

(a) The following costs are irrelevant to the decisions of alternative choices :

(i) The materials worth Rs. 7,000 was bought a few years ago cannot be used for the original job. Therefore, materials amounting to Rs. 7,000 is the past cost which is irrelevant for cost and benefit analysis.

(ii) Apportionment of general administration overheads amounting to Rs. 3,800 to one-time job 101 is irrelevant as this amount represents fixed cost which cannot be considered relevant to the present analysis.

(iii) Decision to use the material as substitute in a regular job (Job 208). This is expected to yield an additional net benefit of Rs. 11,000. The undertaking of Job 208 (a regular job) is already committed and therefore, this cost is irrelevant of the analysis.

(b) (1) Incremental cost and benefit analysis

Any incremental cost and benefit analysis requires certain base to be used. For the present analysis, Job 208 is a regular job and the same has been used as a base for incremental cost and benefit analysis.

Details	**Execute Job 208**	**Use the material in Job 101**	**Selling the existing materials**
Costs :			
Cost of Job 101 (additional cost less fixed overheads)	–	10,400	–
Purchase of material for Job 208	–	6,000	6,000
Total costs	–	16,400	6,000
Benefits :			
Sales of existing material	–	–	4,000
Revenue from Job 101	–	16,000	–
Total benefit	–	16,000	4,000
Net cost/benefit			
(in both the above alternatives the costs are more than the benefits)	–	(400)	(2,000)

(2) Opportunity cost analysis :

Opportunity costs	–	10,400	–
Benefits (by using materials)	6,000	16,000	4,000
Net benefit	6,000	5,600	4,000

(c) As the benefit is maximum if the material is used in Job 208, it is advisable to use the materials in Job 208.

Q. 19. (a) A company has two divisions. Division 'M' and Division 'N'. Division 'M' has a budget of selling 2,00,000 nos. of a particular component 'x' to fetch a return of 20% on the average assets employed. The following particulars of Division 'M" are also known :

Fixed overhead	**Rs. 5 lakhs**
Variable cost	**Rs. 1 per unit**
Average assets	
Sundry debtors	**Rs. 2 lakhs**
Inventories	**Rs. 5 lakhs**
Plant & equipments	**Rs. 5 lakhs**

However, there is constraints in Marketing and only 1,50,000 units of the component 'x' can be directly sold to the Market at the proposed price.

It has been gathered that the balance 50,000 units of component 'x' can be taken up by Division 'N'. Division 'M' wants a price of Rs. 4 per unit of 'x' but Division 'N' is prepared to pay Rs. 2 per unit of 'x'.

Division 'M' has another option in hand, which is to produce only 1,50,000 units of component 'x'. This will reduce the holding of assets by Rs. 2 lakhs and fixed overhead by Rs. 25,000.

You are required to advise the most profitable course of action for Division 'A'.

(b) State what type of cost analysis is used in taking managerial decisions :

(i) Make or buy
(ii) Accept or reject an offer at lower than existing price
(iii) Submission of a tender
(iv) Reduce or maintain price
(v) Retain or replace a machine
(vi) Process a product further or not
(vii) Lease or buy
(viii) Optimizing investment plant out of multiple plans
(ix) Shut down or continue
(x) Drop a product or not
(xi) Drop a product & introduce another product or not
(xii) Expand or contract capacity
(xiii) Export sales vs. local sale
(xiv) Product mix if there is key factor

Answer 19. (a)

Working Notes :

1. Profit = 20% return on average assets employed

Average Assets	**Rs. In lakhs**
Sundry debtors	2
Inventories	5
Plant & Equipment	5
Total	12

Profit = Rs. 12,00,000 × 20/100 = Rs. 2,40,000

2. Budgeted sales revenue (2,00,000 units of component x)	**Rs. In lakhs**
Fixed costs	5.00
Variable cost (2,00,000 units @ Re.1)	2.00
Profit	2.40
Total sales	9.40

Selling price per unit of component x = Rs. 9,40,000/ 2,00,000 units = Rs. 4.70 per unit

Options in hand with Division M

Option I – Sell 1,50,000 units in market and transfer 50,000 units to Division N

Option II – Sell only 1,50,000 units in market

Statement of profitability of Division M under two options

Rs.

Particulars		**Option – I**	**Option –II**
Sales (1,50,000 units @ Rs. 4.70)		7,05,000	7,05,000
Transfer to Division N (50,000 units @ Rs. 2)		1,00,000	–
Total sales revenue		8,05,000	7,05,000
Less : variable overhead		2,00,000	1,50,000
Contribution		6,05,000	5,55,000
Less : Fixed cost		5,00,000	4,75,000
Profit	(a)	1,05,000	80,000
Capital employed	(b)	12,00,000	10,00,000
Return on capital employed	[a) / (b)] × 100	8.75%	8%

Analysis : From the analysis of the above it is observed that under Option – I. division M's, Profit and ROCE is increased by Rs. 25,000 and 0.75% respectively. Hence Option –I is suggested for Division-M.

Answer 19. (b)

Decision	**Useful cost analysis**
Make or buy	Marginal cost analysis
Accept or reject an offer at lower than existing price	Differential cost analysis
Submission of a tender	Differential cost analysis
Reduce or maintain price	Differential cost analysis
Retain or replace a machine	Differential cost analysis
Process a product further or not	Differential cost analysis
Lease or buy	Differential cost analysis
Optimizing investment plan out of multiple plans	Differential cost analysis
Shut down or continue	Avoidable fixed costs and additional fixed costs on shut down
Drop a product or not	Contribution analysis and avoidable fixed costs
Drop a product & introduce another product or not	Contribution analysis
Expand or contract capacity	Contribution analysis and avoidable fixed costs
Export sales vs. local sale	Differential cost analysis if surplus capacity is utilized
Product mix if there is key factor	Contribution per unit of key factor analysis

Q. 20. (a) A company is at present working at 90% of its capacity and producing 13,500 units per annum. It operates a Flexible Budgetory Control System. The following figures are obtained from its budget.

Rs.

Particulars	Capacity utilization	
	90%	100%
Sales	15,00,000	16,00,000
Fixed expenses	3,00,500	3,00,600
Semi-fixed expenses	97,500	1,00,500
Semi-variable expenses	1,45,000	1,49,500
Units manufactured	13,500	15,000

Labour and material costs per unit are constant under the present conditions. Profit margin is 10%.

Required **:**

i. Determine the differential cost of producing 1,500 units by increasing capacity utilization to 100 per cent.

ii. What would you recommend as an expert for these 1,500 units after considering that overseas prices are much lower than inland prices.

(b) What is the objective of break even analysis?

Answer 20. (a)

Working notes :

Statement showing the computation of cost of materials and labour

Rs.

Sales at 90% capacity		15,00,000
Less : Profit margin (10%)		1,50,000
Total cost		13,50,000
Less : Expenses :		
Fixed	3,00,500	
Semi-fixed	97,500	
Variable	1,45,000	5,43,000
Cost of materials & labour at 90% capacity		8,07,000
Cost of materials & labour at 100% capacity [Rs. 8,07,000 × 100/90]		8,96,667

i. Statement showing the differential cost

Particulars	90% 13,500 units Rs.	100% 15,000 units Rs.	Differential cost of 1,500 units Rs.
Materials and labour	8,07,000	8,96,667	89,667
Variable expenses	1,45,000	1,49,500	4,500
Semi-fixed expenses	97,500	1,00,500	3,000
Fixed expenses	3,00,500	3,00,600	100
	13,50,000	14,47,267	97,267

ii. Minimum price for export = 97,267/1,500 = Rs. 64.84 per unit

At the minimum price of Rs. 64.84 per unit, there will be no additional profit to the company. A price below this may be considered, if there is a possibility of getting some benefits of exports e.g. export incentive or subsidy from the Government.

It has been presumed in the above case that utilisation of full capacity would not require any additional capital investment and also sufficient care has been taken to see that the goods exported are not dumped in the home market.

Answer 20. (b)

Break even analysis used to determine :

(i) The amount of profit/loss at various volume of operations
(ii) The volume of operations required to earn a target profit
(iii) The effect of change in variable cost on profit
(iv) The effect of change in fixed cost on profit
(v) The effect of change in selling price on profit
(vi) The effect of change in sales volume on profit

Budgeting :

Q. 21. Prepare cash budget of ABC Ltd. For April to June 2010 from the following information :

(i) Sales Jan, 1000 units. Sales are expected to be increased by 1,000 units per month.
(ii) Uniform selling price of Rs. 100 per unit was fixed after adding 25% to cost.
(iii) Cash sales are 25% of net credit sales.
(iv) 2% of accounts receivables constitute bad debt losses. 50% of the good accounts receivable are collected in the month following the sales, 50% of the remaining in the second month and the balance in the third month.
(v) Cash purchases are 33- 1/3% of net credit purchases.
(vi) 50% of credit purchases are paid within one month and the balance in two months.
(vii) No stock remains at the end of a month.
(viii) The estimated expenses are as follows :

	Jan Rs.	Feb Rs.	March Rs.	April Rs.	May Rs.	June Rs.
Wages	12,000	15,000	18,000	24,000	30,000	36,000
Adm. Expenses	15,000	20,000	25,000	30,000	35,000	40,000
Selling & dist. Exp.	15,000	25,000	35,000	45,000	55,000	50,000

(ix) Commission on sales – 10%
(x) The time lag in the payment of wages is one third of the month and that of Adm. Expenses one month.
(xi) Adm. Expenses for each month include depreciation amounting to Rs. 5,000.
(xii) 12% Rs. 1,00,000 Debentures of Rs. 100 each were issued on 1st Jan (half yearly interest due on 30th June and 31st Dec)
(xiii) 18,000 equity shares of Rs. 10 each were issued on 1st May at 5% premium.

(xiv) Estimated advance tax for the assessment year 2011-12 is Rs. 1,00,000. First installment of advance tax is 15%.

(xv) Cash balance at the end of March Rs. 2,00,000.

Answer 21.

Cash budget for April to June 2010

Particulars	April Rs.	May Rs.	June Rs.
Total cash available			
Cash in hand	2,00,000	1,17,775	2,16,825
Cash sales	80,000	1,00,000	1,20,000
Collection from debtors	1,76,400	2,54,800	3,33,200
Issue of equity shares	–	1,89,000	–
	4,56,400	**6,61,575**	**6,70,025**
Total cash payments :			
Cash purchases	74,000	92,500	1,11,000
Payment to creditors for purchases	1,37,625	1,94,250	2,49,750
Wages	22,000	28,000	34,000
Administrative expenses	20,000	25,000	30,000
Selling and distribution expenses	45,000	55,000	50,000
Commission on sales	40,000	50,000	60,000
Interest on debentures	–	–	6,000
Advance tax	–	–	15,000
	3,38,625	**4,44,750**	**5,55,750**
Closing balance	1,17,775	2,16,825	1,14,275

Working notes :

i. Calculation of cash sales and collection from debtors

Particulars	Jan Rs.	Feb Rs.	March Rs.	April Rs.	May Rs.	June Rs.
Sales (Units)	1,000	2,000	3,000	4,000	5,000	6,000
Selling price per unit	100	100	100	100	100	100
Total sales	1,00,000	2,00,000	3,00,000	4,00,000	5,00,000	6,00,000
Less : Cash sales @ 20%	20,000	40,000	60,000	80,000	1,00,000	1,20,000
Credit sales @ 80%	80,000	1,60,000	2,40,000	3,20,000	4,00,000	4,80,000
Less : 2% bad debts	1,600	3,200	4,800	6,400	8,000	9,600
Good a/c. receivable	78,400	1,56,800	2,35,200	3,13,600	3,92,000	4,70,400
50% of previous month				1,17,600	1,56,800	1,96,000
25% of previous to previous				39,200	58,800	78,400
25% of third previous month				19,600	39,200	58,800
				1,76,400	2,54,800	3,33,200

ii. Calculation of cash purchases and payment to creditors

Particulars	Jan Rs.	Feb Rs.	March Rs.	April Rs.	May Rs.	June Rs.
Total sales	1,00,000	2,00,000	3,00,000	4,00,000	5,00,000	6,00,000
Less : Gross profit @ 20%	20,000	40,000	60,000	80,000	1,00,000	1,20,000
Cost of goods sold	80,000	1,60,000	2,40,000	3,20,000	4,00,000	4,80,000
Less : Wages	12,000	15,000	18,000	24,000	30,000	36,000
Total purchases	68,000	1,45,000	2,22,000	2,96,000	3,70,000	4,44,000
Less : Cash purchases @ 25%	17,000	36,250	55,550	74,000	92,500	1,11,000
Credit purchases	51,000	1,08,750	1,66,500	2,22,000	2,77,500	3,33,000
Payment to creditors						
50% of previous month				83,250	1,11,000	1,38,750
50% of previous to previous				54,375	83,250	1,11,000
				1,37,625	1,94,250	2,49,750

iii. Payment of wages

	April (Rs.)	May (Rs.)	June (Rs.)
2/3rd of current month's	16,000	20,000	24,000
1/3rd of previous month's	6,000	8,000	10,000
	22,000	28,000	34,000

iv. In the absence of time lag in payment of selling and dist. Expenses and commission on sales, the payment has been made in the same month.

v. Depreciation being non-cash expense will not appear in the cash budget.

vi. The first installment of advance tax in case of a company assessee is payable on/before 15th June.

Q. 22. ABC Manufacturers normally produce 8,000 units of their product in a month in their machine shop. For the month of January, they had planned for a production of 10,000 units. Owing to sudden cancellation of contract in the middle of January, they could only produce 6,000 units in January.

Indirect manufacturing costs are carefully planned and monitored in the machine shop and the Foreman of the shop is paid a 10% of the savings as bonus when in any month the indirect manufacturing cost incurred is less than the budgeted provision.

The Foreman has put in a claim that he should be paid a bonus of Rs. 88.50 for the month of January. The work manager wonders how any one can claim a bonus when the company has lost a sizable contract. The relevant figures are as under :

Rs.

Indirect manufacturing costs	Expenses for a normal month	Planned for January	Actual in January
Salary of Foreman	**1,000**	**1,000**	**1,000**
Indirect labour	**720**	**900**	**600**
Indirect material	**800**	**1,000**	**700**
Repairs and maintenance	**600**	**650**	**600**
Power	**800**	**875**	**740**
Tools consumed	**320**	**400**	**300**
Rates and taxes	**150**	**150**	**150**
Depreciation	**800**	**800**	**800**
Insurance	**100**	**100**	**100**
	5,290	**5,875**	**4,990**

Do you agree with the Works Manager? Is the Foreman entitled to any bonus for the performance in January? Substantiate your answers with facts and figures.

Answer 22.

Flexible budget of ABC Manufacturers
(for the month of January)

Indirect manufacturing costs	Nature of cost	Expenses for a normal month Rs.	Planned expenses for January Rs.	Expenses per flexible budget of January Rs.	Actual expenses for the month of January Rs.	Difference (Increase/ Decrease)
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(5)–(4)=(6)**
Salary of foreman	Fixed	1,000	1,000	1,000	1,000	Nil
Indirect labour (Note 1)	Variable	720	900	540	600	60
Indirect material (Note 2)	Variable	800	1,000	600	700	100
Repairs and maintenance (Note 3)	Semi-variable	600	650	550	600	50
Power (Note 4)	Semi-variable	800	875	725	740	15
Tools consumed	Variable	320	400	240	300	60
Rates and taxes	Fixed	150	150	150	150	Nil
Depreciation	Fixed	800	800	800	800	Nil
Insurance	Fixed	100	100	100	100	Nil
		5,290	5,875	4,705	4,990	285

Conclusion : The analysis in flexible budget makes it very clear that the expenditure of ABC Manufacturers has increased from Rs. 4,705 to Rs. 4,990. Under these circumstances, the foreman of the company is not entitled for any performance bonus.

Working notes :

1. Indirect labour for 8,000 units = Rs. 720
   Indirect labour for 10,000 units = (720 ÷ 8,000) × 10,000 = Rs. 900
   Indirect labour which is variable per unit = Re. 0.09
   Indirect labour for 6,000 units = 6,000 × 0.09 = Rs. 540

2. Indirect material
   Indirect material for 8,000 units = Rs. 800
   Indirect material for 10,000 units = (800 ÷ 8,000) × 10,000 = Rs. 1,000
   It is variable and indirect material for 6,000 units = (800 ÷ 8,000) × 6,000 = Rs. 600

3. Repair and maintenance
   Repair and maintenance of 8,000 units = Rs. 600
   Repair and maintenance of 10,000 units = (600 ÷ 8,000) × 10,000 = Rs. 750

   But as per budget, repair and maintenance for 10,000 is Rs. 650
   Therefore, repair and maintenance is semi-variable

   $$\text{Variable repair and maintenance per unit} = \frac{\text{Change in exp. Leve}}{\text{Change in output}} = \text{Rs. } (50 \div 2{,}000)$$

   = Rs. 0.025

   Variable element of repair and maintenance at levels of 8,000 units = 8,000 × 0.025 = Rs. 200
   Fixed element of repair and maintenance at level of 8,000 units = Rs. 600 – Rs. 200 = Rs. 400
   Repair and maintenance cost at a level of 6,000 units = 400 + (6,000 × Re. 0.025) = Rs. 550

4. Power
   Power for 8,000 units = Rs. 800
   Power for 10,000 units = Rs. (800 ÷ 8,000) × 10,000 = Rs. 1,000
   But, it is given that power for 10,000 units is Rs. 875
   Therefore, power is semi-variable overhead

   $$\text{Therefore, variable power per unit} = \frac{\text{Change in exp. Level}}{\text{Change in output}} = (75 \div 2{,}000) = \text{Re. } 0.0375$$

   Variable element of power at the level of 8,000 units = 8,000 x Re. 0.0375 = Rs. 300
   Fixed element of power at level of 8,000 units = Rs. 800 – Rs. 300 = Rs. 500
   Power at the level of 6,000 units = 500 + (6,000 × Re. 0.0375) = Rs. 725

5. Tools consumed
   Tools consumed at the level of 8,000 units = Rs. 320
   Tools consumed at the level of 10,000 units = (320 ÷ 8,000) × 10,000 = Rs, 400
   Therefore, tools consumed is variable overhead
   Therefore, tools consumed at the level of 6,000 units = (320 ÷ 8,000) × 6,000 = Rs. 240

Q. 23. In its budget for the period ahead 'M' Ltd. Is considering two possible sales forecasts for the three products as follows :

		Product		
	Forecast	**X**	**Y**	**Z**
I.	**Sales (Units)**	**22,000**	**40,000**	**6,000**
	Selling price per unit	**Rs. 10**	**Rs. 6**	**Rs. 7.50**
II.	**Sales (Units)**	**30,000**	**50,000**	**7,000**
	Selling price per unit	**Rs. 9**	**Rs. 5.50**	**Rs. 7.50**

Variable costs per unit are expected to be the same at the different levels of possible sales. The variable costs per unit are as follows :

	Product		
Forecast	**X**	**Y**	**Z**
Direct material	**3.00**	**2.00**	**4.00**
Direct labour	**2.00**	**1.50**	**1.00**
Variable overheads	**1.00**	**0.50**	**1.00**

Fixed overheads are expected to total Rs. 1,00,000. These are expected to be unaffected by the possible changes in activity which are being considered. Due to recent high labour turnover problems, direct labour will be restricted to a maximum of Rs. 1,30,000 in the period. It can be assumed that all labour is of the same grade and is freely transferable between products. Other resources are expected to be generally available.

You are required to :

Taking each of the possible sales forecasts in turn

(i) Say what the principal budget factor is for each of the forecasts.
(ii) For each forecast calculate the sales budget that you would recommend to maximize profits.
(iii) What profit would you expected from each sales budget?

Assume that the products will be sold according to the selling price estimated as per the forecast and no interchange of the forecast is allowed.

Answer 23.

(i) Determination of Principal Budget Factor :

Particulars	**Products**			**Total**
	X	**Y**	**Z**	
Forecast I				
Sales (units)	22,000	40,000	6,000	
Labour cost (Rs. Per unit)	2.00	1.50	1.00	
Total labour cost (Rs.)	44,000	60,000	6,000	1,10,000
Direct labour available (Rs.)				1,30,000
Forecast II				
Sales (units)	30,000	50,000	7,000	
Labour cost (Rs. Per unit)	2.00	1.50	1.00	
Total labour cost (Rs.)	60,000	75,000	7,000	1,42,000
Direct labour available (Rs.)				1,30,000

Sales is the principal budget factor in Forecast I, and labour is the principal budget factor in Forecast II.

(ii) Sales budget – Forecast I (Sales – principal budget factor)

Product	Sales (units)	Selling price p.u. Rs.	Amount Rs.
X	22,000	10.00	2,20,000
Y	40,000	6.00	2,40,000
Z	6,000	7.50	45,000
Total			5,05,000

Sales budget – Forecast II (Labour - principal budget factor)

Product	Sales (units)	Selling price p.u. Rs.	Amount Rs.
X	30,000	9.00	2,70,000
Y	42,000	5.50	2,31,000
Z	7,000	7.50	52,500
Total			5,53,500

Particulars	Products			Total
	X	Y	Z	
Sales (units) (i)	22,000	40,000	6,000	
Selling price p.u.	10.00	6.00	7.50	
Variable cost p.u.	6.00	4.00	6.00	
Contribution p.u. (ii)	4.00	2.00	1.50	
Total contribution (i) x (ii)	88,000	80,000	9,000	1,77,000
Less : Fixed cost				1,00,000
Profit				77,000

(iii) Budgeted sales and profit – Forecast I

Working notes : In case of Forecast II, since labour is the principal budget factor, in order to maximize profit, the product which gives highest contribution per rupee of direct labour should be given priority in production and sales.

Ranking of products based on contribution per rupee of direct labour :

Particulars		Products		
		X	Y	Z
Selling price	(a)	9.00	5.50	7.50
Variable cost :				
Direct material		3.00	2.00	4.00
Direct labour		2.00	1.50	1.00
Variable overheads		1.00	0.50	1.00
	(b)	6.00	4.00	6.00
(i) Contribution	(a) – (b)	3.00	1.50	1.50
(ii) Labour cost		2.00	1.50	1.00
Contribution per rupee of direct labour (i)/(ii)		1.50	1.00	1.50
Ranking		I	III	II

Manufacturing budget based on ranking

Product	Units	Labour cost per unit (Rs.)	Total labour cost (Rs.)
X	30,000	2.00	60,000
Z	7,000	1.00	7,000
Y	42,000 #	1.50	63,000*
		Total	1,30,000

*Balancing figure # Rs. 63,000/Rs. 1.50 = 42,000 units

Budgeted sales and profit – Forecast II

Particulars	Products			Total
	X	Y	Z	
Sales (units) (i)	30,000	42,000	7,000	
Selling price p.u.	9.00	5.50	7.50	
Less : Variable cost p.u.	6.00	4.00	6.00	
Contribution p.u. (ii)	3.00	1.50	1.50	
Total contribution (i) x (ii)	90,000	63,000	10,500	1,63,500
Less : Fixed cost				1,00,000
Profit				63,500

Q. 24. A company has established the following relationship of costs with sales at 100% capacity utilization :

Factory cost	**66.67 % of sales**
Prime cost	**75% of factory cost**
Selling cost (75% is variable)	**20% of sales**

The factory overhead at different capacity levels are estimated as under :

Capacity utilization	Factory overheads (Rs.)
120%	**2,50,000**
100%	**2,00,000**
80%	**1,80,000**
60%	**1,65,000**

Presently the company operates at 60% capacity utilization and the sales value at this level is Rs. 7,20,000 per annum.

The management receives an offer at a sales value of Rs. 1,65,000 per annum from a Government department. This offer will occupy 40% of the company's capacity. The prime cost of this order is Rs. 1,00,000 and there will be an increase of selling costs of Rs. 8,000 only per annum on account of this order.

The sales department claims that the company's own sales will increase to 80% of capacity by the time the aforesaid Government department's order materializes.

***Required* :**

(i) Present statements to show the profitability of the company at 60% and 80% operating levels.

(ii) Show the calculation of the profitability of the order of the Government department and advise whether it should be accepted or not.

Answer 24.

Present sales at 60% operating capacity = Rs. 7,20,000

Total sales at 100% capacity = $\frac{\text{Rs. } 7,20,000}{60} \times 100$ = Rs. 12,00,000

Costs at 100% capacity :

Factory cost (66.67% of sales)	= Rs. 12,00,000 × 66.67/100	= Rs. 8,00,000
Prime cost (75% of Factory cost)	= Rs. 8,00,000 × 75/100	= Rs. 6,00,000
Selling cost (20% of sales)	= Rs. 12,00,000 × 20/100	= Rs. 2,40,000

Profitability Statement		**Rs.**
Prime cost		6,00,000
Add : Factory overheads (balancing figure)		2,00,000
Factory cost		8,00,000
Add : Selling cost		
Variable (75%)	1,80,000	
Fixed	60,000	2,40,000
Total cost		10,40,000
Profit		1,60,000
Sales		12,00,000

Variable selling overhead at 100% capacity

At 100% capacity = Rs. 1,80,000

At 60% capacity = $\frac{\text{Rs. } 1,80,000}{100} \times 60$ = Rs. 1,08,000

At 80% capacity = $\frac{\text{Rs. } 1,80,000}{100} \times 80$ = Rs. 1,44,000

(i) Profitability Statement at 60% and 80% operating levels

Capacity level		**60%**	**80%**
Sales	(i)	7,20,000	9,60,000
Costs			
Prime cost (50% of sales)		3,60,000	4,80,000
Factory overhead		1,65,000	1,80,000
		5,25,000	6,60,000
Add: Selling cost			
Variable		1,08,000	1,44,000
Fixed		60,000	60,000
Total cost	(ii)	6,93,000	8,64,000
Profit	(i) - (ii)	27,000	96,000

Profitability statement of special order

Sales		(i)	1,65,000
Prime cost given			1,00,000
Factory overheads	(Rs. 2,50,000 – Rs. 1,80,000)		70,000
Factory cost			1,70,000
Add : Selling cost			8,000
Total cost		(ii)	1,78,000
Loss			13,000

Analysis : There is an incremental loss of Rs. 13,000 by accepting special order. Hence it is suggested to reject the special order.

Standard Costing :

Q. 25. (a) The following standards have been set to manufacture a product :

Direct material	**Rs.**
2 units of A @ Rs. 4 per unit	**8.00**
3 units of B @ Rs. 3 per unit	**9.00**
15 units of C @ Re. 1 per unit	**15.00**
	32.00
Direct labour 3 hrs. @ Rs. 8 per hour	**24.00**
Total standard prime cost	**56.00**

The company manufactured and sold 6,000 units of the product during the year. Direct material costs were as follows :

12,500 units of A at Rs. 4.40 per unit

18,000 units of B at Rs. 2.80 per unit

88,500 units of C at Rs. 1.20 per unit

The company worked 17,500 direct labour hours during the year. For 2,500 of these hours the company paid at Rs. 12 per hour while for the remaining the wages were paid at standard rate. Calculate materials price variances and usage variances and labour rate and efficiency variances.

(b) What are the objectives of Standard Costing Technique?

Answer 25. (a) For material cost variances

Actual cost of material used

A	12,500 units × Rs. 4.40	=	Rs. 55,000
B	18,000 units × Rs. 2.80	=	Rs. 50,400
C	88,500 units × Rs. 1.20	=	Rs. 1,06,200
			Rs. 2,11,600

Standard cost of material used

A	12,500 units × Rs 4.00	=	Rs. 50,000
B	18,000 units × Rs. 3.00	=	Rs. 54,000
C	88,500 units × Rs. 1.00	=	Rs. 88,500
			Rs. 1,92,500

Standard material cost of production 6,000 units x Rs. 32 = Rs. 1,92,000

Variances

Material price variance

= Actual cost of material used – Standard cost of material used

= Rs. 2,11,600 – Rs. 1,92,500

= Rs. 19,100 (A)

Material usage variance

= Standard cost of material – Standard material cost of production

= Rs. 1,92,500 – Rs. 1,92,000

= Rs. 500 (A)

For labour cost variance

Actual wages paid to workers

2,500 hrs. × Rs. 12	=	Rs. 30,000
15,000 hrs. × Rs. 8	=	Rs. 1,20,000
		Rs. 1,50,000

Payment involved, if workers had been paid at standard rate

= 17,500 hrs. × Rs. 8 = Rs. 1,40,000

Standard labour cost of output achieved = 6,000 units × Rs. 24 = Rs. 1,44,000

Variances :

Labour rate variance = Rs. 1,50,000 – Rs. 1,40,000 = Rs. 10,000 (A)

Labour efficiency variance = Rs. 1,40,000 – Rs. 1,44,000 = Rs. 4,000 (F)

Answer 25. (b)

Objectives of Standard costing technique :

- To provide a formal basis for assessing performance and efficiency
- To control costs by establishing standards and analysis of variances
- To enable the principle of 'Management by exception' to be practiced at the detailed, operational level
- To assist in setting budgets
- The standard costs are readily available substitutes for actual average unit costs and can be used for stock and work-in-progress valuations, profit planning and decision making and as a basis of pricing where 'cost-plus' systems are used
- To assist in assigning responsibility for non-standard performance in order to correct deficiencies or to capitalize on benefits
- To motivate staff and management
- To provide a basis for estimating
- To provide guidance on possible ways of improving performance

Q. 26. (a) A raw material X, is used in the production of Chemical M and an extract from the standard cost card for Chemical M showing the rates of usage and expected price is as follows :

Chemical M Standard Cost Card (extract) – Material per unit 10 kgs of X @ Rs. 6 kg = standard material cost.

During the current period 270 units of Chemical M were produced and the usage was 2,850 kgs with an actual material cost of Rs. 16,530. Due to world price movements X was freely available at Rs. 5.5 kg during the period.

Calculate :

(i) The traditional variances

(ii) The planning and operating variances

(b) What are the causes of variance?

Answer 26. (a)

(i) Traditional variances

	Rs.
1. Material price variance Rs. 16,530 – (2,850 x Rs.6)	570 (F)
2. Material Usage Variance (2,850 – 2,700) x Rs. 6	900 (A)
Total material cost variance	330 (A)

(ii) Planning and operating variances/ planning variance (uncontrollable)

(Rs. 2,700 × Rs. 6) – (Rs. 2,700 × Rs. 5.5) = Rs. 1,350 (F)

Operating variances (controllable)

	Rs.
1. Operating price variance Rs. 16,530 – (2,850 x Rs. 5.5) =	855 (A)
2. Operating usage variance (2,850 – 2,700) × Rs. 5.5 =	825 (A)
Total operating material variance	1,680 (A)

Planning variance + Operating variance = Traditional variance

= Rs. 1,350 (F) + 1,680 (A) = Rs. 330 (A)

Note :

1. The planning variance shows the total difference due to uncontrollable factors, i.e., the world-wide price change, and is the difference between old standard price and the new standard price for the standard quantity of material that should be used. If the planning variance is correct all that is left are controllable factors which are analysed by the operating variances.
2. The operating variances follows the normal procedures for material variances except that the new standard price of Rs. 5.5 is used. It will be noted that the operating price variance shows that there have been purchasing inefficiencies which contracts with the traditional price variance which showed apparent purchasing efficiency.

Answer 26. (b)

The causes of variances can be categorized as follows :

(i) Implementation deviation results from a human or mechanical failure to achieve an attainable income.

(ii) Prediction deviation results from errors in specifying the parameter values in decision model.

(iii) Measurement deviation arises as a result of error in measuring the actual outcome.

(iv) Model deviation arises as a result of an erroneous formulation in a decision model.

(v) Random deviations due to chance fluctuations of a parameter for which no cause can be assigned.

Q. 27. S Ltd. Operates a system of standard costing in respect of one of its products which is manufactured within a single cost centre, the following information is available :

For one unit of product the standard material input is 20 litres at a standard price of Rs. 2 per litre. The standard wage rate is Rs. 6 per hour and 5 hours are allowed to produce one unit. Fixed production overhead is absorbed at the rate of 100% of direct wages cost. The material price variance was extracted on purchase.

During the month just ended the following occurred :

Actual price paid for material purchased	**Rs. 1.95 per litre**
Total direct wages cost was	**Rs. 1,56,000**
Fixed production overhead incurred was	**Rs. 1,58,000**

Variances	**Favourable (Rs.)**	**Adverse (Rs.)**
Direct material price	**8,000**	**–**
Direct material usage	**–**	**5,000**
Direct labour rate	**–**	**5,760**
Direct labour efficiency	**2,760**	**–**
Fixed production overhead expenditure	**–**	**8,000**

***Required* :**

Calculate the following for the month:

i. Budgeted output in units
ii. Number of litres purchased
iii. Number of litres used above standard allowed
iv. Actual units produced
v. Actual hours worked
vi. Average actual wage rate per hour.

Answer 27.

i. Budgeted output (in units)

Fixed overhead expenditure = (BH × SR) – (AH x AR)

Or, Rs. - 8,000 = (BH × Rs. 6) – Rs. 1,58,000

Or, BH = (Rs. 1,58,000 – Rs. 8,000)/6 = 25,000

Budgeted output = 25,000/5 = 5,000 units

ii. Number of liters purchased

Material price variance = AQ (SP – AP)

Or, Rs. 8,000 = AQ (Rs. 2.00 – Rs. 1.95)

Or, AQ = 1,60,000 liters

iii. No. of liters used above standard

Material usage variance = SP (SQ – AQ)

Or, Rs. - 5,000 = 2 (SQ – 1,60,000)

Or, SQ = 1,60,000 – (5,000/2) = 1,57,500

No. of liters used above standard allowed

= AQ – SQ = 1,60,000 – 1,57,500 = 2,500 liters

iv. Actual no. of units produced

Direct labour cost variance = (SH × SR) – (AH × AR)

Or, Rs. 2,760 (F) + Rs. 5,760 (A) = (SH × 6) – Rs. 1,56,000

Or, Rs. – 3,000 = (SH × 6) – Rs. 1,56,000

Or, SH = (1,56,000 – 3,000)/6 = 25,500

Actual number of units produced = 25,500/5 = 5,100

v. Actual hours worked

Direct labour efficiency variance = SR (SH – AH)

Or, Rs. 2,760 = 6 [(5,100 × 5) – AH]

Or, AH = 1,50,240/6 = 25,040 hours

vi. Actual wage rate per hour $= \frac{\text{Actual direct wage cost}}{\text{Actual hours}}$

$= \frac{\text{Rs. } 1,56,000}{25,040} = \text{Rs. } 6.23$

Q. 28. Calculate all the Sales Variance on Sales Margin basis from the following information provided by Bidyut Ltd.

Product	Budgeted sales quantity	Budgeted selling price per unit	Standard cost per unit	Actual sales quantity units	Actual selling price per unit	Actual cost per unit
A	60	20	15	44	25	16
B	40	10	4	66	5	5

Also reconcile the standard profit with actual profit.

Answer 28.

Basic calculation :

1. Budgeted margin per unit (BM) = Budgeted selling price per unit – Standard cost per unit

Product A = Rs. 20 – RS. 15 = Rs. 5

Product B = Rs. 10 – Rs. 4 = Rs. 6

2. Actual margin per unit (AM) = Actual selling price per unit – Standard cost per unit

Product A = Rs. 25 – Rs. 15 = Rs. 10

Product B = Rs. 5 – Rs. 4 = Re. 1

Basic calculation for the computation of sales variances (on sales margin basis)

Product	BQ	BM	BQ x BM (1)	AQ	AM	AQ x AM (2)	AQ x BM (3)	RQ	RQ x BM (4)
A	60	5	300	44	10	440	220	66	330
B	40	6	240	66	1	66	396	44	264
Total	100		540	110		506	616		594

Sales margin (profit) variance (2 – 1) = (AQ × AM) – (BQ × BM)
= Rs. 506 – Rs. 540 = Rs. 34 (A)

Sales margin price variance (2 – 3) = (AQ × AM) – (AQ × BM)
Product A = Rs. 440 – Rs. 220 = Rs. 220 (F)
Product B = Rs. 66 – Rs. 396 = Rs. 330 (A)
Rs. 110 (A)

Sales margin volume variance (3 – 1) = (AQ × BM) – (BQ × BM)
Product A = Rs. 220 – Rs. 300 = Rs. 80(A)
Product B = Rs. 396 – Rs. 240 = Rs. 156 (F)
Rs. 76 (F)

Sales margin mix variance (3 – 4) = (AQ × BM) – (RQ × BM)
Product A = Rs. 220 – Rs. 330 = Rs. 110 (A)
Product B = Rs. 396 – Rs. 264 = Rs. 132 (F)
Rs. 22 (F)

Sales margin sub-volume variance = (AQ – BQ) × Average budgeted margin
$= (110 - 100) \times \frac{\text{Rs. } 540}{100}$ = Rs. 54 (F)

Verification :

1. Sales margin variance = Sales margin price variance + Sales margin volume variance
= Rs. 110 (A) + Rs. 76 (F) = Rs. 34 (A)
2. Sales margin volume variance = Sales margin volume variance + Sales margin sub-volume variance
= Rs. 22 (F) + Rs. 54 (F) = Rs. 76 (F)

Statement reconciling the standard profit with actual profit

		Rs.	Rs.
A.	Budgeted profit		
	Product A [60 × Rs. 5]	300	
	Product B [40 × Rs. 6]	240	540
B.	*Add* : Fav. Sales margin volume variance		76
C.	Standard profit [A + B]		616
D.	*Less* : Adverse Sales price variance	110	
	Adverse cost variance : Product 'A' 44 × (Rs. 15 – Rs. 16)	44	
	Product 'B' 66 × (Rs. 4 – Rs. 5)	66	220
E.	Actual profit [C – D]		396

Verification : Actual profit = [44 × (Rs. 25 – Rs. 16] + [66 × (Rs. 4 – Rs. 5)] = Rs. 396

Costing and performance management :

Q. 29. (a) Write short notes on Value Analysis.

(b) Enumerate the benefits of transfer pricing policy.

Answer 29. (a)

Value Analysis *:* It is one of the important tools of modern management in the area of cost reduction. It is also known by other names such as value engineering, value control and product research. Value analysis is the process of systematic analysis and evaluation of various techniques and functions with a view to improve organisational performance. It aims at reducing and controlling the cost of a product from the point of view of its value by analysing the value currently received. It investigates into the economic attributes of value analysis, believes in a planned action to improve performance and thereby, generates higher value in a product and ultimately causes reduction in its cost.

The meaning of the term value may vary from person to person, time to time and place to place. However, in the context of cost reduction and control it refers to the 'use value'.

The reduction in the costs of a product and thus increasing the profitability of a concern is the main advantage of value analysis.

The benefits of value analysis are being derived in many industries, e.g., engineering, building construction and the oil industry. It is being applied to components of a product, finished product and also to be methods of packaging.

The various steps involved in value analysis are;

(a) Identification of the problem;

(b) Collecting information about the function, design, material, labour, overhead costs, etc., of the product and finding out the availability of the competitive products in the market; and

(c) Exploring and evaluating alternatives and developing them.

Answer 29. (b)

An ideal transfer pricing policy will benefit the organization in the following ways :

- Divisional performance evaluation is made easier.
- It will develop healthy inter-divisional competitive spirit.
- Management by exception is possible.
- It helps in co-ordination of divisional objectives in achieving organizational goals.
- It provides useful information to the top management in making policy decisions like expansion, sub-contracting, closing down of a division, make or buy decisions, etc.
- Transfer price will act as a check on supplier's prices.
- It fosters economic entity and free enterprise system.
- It helps in self-advancement, generates high productivity and encouragement to meet the competitive economy.
- It optimizes the allocation of company's financial resources based on the relative performance of various profit centres, which in turn are influenced by transfer pricing policies.

Q. 30. (a) Discuss different methods of establishment of Target cost.

(b) Discuss briefly the meaning of cost plus pricing and elaborate up on the various advantages and disadvantages of this approach.

Answer 30. (a)

Three basic methods are used for setting target costs :

First, there is the subtraction method which is based on the price of competitors' product**,** where the target cost is worked backwards from the market price. The result may represent a very rigorous target, and it may be impossible to achieve.

The second method of setting up the target cost is the addition method which is based on the existing technology and past cost data of the company. Normally it results in achievable targets because it is basically an extension of what has already been happening within the company. The greatest disadvantage of this method is that it is very inward looking and grossly ignores the market situation.

The third method is the integrated method, a mixture of the subtraction and addition methods. However, in practice this integrated method involves many difficult problems.

Answer 30. (b)

Cost plus pricing refers to a pricing technique in which selling prices of a product are determined based on its estimated cost plus a fixed profit margin. For purposes of cost plus pricing, 'Cost' means full cost at current level of production/ operation and wage levels since these are regarded as most appropriate for price determination purposes.

The following are the various advantages and disadvantages of cost plus pricing method.

Advantages :

- The use of cost plus pricing technique ensures a guaranteed contribution to a firm – This contribution is suffice to recover all the fixed costs and provides positive profits.
- Since the use of cost plus pricing assures that the price is more that the cost of a product, there are lesser risks and uncertainties involved in the adoption of this method.
- This pricing method is most suited for the long run since there are no permanent opportunity costs involved. The prices are based on the normal long run costs. This ensures that the seasonal fluctuations are taken care of.
- The mark up considered in cost plus pricing is normally the cost of capital of the firm. The cost of capital is arrived at by considering the market forces being exerted in the business environment. Hence it can be said that cost plus pricing technique takes into account various market forces while arriving at the desired selling price.
- Prices when fixed on a cost plus basis provide stability in the long run. This facilitates planning.
- The use of cost plus pricing does not take into account the buyers needs and willingness variable. This makes the formulae simple and easy to use.

Disadvantages :

- The concept of cost plus pricing does not take into account the buyers needs and willingness to pay.
- Cost plus pricing assumes that costs have been estimated and allocated with accuracy. This may not be true in cases of multi product firms.
- In specific circumstances, incremental costs play an important role for decision making purposes. The concept of cost plus may not be of any help in such situations. It may lead a firm towards ignoring opportunity costs which may result in a wrong price fixation.

Cost plus pricing gives undue importance to the concept of capacity utilization. During times of short product life cycles and frequent innovation, the absorption of fixed overheads on the basis of capacity may be erroneous and detrimental for an organization.

Q. 31. (a) What is meant by 'Inter-firm comparison'?

(b) What are the limitation of Activity based costing?

Answer 31. (a)

It is the technique of evaluating the performance efficiency, costs and profits of firms in an industry. It consists of voluntary exchange of information/data concerning costs, prices, profits, productivity and overall efficiency among firms engaged in similar type of operations for the purpose of bringing improvement in efficiency and indicating the weaknesses. Such a comparison will be possible where uniform costing is in operation.

An inter-firm comparison indicates the efficiency of production and selling, adequacy of profits, weak spots in the organisation, etc and thus demands from the firm's management an immediate suitable action. Inter-firm comparison may enable the management to challenge the standards which it has set for itself and to improve upon them in the light of the current information gathered from more efficient units. Such a comparison may be pharmaceuticals, cycle manufacturing, etc.

Answer 31. (b)

Though Activity based costing system is very effective, it suffers from some limitations as given below :

(i) Activity based costing is a complex system and requires lot of records and tedious calculations.

(ii) For small organization, traditional cost accounting system may be more beneficial than activity based costing due to the simplicity of operation of the former.

(iii) Sometimes it is difficult to attribute costs to single activity as some costs support several activities.

(iv) There is a need of trained professionals who are limited in number.

(v) Substantial investment of time and money is required for the implementation of this system.

Recent trends in cost and management accounting :

Q. 32. (a) Define Cost Audit, How it is useful to the *Management*.

(b) What are the various techniques of cost reduction?

Answer 32. (a)

According to the Institute of Cost and Management Accountants of England, Cost Audit is defined as the verification of Cost Accounts and a check on the adherence to the Cost Accounting plan. The cost audit, therefore comprises :

(i) the verification of the cost accounting records such as the accuracy of the cost accounts, cost reports, cost statements, cost data, costing techniques and

(ii) examining these records to ensure that they adhere to the cost accounting principle, plans, procedures and objectives.

Usefulness of Cost Audit

Cost audit will prove to be useful to the management, society, shareholders and the government as shown below.

Usefulness to the Management :

(i) The management will get reliable data for its day to day operations like price fixing, control, decision making, etc.

(ii) A close and continuous check on all wastages will be kept through a proper system of reporting to the management.

(iii) Inefficiencies in the working of the company will be brought to the notice of the management to take corrective action.

(iv) Management by exception becomes possible through allocation of responsibilities to individual managers.

(v) The system of budgetary control and standard costing will be greatly facilitated.

(vi) A reliable check in the valuation of closing stock and work-in-progress can be established.

(vii) It helps in the detection of errors and fraud.

Answer 32. (b)

The various techniques of cost reduction include :

(i) Inventory control techniques (such as EOQ)

(ii) Labour control techniques 9such as time and motion study)

(iii) Production planning and control (such as economic batch quantity)

(iv) Quality control techniques (such as statistical quality control techniques)

(v) Value analysis

(vi) Improvement in product design

(vii) Substitute material utilization

(viii) Operational research

(ix) Market research

(x) Standardization and simplification.

INTERMEDIATE EXAMINATION

(REVISED SYLLABUS - 2008)

GROUP - II

Paper-9 : OPERATION MANAGEMENT AND INFORMATION SYSTEMS

Section I : Operation Management

Q. 1.(a) Choose the most correct alternative :

(i) Job evaluation determines —

(A) relative worth of job holders

(B) relative worth of various jobs

(C) time taken for a job

(D) bonus

(ii) Cost Reduction can be achieved through :

(A) Work Sampling

(B) Value Analysis

(C) Quality Assurance

(D) Supply Chain management

(iii) Enameling is a —

(A) Heat Treatment Process

(B) Surface Treatment Process

(C) Machining Process

(D) Extrusion Process

(iv) ALDEP is a technique used in :

(A) Production Planning.

(B) Resource Management.

(C) Plant Layout.

(D) Maintenance Management.

(v) Control chart for proportion of defectives is —

(A) c-chart

(B) N-chart

(C) X chart

(D) p chart

(vi) Time Study aims

(A) to check what the worker is doing during the work

(B) to find the time taken by a worker to do the job

(C) to find out the time required to do a job

(D) to determine how to do a job

(vii) Jigs are used in machine tool for holding :

(a) tools

(b) work piece

(c) head stock

(d) tail stock

(viii) Specifying the order in which individual jobs are to be executed :

(A) Planning

(B) Loading

(C) Sequencing

(D) Routing

(ix) Independent float is

(A) Total float - Head Slack

(B) Earliest Start Time- Earliest Finish Time

(C) Free Float – Total Float

(D) None of the above.

(x) Ergonomics is

(A) fitting the job to worker

(B) fitting worker to job

(C) study of work content of job

(D) study of time required for a job

Q. 1.(b) Fill in the blanks with appropriate word/words.

(i) Plant layout is a _____ affair.

(ii) Optimum Capacity is rate of output at which there is _____ to change the size of the plant.

(iii) Under input-output analysis only _____ input is treated as scarce.

(iv) Labour Rate Variance is Actual Rate minus Standard Rate multiplied by _____ hours.

(v) Centrifugal pumps convert _____ energy into hydraulic energy.

(vi) Shift working is suitable in case of _____ intensive technology.

(vii) Acceptance number is the maximum number of _____ items in a sample.

(viii) PERT is used in _____ jobs.

(ix) X chart is _____ chart.

(x) Ranking is a _____ method.

Answer 1. (a)

(i) (B) relative worth of various jobs
(ii) (B) Value Analysis
(iii) (B) Surface Treatment Process
(iv) (C) Plant Layout
(v) (D) p chart
(vi) (C) to find out the time required to do a job
(vii) (A) tools
(viii) (C) Sequencing
(ix) (B) Earliest Start Time - Earliest Finish Time
(x) (A) fitting the job to worker

Answer 1. (b)

(i) dynamic
(ii) no incentive
(iii) labour
(iv) Actual
(v) mechanical
(vi) capital
(vii) defective
(viii) non-repetitive
(ix) mean
(x) Job Evaluation

Q. 2.(a) Match each item in Column A with appropriate item in Column B :

Column A	*Column B*
(i) Pareto Analysis	**(A) Job Sequencing**
(ii) CORELAP	**(B) Plant Layout**
(iii) Pickling	**(C) Investment decision**
(iv) Payback period	**(D) Surface Treatment**
(v) EDD	**(E) Transportation Analysis**
(vi) Failure Analysis	**(F) Inventory Control**
(vii) VAM	**(G) Marketing strategy**
(viii) VA	**(H) Cost Control**
(ix) USP	**(I) Maintenance System**
(x) SOT	**(J) Priority Rules**

Q. 2.(b) Expand the following acronyms:

(i) MTBF
(ii) PMTS
(iii) CRAFT

(iv) MBO
(v) IPPS
(vi) BIS
(vii) OCC
(viii) BOM
(ix) 5 S
(x) VFM

Q. 2. (c) Indicate whether the following statements are *True*/*False*.

(i) Industrial Engineering is a staff function.
(ii) Lathe is a special purpose machine.
(iii) Efficiency is 'doing right things.'
(iv) Casting is the process of pouring a molten metal into a prepared cavity.
(v) A slack variable represents unused capacity.
(vi) MRP is a marketing technique.
(vii) Total output of all sectors is equal to total input of all sectors.
(viii) Maintenance management should reduce overall cost of maintenance.
(ix) EOQ formula does not consider storage cost.
(x) SIMO chart is used in Quality Control.

Answer 2. (a)

(i) – (F)
(ii) – (B)
(iii) – (D)
(iv) – (C)
(v) – (A)
(vi) – (I)
(vii) – (E)
(viii) – (H)
(ix) – (G)
(x) – (J)

Answer 2. (b)

(i) MTBF - Mean Time Between Failures.
(ii) PMTS - Predetermined Motion Time Systems.
(iii) CRAFT - Computarised Relative Allocation of Facilities Techniques
(iv) MBO - Management by Objectives
(v) IPPS - Integrated Production Planning System.
(vi) BIS - Bureau of Indian Standard
(vii) OCC - Operating Characteristic Curve.
(viii) BOM - Bill of Materials.

(ix) 5 S - Seiri, Seiso, Seiton, Seiketsu, Shisuke.

(x) VFM - Value for Money.

Answer 2. (c)

(i) True.

(ii) False – It is a general purpose machine.

(iii) False – It is 'doing things right'.

(iv) True.

(v) True.

(vi) False – It is a production technique.

(vii) True.

(viii) True.

(ix) False – EOQ does not consider stock out cost.

(x) False – It is used in Method Study.

Q. 3. (a) Distinguish between a job shop and a flow shop.

(b) 'Toyotoy' is a worldwide popular Brand among the toy industries. At preset the producer of the 'Toyotoy' is producing 60000 units annually. The total capital employed in this business till date is Rs. 25 crores. The current year's surplus is Rs. 1.25 crores. Due to some imbalance the production shop's capacities are not fully utilized, indication of which is narrated below :

Production shop	*Capacity utilized*
Moulding Shop	**75%**
Assembly Shop	**80%**
Treatment Shop	**75%**

The company at present operates in single working shift of 8 hours per day on an average for 300 working days in a year. Due to some other litigation the company has to operate on single shift basis only.

An OMC consultant derived two alternatives after detailed study.

***Alternative (a)* To hire out the surplus unutilized capacity in the production shops for which constant demand exists. The revenue-cost table of those aiternatives are drawn out :**

Shop	*Hire Charges per hour (Rs.)*	*Incremental cost per hour (Rs.)*
Moulding Shop	**10000**	**2000**
Assembly Shop	**8500**	**2500**
Treatment Shop	**6000**	**1500**

***Alternative (b)* To increase the installed capacity to 75000 units by spending Rs. 3 crores on additional machines as required. The incremental revenue from the additional sales will be Rs. 500 per toy. In addition, tax benefit on an average will be 1 % of the additional investment.**

You are required to advise :

(i) On the average rate of return when the surplus capacity is hired out.

(ii) On the average rate of return when the capacity is increased as decided.

(iii) Alternative to which the company should opt for.

Answer 3. (a)

Flow Shop	Job Shop
(i) In a flow shop, continuous production/ assembly line, each of the *n* jobs must be processed through *m* machines in exactly the same order and once in every machine.	In a job shop, not all *n* jobs are assumed to pass through or require processing in *m* machines. Also some jobs may require more than one operation in the same machine. The sequencing of operations, may be different for different jobs.
(ii) Specialised machine results in low variable cost per unit and high volume absorbs the fixed cost easily; so unit cost is low.	Wide variety at reasonably low cost since general purpose machines are utilized.
(iii) Even unskilled or semi-skilled operator will be able to operate the machine thereby reducing dependencies on workers.	Through grouping of facility around standard operations, high capacity utilization could be effected.
(iv) Operation management is much simpler and meeting delivery commitments is relatively easier.	The workers are engaged in non-repetitive and challenging job. Their job gets enriched and morale high.
(v) Failure at any stage would result in breakdown of entire flow until repair is completed.	Determination of optimum batch size creates a problem
(vi) The pace of production is determined by the slowest machine.	Material flow is complicated and unsystematic.
(vii) The system is relatively inflexible.	Machines are diverse and operations are complex requiring highly skilled workers.
(viii) The system requires high investment due to specialized nature of machine.	Material Handling cost is usually higher since flow lines are irregular.

Answer 3. (b)

Statement of capacity (utilized and unutilized)

Production Shop	*Available hours in a year*	*Utilized*		*Unutilized*	
		Capacity (%)	*Hours*	*Capacity (%)*	*Hours*
Moulding shop	2400	75	1800	25	600
Assembly shop	2400	80	1920	20	480
Treatment shop	2400	75	1800	25	600

Alternative (a)

Where surplus capacity is hired out:

Incremental Revenue:		*Rs.*	*Rs.*
Moulding shop	600 hours @ Rs. 10000		60,00,000
Assembly shop	480 hours @ Rs. 8500		40,80,000
Treatment shop	600 hours @ Rs. 6000		36,00,000
			1,36,80,000

Less incremental cost :

Moulding shop	600 hours @ Rs. 2,000 =	12,00,000	
Assembly shop	480 hours @ Rs. 2,500 =	12,00,000	
Treatment shop	600 hours @ Rs. 1,500 =	9,00,000	33,00,000
Profit on hiring			1,03,80,000
Existing profit			1,25,00,000
			2,28,80,000

Return on Capital employed = 2,28,80,000 × 100 ÷ 25,00,00,000 = 9.152%

Alternative (b)

Where capacity is increased by 15000 units per annum :

Time required for production of additional 15000 units :

Production Shop	*Hours required for 15000 unit p.a.*	*Unutilized hours available*	*Remark*
Moulding shop	1800 × 15000/60000 = 450	600	150 hrs. still unutilised
Assembly shop	1920 × 15000/60000 = 480	480	Fully utulised
Treatment shop	1800 × 15000/60000 = 450	600	150 hrs. still unutilised

	Rs.
Incremental revenue from 15000 toys @ Rs. 500	75,00,000
Add :	
(a) Net incremental revenue from unutilized excess hours after utilizing hours for 15000 units at Moulding shop & Treatment shop 150 hrs. [(Rs. 10000 - Rs. 2000) + (Rs. 6000 - Rs. 1500)]	18,75,000
(b) 1% of additional investment on account of Tax benefit 1% on Rs. 3 crores	3,00,000
	96,75,000
Existing profit	1,25,00,000
Total profit	2,21,75,000

Existing capital employed = Rs. 25,00,00,000

Additional capital employed = Rs. 3,00,00,000

Total capital in business = Rs. 28,00,00,000

Return on capital employed = 22175000 × 100/28,00,00,000 = 7.919%

The company should opt for hiring out the unutilized capacity.

Q. 4. (a) What are the material handling equipments you would choose for handling:

(i) For movement of small components in a shop.

(ii) Handling heavy machine parts within small radial distance.

(iii) Feeding coal and iron in a steel plant.

(iv) Picking up bits of iron and steel in a scrap yard.

(v) Handling crates on pallets within a factory.

Answer 4. (a)

(i) Hand Trolley.
(ii) Jib Crane.
(iii) Belt Conveyor.
(iv) Electromagnet.
(v) Fork-lift Truck.

Q. 4. (b) Mention the metal working process involved in carrying out following operations :

(i) Joining two metallic objects.
(ii) Cutting a 'V' groove on a flat surface.
(iii) Making a cylindrical hole of an object.
(iv) Reducing diameter of a cylindrical object.
(v) Removing metal from inside a hole.

Answer 4. (b)

(i) Welding.
(ii) Shaping
(iii) Drilling
(iv) Turning
(v) Broaching

Q. 4. (c) Dumpers are used to transport the Steel Ingots from Melting Shop to Ingot Yard, which is situated at a distance of 0.6 km from the melting shop. The capacity of the dumper is 8 tonnes. Due to speed restrictions, within factory the dumper cannot run beyond 12 Km/per hour. In order to avoid congestion in the Melting shop, a minimum transportation of 3200 Tonnes is necessary per shift (of 8 hrs. duration). Find the number of dumpers that would be required. Ignore the loading and unloading time.

Answer 4. (c)

Distance travelled per trip = 0.6 + 0.6 = 1.2 Km.

No. of trips can be made per hour = 12/1.2 = 10 trips.

No. of trips per single shift=10 × 8=80 trips.

Tonnage moved per shift = 80 × 8 = 640 tonnes.

No. of dumpers required = Required tonnage to move per shift/Tonnage moved per shift per dumper = 3200/640=5 Nos.

Q. 4. (d) A crane wheel assembly is made of cast steel wheel and two gun metal bushes. Find the cost of the assembly assuming no special tooling are required and using the details given:

	Cast Wheel	Gun Metal Bush
(i) Weight of each raw casting	**25 Kg**	**3 Kg**
(ii) Material Cost/Kg	**Rs. 20**	**Rs. 60**
(iii) Sale price of Scrap/Kg	**Rs. 4**	**Rs. 40**
(iv) Finished weight /unit after machining	**20 Kg**	**2 Kg**
(v) Machine hours required per unit :		
A. Boring Machine	**6 Hrs.**	**–**
B. Lathe	**–**	**1.5 Hrs.**

Machine Hour Rates are Rs. 40/ hr. for Boring

Machine Hour Rates are Rs. 20/hour for Turning

Assembly takes ½ Hr., costs Rs. 10/ hr. and consumes hardware worth Rs. 5.

Answer 4. (d)

Material Cost = (Cost of Raw Casting + Cost of Hardware) – (Scrap Sale)

= Rs. [(25 × 20) + (2 × 3 × 60) + 5] – [4(25 – 20)+(20 × 40(3 – 2)]

= Rs.765/-

Machining Cost = [Machine Hr. Rate × Machine Hr. required]

= [(40 × 6) + (2 × 20 × 1.5)]

= Rs. 300

Assembly Cost = Rs. (10 × 0.5) = Rs. 5

Therefore, Total Cost = Material Cost+ Machining Cost+ Assembly Cost.

= Rs. (765 + 300 + 5)

= Rs. 1070/-

Q. 5. (a) A warehouse handles 60,00,000 cases each of inbound and outbound shipments per year, operating two shifts a day, five days a week. (Each shift is of 8 hours durations). 70% of inbound shipments and 90% of outbound shipments are by trucks.

The truck loading rate is 175 outbound cases per worker-hour while the unloading rate is 200 inbound cases per worker-hour.

A truck carries 500 cases for both inbound and outbound shipments.

A 25% safety factor is desired since flow of the trucks throughout the month is not uniform. The trucks stand at the entry to the warehouse while being loaded or unloaded. The warehouse manager wants to design a new warehouse with sufficient number of truck entries to the warehouse to handle the operations mentioned above.

Please calculate the number of truck-entries the warehouse should have, from the data given above; assuming that the width of the entry permits only one truck to be loaded or unloaded at a time.

(b) Manufacture of a Gunmetal bush requires operations on Lathe, Milling and Drilling machine tools. The standard times, operator efficiencies and machine availabilities of each of the machine tools are as follows :

Machine tools	Operator Efficiency	Std. Man-hrs/bush	M/c tool availability
Lathe	75%	0.15	95%
Milling	80%	0.20	75%
Drilling	80%	0.10	75%

(i) If the Factory operates one shift of 8 hours for 6 days in a week, how many each of Lathe, Milling and Drilling m/cs will be required to produce 2000 bushes/week?

(ii) What will be the spare capacity available on each of the machine tools?

Answer 5. (a)

(i) Inbound Requirements :

a. (% Inbound via Truck) × (Total Inbound)
= (60,00,000 × 0.7) = 42, 00,000 cases.

b. Inbound Trucks required = (Total lnbound Cases)/Cases per Truck)
= 42, 00,000/ 500 = 8,400 Trucks.

c. Hours per Truck = (Cases per Truck)/(Inbound Productivity)
= 500/200 = 2.5 Hrs per Inbound Truck.

d. Total Inbound Truck- Hours = (b × c)
= (8,400 × 2.5) = 21,000 Hrs/Yr.

(ii) **Outbound Requirements :**

a. (% Outbound via Truck) x (Total Outbound) = (60,00,000 × 0.9) = 54,00,000 cases.

b. Outbound Trucks required = (Total Outbound Cases)/Cases per Truck)
= 54,00,000 / 500 = 10,800 Trucks.

c. Hours per Truck = (Cases per Truck)/(Outbound Productivity)
= 500/175 = 2.85 Hrs per Outbound Truck

d. Total Outbound Truck-Hours = (b × c)
= 10,800 × 2.85 = 30,780 Hrs/Year.

(iii) **Total Hours Required :**

a. Inbound	= 21,000 Hrs.
b. Outbound	= 30,780 Hrs.
c. Sub-Total	= 51,780 Hrs.
d. Safety Factor for peaking (25%)	= 12,495 Hrs.
e. Total	= 64,725 Hrs.

(iv) **Hours Available per Year :**
= (52 weeKs) × (Hrs per Day) × (Days per week)
= 52 × 16 (2 shifts / day) × 5 = 4,160 Hrs.

(v) **Truck Entries required :**
= (Truck-Hours required) / (Annual Hours Available)
= 64,725 Hrs / 4,160 Hrs. = 15.5 say 16.

Answer 5. (b)

Number of Lathes required :

Total working hrs. in a week = 8 × 6 = 48 hours.
Lathe available hours = 95% of 48 = 0.95 × 48 hours.
Standard man-hours/bush = 0.15 hours.
Lathe operator efficiency = 75%.

So, one operator in 1 lathe requires/bush= 0.15/0.75 = 0.20 hours.
Therefore, 1 lathe can produce/week 0.95 × 48 / 0.20 numbers of bushes
= 228 numbers.
So, number of Lathes required to produce 2000 bushes/week
= 2000/ 228 = 8.7 Le., 9 Lathes.

Spare capacity on Lathe =
(9 × 228 – 2000) × 100/(9 × 228)
= 5200/2052% = 2.5%

Number of Milling Machines required :
Standard Man-hours for bush Milling = 0.20
Milling operator efficiency = 80%
So, 1 Milling machine takes 0.20/ 0.80 = 0.25 hours per bush.
So, 1 Milling machine can produce 0.75 × 48 / 0.25 bushes
= 144 nlimbers.

So, number of Milling machines required to produce 2000 bushes per week=
2000/144 = 13.8 i.e., 14 Milling machines.
Spare capacity of 14 Milling machines
= (14 × 144 – 2000) × 100/ (14 × 144)
= 1600/2016 = 0.7% .

Drilling Machines Required :
Standard Man-hours for Drilling bush = 0.10
Drilling operator efficiency = 80%
So, 1 Drilling machine takes 0.1 0/ 0.80 = 0.125 hours per bush.
So, 1 Drilling Machine can produce 0. 75 × 48/0.125 bushes per week = 288 numbers.
So, to produce 2000 bushes/week, number of Drilling machines required= 2000/288
= 6.9 i.e., 7 Drilling Machines.
Spare capacity of 7 drilling machines = (7 × 288 – 2000) × 100/(7 × 288)
= 1600/2016 = 0.7%.

Q. 6. (a) Differentiate between :

(i) Cost control and cost reduction.

(ii) Job Analysis and Value Analysis.

(iii) Stock turnover and labour turnover.

(iv) EOQ and BEP

(b) Define Motion Study. What are the steps involved in carrying out Motion Study.

(c) What do you understand by Ergonomics?

(d) The targeted weekly output of a manufacturing unit employing 20 workers is 400 pieces. The group is entitled to earn an incentive @ 10% on aggregate of wages based on basic piece rate plus dearness allowance (which is Rs. 120 per week) upon achievement of a minimum of 80% of

the output target. This incentive rate is increased by 2.5 % flat for every 10% increase in achievement of targets upto a maximum of 10% at the level of 120% of the output target in the following manner :

Output Target	Incentive Rate
80%-90%	10%
90%-100%	12.5%
100%-110%	15%
110%-120%	17.5%
120% and above	20%

During the four weeks in February, the actual output achieved by the workers are 383 pieces, 442 pieces, 350 pieces and 318 pieces respectively. The average basic rate is Rs. 5 Compute the amount of incentive earned by the group during each of the four weeks.

Answer 6. (a)

(i)

Cost Reduction	Cost Control
(i) It is corrective function.	It is preventive function
(ii) Emphasis is on present and future cost.	Emphasis is on present and past behaviour of cost.
(iii) Challenges the cost standards itself and tries to reduce cost on continuous basis.	Involves setting standards, analyzing variances and taking corrective actions.
(iv) Can be applied to each and every area of business.	Limited to areas where standards can be set.
(v) Calls for change in conditions if that leads to lowering in cost.	Aims at lowest possible cost under given conditions.
(vi) The programme can be finished	It is ongoing or never ending process

(ii)

Job Analysis	Value Analysis
(a) Process of determining task components or work content of a job so as to access relative worth of different jobs.	Systematic application of established techniques to identify functions of product or component and to provide those functions at lowest possible cost.
(b) Technique of merit rating	Technique of cost reduction

(iii)

Stock Turnover	Labour Turnover
(1) It indicates number of times inventory of an organization is rotated during the year.	Rate of change in average labour force during the year.
(2) Increase in stock turnover is a healthy sign for the organization as it indicates increase in sales resulting in increased revenue for the organization.	Increase in labour turnover is not a good sign for management as it indicates dissatisfaction among employees resulting loss in productivity and increased costs.

(iv)

EOQ	BEP
(1) Optimum order quantity or lot size where total inventory costs (holding+carrying) are minimum.	Level of operations at which there is no profit or loss.
(2) EOQ is the lot size where two cost curves (holding&carrying) intersect each other.	BEP is point is the point where TCC and TRC intersect each other.It shows effect of fixed and variable costs, prices on profitability of an enterprise.
(3) Inventory control technique.	Helps management in capacity planning, product mix decisions, make or buy decisions, plant shutdown decisions etc.

Answer 6. (b)

Motion Study is a scientific and critical analysis of motions made by man or machine to perform a job so as to eliminate wasteful and unwanted motions. Steps involved in motion study are as follows:

(i) Selecting the job or process to be studied keeping in view human, technical and economic factors.

(ii) Breaking the job into elements and recording all facts regarding the work methods.

(iii) Analysing the recorded facts so as to identify defects in existing methods. The purpose and sequence of every operation is to be critically analysed.

(iv) After analyzing existing methods, developing new methods thus eliminating the defects in existing methods.

(v) Defining new methods and its requirements.

(vi) Installing the new method after proper training of the concerned staff.

(vii) Maintaining the new method with help of control procedures.

Answer 6. (c)

Ergonomics involves fitting job to the worker so as to minimize fatigue and increase productivity and job satisfaction. Ergonomics uses the knowledge of anatomy, physiology, psychology, to study the man-machine system so as to design machine for users, to blend man and machine into single working unit. Ergonomics facilitates better utilization of human and physical resources.

Ergonomics covers the following areas :

(i) **Workplace :** Consists of layout, information and controls.

(ii) **General environment :** Comprises of lighting , ventilation, noise, vibration and other factors affecting health and wellbeing of workers.

(iii) **Other factors :** Fatigue, vigilance, inspection, problem of disabled workers etc.

Answer 6. (d)

Computation of incentives by group in February

Particulars	Weeks			
	1st	2nd	3rd	4th
Actual output achieved (nos. of pieces)	383	442	350	318
Achievement (%) with respect to Standard(actual output/targeted output) × 100	95.75%	110.5%	87.5%	79.5%
Wages at piece rate (Rs.5 × quantity) [Rs]	1915	2210	1750	1590
Dearness Allowance [Rs.]	120	120	120	120
Total [Rs.]	2035	2330	1870	1710
Incentive Rate (%)	12.5%	17.5%	10%	NIL
Incentive amount earned by group (Rs.)	254.38	407.75	187	NIL

Q. 7. (a) The order position (i.e requirements of dispatch) for the next twelve months in respect of a particular product is as under :

Month	Required units
1	13000
2	12000
3	10000
4	9000
5	11000
6	13000
7	11000
8	7000
9	15000
10	13000
11	12000
12	10000

The production capacity of the shop is 10000 units per month on regular basis and 3000 units per month on overtime basis. Sub-contracting can be relied upon up to a capacity of 3000 units per month after giving a lead time of 3 months.

Cost data reveal as under :

Rs. 5/- per piece on regular basis.

Rs. 9/- per piece on overtime basis.

Rs. 7/- per piece on sub-contract basis.

Assuming an initial inventory of 1000 units and that no back logging of orders is permissible, suggest an optimal production schedule. Also work out the total cost on the basis of the suggested schedule.

(b) A firm has to place orders for the supply of raw materials every three months. The raw materials are procured from a supplier at periodic intervals. The annual requirements of the raw materials amount to Rs. 12 lacs. The cost of ordering is estimated to be Rs. 5000/- per order and the cost of carrying inventory is estimated to be 25% of the value of inventory. Average lead time for procurement of the raw materials from the supplier is observed to be two months. The demand for the raw materials can be approximated to a normal distribution with a standard deviation of Rs. 1 lac per period. Design an inventory system for the raw materials for a service level of 97.5%.

(c) Discuss the managerial uses of Break-even Analysis.

Answer 7. (a)

O/T cost per piece is more than sub-contracting cost, so the latter will always be preferred. Backlogging of orders is not possible, so O/T has to be resorted to initially. The Optimum production schedule is tabulated below :

Month	Required no. of units ('000)	No. of units production'000		Sub-contract ('000)		Inventory at the end of month ('000) units
		Regular Time	Over Time	Order placed for	Delivered	
1	13	10	2	-	-	0
2	12	10	2	-	-	0
3	10	10	0	3	-	0
4	9	10	0	1	-	1
5	11	10	0	-	-	0
6	13	10	0	2	3	0
7	11	10	0	3	1	0
8	7	10	0	2	-	3
9	15	10	0	-	2	0
10	13	10	0	-	3	0
11	12	10	0	-	2	0
12	10	10	0	-	-	0

Cost of production on regular basis = Rs. 1,20,000 × 5 = Rs. 6,00,000/-

Cost of production on overtime basis = Rs. 4,000 × 9 = Rs. 36,000/-

Cost of subcontracting = Rs. 11,000 × 7 = Rs. 77,000/-

Cost of carrying inventory = Rs. 4,000 × 1 = Rs. 4,000/-

Total cost on the basis of the suggested schedule

= Rs. 6,00,000 + Rs. 36,000 + Rs. 77,000 + Rs. 4,000/-

=Rs.717000/-

Answer 7. (b)

Let the cost of the item = Rs. C/unit

No. of units in one year = Rs.1200000/C

Inventory Carrying Cost = 0.25C

EOQ in units = $\sqrt{[2 \times (1200000/C) \times 5000]/0.25C}$ = 219089/C

So EOQ in rupee terms = EOQ in units × C= Rs. 2,19,089.

No. of orders per annum = 1200000/219089 = 5.48 i.e 5 to 6 orders.

Ordering policy is quarterly , i.e 4 orders per annum. Hence, it is not optimal.

Average lead time consumption = $\frac{12,00,000}{12} \times 2$ = Rs. 2,00,000.

Inventory System Design :

Since company has to place orders every three months, the inventory system at a 97.5% service level may be computed as under:

S.D per period = Rs. 1 lac (period signifies present ordering period i.e 3 months)

Variance = Rs. 100000^2 for three months.

Variance for 5 months = Rs. $100000^2 \times 5/3$

Order is being placed every 3 months while lead time is 2 months. So average stock required to be maintained is for 5 months = Rs. 12,00,000/12 × 5 = Rs. 5,00,000.

Safety stock at a service level of 97.5% is 2σ for this period i.e $2 \times 100000 \times \sqrt{5/3}$

Where $100000 \times \sqrt{5/3}$ is S.D = Rs. 2,58,200 (approx)

So Total Stock= Rs. (5,00,000 + 2,58,200) = Rs. 7,58,200.

Safety Stock= Rs. 2,58,200.

This will indicate the inventory system.

Answer 7. (c)

Managerial uses of Break-even Analysis are as follows :

(i) Capacity planning: The BEA helps the management in understanding the impact of increase in output on fixed and variable costs of the organization.

(ii) Choice of technique of production: Useful guide in selecting the most economical production process or equipment.

(iii) Product mix decision: Helps to find out the best combination of product that can maximize profit.

(iv) Plant shutdown decision: During recession when demand for a product falls considerably, BEA facilitates such decision by differentiating between sunk and out of pocket costs.

(v) Add or drop a product: BEA helps management in product planning by indicating the impact of such decision on costs and earning of the enterprise.

(vi) Make or buy decision: BEA helps management to decide whether spare parts and components are to be manufactured in-house or purchased from market.

(vii) Volume required to achieve target profits.

Q. 8. (a) Distinguish between :

(i) Quality of Design and Quality of Conformance.

(ii) 100% Inspection and Sampling Inspection.

(b) What causes variations in Quality?

(c) MARATHAS TEXTILE LTD., monitors for quality the woven coarse cotton cloth as it arrives to be rolled on to a beam. Usually a metre of the cloth is taken as a sample and checked for defects of different kinds such as :

1. Knots;

2. Oily or greasy patches or spots;

3. Missed weave;

4. Cotton seed shell particles.

The sample may have a number of these defects. For instance, if it has one knot, two oil marks and one missed weave, then the number of defects are counted as (1 +2+ 1 = 4).

During the first shift on Thursday, 20 beams have been woven. The quality control record is given in the following table :

Sample No.	Number of Defects	Sample No.	Number of Defects
1	4	11	12
2	9	12	9
3	3	13	3
4	12	14	9
5	5	15	2
6	3	16	2
7	2	17	1
8	2	18	3
9	1	19	1
10	9	20	4

Required :

(i) Design an appropriate Control Chart.

(ii) Was the process in control in the first shift on Thursday?

Answer 8. (a)

(i)

Quality of design	Quality of conformance
Refers to manufacturing specification of product. It consists of appearance, indicate life, safety and other features of product.	Refers to degree to which the product actually conforms to design specification.
Higher quality means higher cost.	Higher quality means lower cost.

(ii)

100% Inspection	Sampling Inspection
(i) Quantity inspected is very large and process is time consuming; cost of inspection is high.	Sample is small, less time consuming ; cost of inspection lower.
(ii) No risk of error as all items are inspected.	Sampling error may occur but could be estimated and brought within acceptable limit.
(iii) Risk of fatigue, negligence and lack of supervision. 100% inspection may not be 100% accurate and conclusive.	Through proper design conclusion can be drawn with reasonable accuracy.
(iv) Not possible involving destructive tests.	Only alternative in case of destructive tests.

Answer 8. (b)

Variation in quality occurs due to chance causes and assignable causes. Chance causes are inherent in the process. It is difficult and uneconomical to detect and eliminate them. They are random and independent of each other and are natural and permissible.

Assignable causes are due to improper raw material, bad working, or negligence on part of the worker. They are non random, identifiable, and controllable.

Answer 8. (c)

The type of process control chart required here is the *number of Defects Chart, also* known as *c-chart,* where 'c' denotes the number of defects.

The underlying sampling distribution is the Poisson distribution.

Standard deviation = $\sqrt{\bar{c}}$, where $\bar{c}$ = mean no. of defects.

The 3-sigma control limits are :

UCL = $\bar{c} + 3\sqrt{\bar{c}}$, LCL = $\bar{c} - 3\sqrt{\bar{c}}$

In the case of the present problem,

$\bar{c}$ = total no. of defects/no. of samples.

In the case of the present problem,

$\bar{c}$ = Total number of defects/number of samples = 96/20 = 4.8 defects sample.

Hence, UCL = 4.8 + 3 $\sqrt{}$ (4.8 = 11.4

LCL = 4.8 – 3 $\sqrt{}$ (4.8) = (–) 1.8 ≈ 0 (zero)

Note that a negative number of defects have **no meaning** and therefore the LCL of **effectively *zero***.

The Control chart (c-chart) at this stage looks as given below :

UCl 11.4

$\bar{c}$ 4.8

LCL 0.0

C Chart (initial)

However, in order to use this as a control chart, it is necessary that the process is in control. Looking at our 20 sample readings, we find that the 4th and the 11th sample exceeds the UCL. So, in these two instances, the process *was not in control*. For the construction of a stable control chart, these two readings will have to be dropped from our computations.

Deleting, for the present, the 4th and the 11th reading, we have :

$\bar{c}$ = Σc/18 = 72/18 = 4.0 defects sample.

UCL = 4.0 + 3 $\sqrt{}$ (4.0) = 10.0

LCL = 4.0 – 3 $\sqrt{}$ (4.0) = (–) 2.0 ≈ 0 (zero)

The Control chart will then have :

UCl 10.0

$\bar{c}$ 4.0

LCL 0.0

C Chart (initial)

We observe that none of the 18 sample readings cross the control limit.

Therefore, this is the final c-Chart to be used for the control of the cloth-making process.

Q. 9. (a) A machining centre in a job shop of a local fabrication company has five unprocessed jobs remaining at a particular point in time. The jobs are labeled 1,2,3,4 and 5 in the order they enter the shop. The respective processing time and due dates are given in the time table below :

Job number	Processing time (days)	Due date
1	11	61
2	29	45
3	31	31
4	1	33
5	2	32

The production manager and the marketing manager of the job shop have different opinion on customer service. The production manager feels that for certain jobs delays are inevitable in the basic structure of the job shop working the loss as Rs. 50 per job per day of delay with respect to delivery date. The marketing manager feels delay would cost the organization Rs. 1000 per tardy job.

Examine the three commonest sequencing rules and state sequencing rule that would satisfy the organization requirement best.

(b) Estimate the number of scooters to be sold in a town with population of 12 lacs with help of following data.

Population(in lacs)	(X)	4	6	7	10	13
No. of scooters	(Y)	5500	6600	5700	9000	10500

Answer 9. (a)

The three commonest rules of job sequencing are FCFS (First come first serve), SPT (Shortest possible time) and EDD (Earliest due date) basis.

Job Sequence	Processing time(day)	Completion time(day)	Due date(days)	Lateness(days)
FCFS basis				
1	11	11	61	-
2	29	40	45	-
3	31	71	31	40
4	1	72	33	39
5	2	74	32	42
Total				121

Job Sequence	Processing time(day)	Completion time(day)	Due date(days)	Lateness(days)
SPT basis				
4	1	1	33	-
5	2	3	32	-
1	11	14	61	-
2	29	43	45	-
3	31	74	31	43
Total				43
EDD				
3	31	31	31	-
5	2	33	32	1
4	1	34	33	1
2	29	63	45	18
1	11	74	61	13
Total				33

As per above calculations, results may be shown as :

Rule	No. of late jobs.	Lateness (days)	Average lateness (days)	Loss to the Company As per P.M	As per M.M
FCFS	3	121	24.2	121 × 50 = 6050	3 × 1000 = 3000
SPT	1	43	8.6	43 × 50 = 2150	1 × 1000 = 1000
EDD	4	33	6.6	33 × 50 = 1650	4 × 1000 = 4000

As per P.M. EDD should be accepted, as per M.M SPT should be accepted. No single rule can satisfy both. However considering the no. of late jobs, SPT seems to have an edge.

Answer 9. (b)

Population (in lacs)	Sale of scooter (in '000)	Squares of population	Product of population & sales
X	**Y**	**X^2**	**XY**
4	5.5	16	22
6	6.6	36	39.6
7	5.7	49	39.9
10	9	100	90
13	10.5	169	136.5
$\Sigma X = 40$	$\Sigma Y = 37.3$	$\Sigma X^2 = 370$	$\Sigma XY = 328$

Regression equation of Y on X

$Y = a + bX$

$\Sigma Y = na + b\Sigma X$

$\Sigma XY = a\Sigma X + b\Sigma X^2$

Thus,

$37.3 = 5a + b \times 40$ 1

$328 = a \times 40 + b \times 370$ 2

$40a + 370b = 328$ 2

$40a + 320b = 298.4$ .....(1 × 8)(3)

Subtracting 3 From 2

$50b = 29.6$

$b = 29.6/50$

$b = 0.592$

Putting value of b in Equation 1

$5a + 40 \times .592 = 37.3$

$5a = 37.3 - 23.68$

$5a = 13.62$

$a = 13.62/5$

$a = 2.724$

By putting value of a and b,

$Y = 2.724 + 0.592 \times 12$ (lacs)

$Y = 2.724 + 7.104$

$Y = 9.828$ thousand scooters

Q. 10. Write short note on :

(a) Six Sigma quality programme

(b) Life of Balance

(c) Supply Chain Management

(d) Work Sampling

(e) Sound incentive plan

Answer 10. (a)

Six Sigma Quality program is company- wide approach for continuous improvement in quality of products and services. It measures the degree to which the process deviates from the standards and takes efforts to improve the process to achieve customer satisfaction.

The objective of Six Sigma Quality programme are two–fold :

(i) to improve the customer satisfaction and reducing and eliminating gaps/defects and

(ii) to continuously improve processes throughout the organization with a view to reduce sources of variation and improve quality as well as productivity.

It is a statistical measurement which tells us how good our products, services and process are and enables us to benchmark our operations with the best in the field. It thus helps us to establish our course in the race for total customer satisfaction.

A process at 6- Sigma level normally produces 3-4 non conformances in a million operations. This is supposed to be the best-in-class quality. Thus 6-Sigma is essentially a philosophy of working smarter. This means making fewer mistakes in everything we do. As we discover and eliminate the sources of variation , the non conformances are eliminated and the process capability improves.

Answer 10. (b)

Line of Balance is a production planning system , which schedules key events necessary for completing an assembly with respect to delivery dates for completed system. Graphic displays are used to monitor progress achieved on a project and to indicate where an objective is not being met. Thus the LOB technique is based on the principle of 'management by Exception' wherein, management attention is directed to existing or potential problems. The LOB technique is a useful complement to PERT and Gantt Charts.

Answer 10. (c)

Supply Chain Management : The term 'supply chain' comes from a picture of how organizations are linked together. If we start with purchase department and work down on the supply side, we find a number of suppliers, each of whom in turn has its own supplier. This can indeed be a complex network or a series of chains.

The objectives of supply chain management are reduction of uncertainty and risk in the supply chain which will enable reduction in inventory levels, cycle time of processing and ultimately improve end-customer service levels. The focus is on system optimization. Some of the useful tools are forecasting, aggregate planning, inventory management, scheduling etc.

The forecast becomes an input to the aggregate plan, which sets the guidelines and constraints for development of an inventory system from which the detailed workforce and equipment schedules can be determined. The decisions made in one node of the supply-chain affect the other areas, e.g if an automobile industry factory plans to assemble 1000 vehicles in a given period, it is imperative that the supplier of tyres makes available 4000 tyres at the plant in time for use on the assembly line.

The overall plan needs to be optimized so that adequate number of men, materials and time available to meet the requirements.

Answer 10. (d)

Work sampling is a work measurement technique in which a sufficient large number of instantaneous observations of an worker or machine are taken over a period of time to obtain a reasonably accurate picture of the time spent on different activities. It is based on statistical theory of sampling. Work sampling is thus a method of finding out percentage occurrence of a certain activity or delay by statistical sampling. The procedure of work sampling consists of following steps :

(i) The purpose of study to be determined first.
(ii) The worker or machine to be identified.
(iii) The operations to be observed to be decided.
(iv) The number of observations to be made to be decided.
(v) The activity performed at each visit to be recorded.
(vi) Percentage of total time spent on each activity to be calculated.
(vii) Standard time is established by adding allowances.

Answer 10. (e)

Incentive is a management tool that is used to motivate the employees to work towards attainment of organizational goals. Well developed and properly operated incentive can yield significant productivity gains. Incentive plans may be financial or non -financial, individual or group. Characteristics of a sound incentive plan are as follows :

(i) **Simple :** Simple enough for employees to understand easily and compute his own incentive pay.
(ii) **Accurate :** Scheme should be based on accurate and scientific standards.
iii) **Secure :** A minimum basic wage should be guaranteed to all employees irrespective of the reward.

(iv) **Effective :** The incentive plan should convince the workers that they are being accurately rewarded for good performance.

(v) **Economy :** The incentive plan should result in reduction in unit cost of production. Administration cost of implementing the plan should be justifiable.

(vi) **Equity :** The scheme should be beneficial to both management and employees.

(vii) **Control systems :** The plan should be coordinated properly with control procedures like QC, Inventory control, production control etc.

(viii) **Flexible :** The plan should provide for revision of standards when changes in underlying conditions take place and modifications agreed with trade unions should be clearly specified.

(ix) Basis whether individual or group should be clearly stated.

(x) **Grievance machinery :** This will help in prompt redressal of complaints arising out of the plan. Adjustments should be made for failure beyond the control of workers.

Q. 11. (a) A Media Company proposes to build a new office in one of the three locations. Using the data below, determine the best location. Please assume the following values :

Excellent = 10, V. Good = 8, Good = 6, Fair = 4 and Poor = 2.

Rating Factor	Location	Location	Location	Weight
A. Living Standard	**Excellent**	**Good**	**Fair**	**30**
B. Labour Relations	**Good**	**Fair**	**Excellent**	**10**
C. Govt. aid	**V. Good**	**Good**	**Poor**	**5**
D. Schooling System	**Fair**	**Excellent**	**Good**	**15**
E. Distance to Customers	**V. Good**	**Poor**	**Excellent**	**10**
F. Distance to Suppliers	**Poor**	**Good**	**V. Good**	**10**
G. Revenue Contribution	**V. Good**	**Excellent**	**Good**	**20**

Answer 11. (a)

The following steps are to be followed :

(a) Convert descriptive scores into numerical.

(b) Multiply by weights.

(c) Add them.

The location that scores the highest total will obviously be the best choice.

Location – 1 :

$10 \times 30 + 6 \times 10 + 8 \times 5 + 4 \times 15 + 8 \times 10 + 2 \times 10 + 8 \times 20 = 720.$

Location – 2 :

$6 \times 3 + 4 \times 10 + 6 \times 5 + 10 \times 15 + 2 \times 10 + 6 \times 10 + 10 \times 20 = 680.$

Location – 3 :

$4 \times 30 + 10 \times 10 + 2 \times 5 + 6 \times 15 + 10 \times 10 + 8 \times 10 + 6 \times 20 = 620.$

Conclusion :

As **Location No. 1** gets the highest scores, it becomes the best Choice.

Q. 11. (b) An analyst has observed a job long enough to become familiar with it and has divided it into five elements. The element times for the first four cycles and a performance rating for each element are given in the following table :

Element	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5
1	1.246	1.328	1.298	1.306	90
2	0.972	0.895	0.798	0.919	100
3	0.914	1.875	1.964	1.972	100
4	2.121	2.198	2.146	2.421	110
5	1.253	1.175	1.413	2.218	100

(i) Do any of the times look like outliners, i.e. probable errors in reading or recording data that should not be included in the analysis?

(ii) Compute an estimated normal time for the job based on the data available at this stage of the study.

(iii) On the basis of the data available, what sample size should be taken to estimate the time for element 2 within 5% of the true mean time with 95% confidence?

Answer 11. (b)

(i) The times for element 3 in cycle 1 and for element 5 in cycle 4 are suspect and should be disregarded.

(ii) The following estimates are made on the basis of the remaining times.

Element	Mean Actual Time	Performance Rating(%)	Normal Time
1	1.295	90	1.116
2	0.896	100	0.896
3	1.937	100	1.937
4	2.222	110	2.444
5	1.28	100	1.28

Normal time for total job = 7.723

(iii) For element 2 :

Mean x = 0.896

$S = \sqrt{[\Sigma x^2 - (\Sigma x)^2/n']/n' - 1} = \sqrt{[3.227174 - (3.584)^2/4]/3} = 0.0728$

$n = [Zs/Ax]^2 = [1.96\ (0.0728)/0.05\ (0.896) = 10.14$

The analyst probably would want to use more than 10 observation, so that workers would have more confidence in the standard. A Company might make it a general practice to use at least say 15 or more observations.

Q. 12. (a) Define obsolescence. State the factors that determine obsolescence.

Answer 12. (a)

Obsolescence is defined as becoming out of date or comparatively inefficient or undesirable. Obsolescence occur due to improvement in technology or product or both.

Technological obsolescence occur due to continuous improvement in technique and methods of production. Product obsolescence implies better and improved substitutes are available in the market.

Factors determining obsolescence are as follows :

(i) Higher fuel and power consumption due to lower design efficiency.

(ii) Lower productivity due to lower efficiency of machines.

(iii) Higher repair and maintenance cost due to inferior design.

(iv) Increased frequency of breakdowns resulting in increased idle time of machines.

(v) Defective design leading to greater spoilage and material wastage.

(vi) Poor design calculations may require more labour and supervisions.

(vii) More floor space due to less compact design leading to increased cost.

However obsolescence is not one way traffic. For e.g more automation may lower cost in terms of labour, spoilage, supervision, and floor space. But it may lead to increase in fuel power, inspection or maintenance costs.

Q. 12. (b) Product A has a Mean Time Between Failures (MTBF) of 30 hours and has a Mean Time To Repairs (MTTR) of 5 hours. Product B has an MTBF of 40 hours and has an MTTR of 2 hours.

(i) Which product has higher reliability?

(ii) Which product has greater maintainability?

(iii) Which product has greater availability?

Answer 12. (b)

(i) The product having higher MTBF will be more reliable, as it will have a lesser chance to fail during service. Product B has higher MTBF(40hrs.) So it is more reliable.

(ii) MTTR means time by which the machine can be repaired and put to use. Since MTTR of B is less than that of A, it has a greater maintainability.

(iii) The availability may be computed as follows:

Availability of A = MTBF/(MTBF + MTTR) × 100
= 30/(30 + 5) × 100
= 30/ 35 × 100
= 85.7%

Availability of B = MTBF/(MTBF + MTTR) × 100
= 40/(40 + 2) × 100
= 40/42 × 100
= 95.2

Q. 13. (a) What is maintenance? What types of losses may arise due to poor maintenance?

(b) The probabilities of failure p_n of an equipment in the n^{th} period after maintenance have been estimated as follows :

n	1	2	3	4
p_n	0.1	0.2	0.4	0.3

Cost of preventive maintenance : Rs. 150

Cost of breakdown maintenance : Rs. 1000

Determine the optimum frequency of preventive maintenance.

Answer 13. (a)

Any function aimed at bringing back or restore an item to its original or acceptable position or to keep it or retain its healthy, workable position is known as maintenance.

Losses that arise due to poor maintenance are as follows :

(i) **Lower productivity :** Deterioration of P&M will lead to frequent breakdowns leading to production loss. Such loss is very high in case of capital intensive industries.

(ii) **Higher costs :** Every breakdown means cost of idle machine and wages to idle labour, resulting in increase in unit cost of production.

(iii) **Poor product quality :** Undetected and uncontrolled wear and tear results in deterioration in product quality.

(iv) **Destruction of equipment :** Overuse and careless use of machinery and equipment cause premature replacement of capital assets.

(v) **Induced loss :** Production loss in one plant negatively affects both suppliers and consumers. When quality of intermediate goods is poor, it requires additional processing or deterioration on quality of final product. Frequent breakdown result in irregular delivery which in turn requires excess stocking of intermediate components and spares.

(vi) **Disguised loss :** Breakdown of ill-maintained machinery leads to switching over to idle machine where installed capacity is underutilized.This may give an impression that excess capacity is utilized which in fact is poor maintenance.Similarly in sellers' market even poor quality may be sold out as consumers have to accept whatever is available at whatever time.

(vii) **Poor customer relations :** When quality of product is poor or delivery is behind scheduled time customer relation deteriorate leading to loss of market.

(viii) **Poor staff morale :** Employees lose interest in work when machine frequently breaks down.

Answer 13. (b)

(i) It has been assumed that equipments that fail are replaced just before end of the week.

(ii) Actual percentage of failures during for equipments of same age is same as the expected percentage of failure during the period for them.

Period	Prob. Of failure p_n	No. of replacements made at the end of n^{th} period.	Cost of breakdown maintenance	Cost of preventive maintenance	Total cost of maintenance	Cost per period
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	0.1	0.1	0.1 × 1000 =100	150	250	250
2	0.2	0.2 + (0.1 × 0.1) = 0.21	0.21 × 1000 = 210	150	250+210 = 460	460/2 = 230
3	0.4	0.4+(0.21×0.1)+(0.1×0.2) = 0.4+0.021+0.02=0.441	0.441×1000 = 441	150	460+441 = 901	901/3 = 300.3

Therefore optimum frequency of preventive maintenance is once in 2 periods and expected cost of maintenance is Rs. 230.

Q. 14. A company manufactures two items X_1 and X_2. They are sold at a profit of Rs. 30 per unit of X_1 and Rs. 20 per unit of X_2. X_1 requires 2kgs of materials, 3 man-hours and 1 machine hour per unit. X_2 requires 1 kg of material, 2 man hours and 3 machine hours per unit.

During each production run there are 280 kgs of material available, 500 labour hours and 420 hours of machines used. How much of the two items should the company produce to maximize profits?

Maximise $30X_1 + 20X_2$ subject to

$$2x_1 + x_2 \leq 280$$

$$3x_1 + 2x_2 \leq 500$$

$$x_1 + 3x_2 \leq 420$$

$$x_1, x_2, x_3 \geq 0$$

Answer 14.

The objective function to be maximised in this problem may be expressed in the following way :

$$Z = 30X_1 + 20X_2$$

Subject to constraints

$$2x_1 + x_2 \leq 280$$

$$3x_1 + 2x_2 \leq 500$$

$$x_1 + 3x_2 \leq 420$$

$$x_1, x_2, x_3 \geq 0$$

Now, by introducing slack variables, we get

$$2X_1 + X_2 + S_1 + 0S_2 + 0S_3 = 280$$

$$3X_1 + 2X_2 + 0S_1 + S_2 + 0S_3 = 500$$

$$X_1 + 3X_2 + 0S_1 + 0S_2 + S_3 = 420$$

and $Z = 30X_1 + 20X_2 + 0S_1 + 0S_2 + S_3$

Now, various tables will be prepared as under:

Tableau I

		C_j	30	20	0	0	0	
Profit	Programme	Constant	X_1	X_2	S_1	S_2	S_3	Ratio
0	S_1	280	2	1	1	0	0	140
0	S_2	500	3	2	0	1	0	166.67
0	S_3	420	1	3	0	0	1	420
	Z_j	0	0	0	0	0	0	
	C_j-Z_j		30	20	0	0	0	

Tableau II

		C_j	30	20	0	0	0	
Profit	Programme	Constant	X_1	X_2	S_1	S_2	S_3	Ratio
30	X_1	140	1	1/2	1/2	0	0	280
0	S_2	80	0	1/2	-3/2	1	0	160
0	S_3	280	0	5/2	-1/2	0	1	112
	Z_j	4200	30	15	15	0	0	
	C_j-Z_j	0	0	5	-15	0	0	

Tableau III

		Cj	30	20	0	0	0	
Profit	Programme	Constant	X_1	X_2	S_1	S_2	S_3	Ratio
30	X_1	84	1	0	3/5	0	–1/5	
0	S_2	24	0	0	–7/5	1	–1/5	
20	X_2	112	0	1	–1/5	0	2/5	
	Z_j	4760	30	20	14	0	25/2	
	C_j-Z_j	—	0	0	–14	0	–25/2	

In the above Tableau III, all C_j-Z_j are zero or negative, hence it is optimal solution X_1 = 84 ; S_2 = 112 and maximum profit (Z_j) = 4,760.

Q. 15. Write short notes on :

(a) FMS

(b) Technology Life Cycle.

Answer 15. (a)

A Flexible Manufacturing System is a hybrid between continuous and intermittent flow of production. Here, using computer controlled machine and automated material handling equipment, a continuous flow is instilled in otherwise high variety, low production volume flow. Thus FMS is builds on the programmable automation of NC and CNC machines. Programs and tooling set up can be quickly changed and production can be switched on from one job to another without any loss of change-over time.

Key components of FMS are :

(i) Several computer controlled workstations having CNC machines and robots for loading and unloading.

(ii) Computer controlled transport systems for moving materials and parts from one machine to another.

(iii) Computer controlled robots for loading and unloading stations.

(iv) An automated storing and retrieval system.

The above subsystems of FMS are controlled by a central computer with the needed software.

Answer 15. (b)

Technology Life Cycle :

Technology Life Cycle comprises of 4 stages, viz., Innovation, Syndication, Diffusion and Substitution.

(i) **Innovation :** This stage, in turn, comprises of three stages, namely Intelligence, Design and Choice.

Intelligence stage involves creation of a product or technology through pure research, applied research, market research, brain storming etc., and selection through preliminary screening and feasibility analysis.

Design stage: involves development of the process or technology through which the concept could be given shape and Design and Testing are then done before final launching /adoption. Choice of the desired product/technology paves the way for finally launching the same in the market.

(ii) **Syndication:** During this stage, the technology/product is demonstrated and slowly commercialized.

(iii) **Diffusion:** In this stage, the new technology slowly penetrates and replaces the old one.(E.g. Pentium chips have replaced 486 and the colour TV have phased out the Black & White T.V)

(iv) **Substitution:** Substitution comes in when the cycle is complete and original technology is completely replaced by the advanced one(e.g the valve set radio no more exits.)

Section II : Information Systems

Q. 16. (a) Choose the most appropriate answer from the four alternatives in the set :

(i) Assembly language is :

(A) Machine dependent.

(B) Machine independent

(C) Partly dependent and partly independent.

(D) Not a programming language.

(ii) For information recording the magnetic tape is divided into vertical columns called:

(A) Channels

(B) Tracks

(C) Grid

(D) Frames.

(iii) A common coding language for World Wide Web(www) is:

(A) HTML

(B) Front page

(C) Netscape

(D) List server

(iv) A network topology where all computers are connected to a central hub is called:

(A) Ring

(B) Bus

(C) Star

(D) Token

(v) Which of the following is NOT an operating system?

(A) OS/2

(B) Win XP

(C) Oracle

(D) UNIX

(vi) 'Firmware' is associated with :

(A) Application software for firms.

(B) Special purpose hardware device.

(C) Benchmark software.

(D) Software in ROM.

(vii) Key field implies :

(A) Alpha-numeric field.

(B) Only numeric field.

(C) Search field.

(D) Important field.

(viii) One KB stands for :

(A) 1000 bytes

(B) 9999 bytes

(C) 999 bytes

(D) 1024 bytes

(ix) OCR is :

(A) Input device

(B) Output device

(C) Processing device

(D) Storage device.

(x) Oracle is a software package for :

(A) MRP

(B) DBMS

(C) MIS

(D) TQM

Q. 16. (b) State whether the following statements are *True/False* :

(i) Cache memory operates between CPU and main memory.

(ii) A dumb terminal has an inbuilt processing capability.

(iii) Virus and bug are not synonymous.

(iv) Protocol is geometric arrangement of computer resources.

(v) Processing is done in primary storage unit.

(vi) Power Point is not a spread sheet software.

(vii) Cryptography maintains confidentiality in the information between sender and receiver.

(viii) A modem provides the connection between server and work station.

(ix) Cursor is a communication device between user and machine.

(x) Mail server sends mail to e-mail address of the receiver.

(xi) HLL converts source program into Machine Language Program.

(xii) Eliminating errors fro a program is called debugging.

(xiii) Tape speed is measured in inch.

(xiv) SAP AG is a popular spreadsheet package.

(xv) Normalisation works on the principle that same data may be stored in number of places.

Q. 16. (c) Expand the following abbreviations :

(i) MDR

(ii) MFLOPS

(iii) ASIC

(iv) INGRES

(v) B2C

(vi) ALGOL

(vii) EBCDIC
(viii) SAP
(ix) APRANET
(x) MODEM
(xi) RISC
(xii) A/D
(xiii) DHTML
(xiv) SQL
(xv) WORM

Answer 16. (a)

(i) (A) Machine dependent
(ii) (D) Frames
(iii) (A) HTML
(iv) (C) Star
(v) (C) Oracle
(vi) (D) Software in ROM
(vii) (C) Search field
(viii) (D) 1024 bytes
(ix) (A) Input device
(x) (B) DBMS

Answer 16. (a)

(i) True
(ii) False
(iii) True
(iv) False
(v) False
(vi) True
(vii) True
(viii) False
(ix) True
(x) True
(xi) False
(xii) True
(xiii) True
(xiv) False
(xv) False

Answer 16. (c)

(i) MDR — Monochrome Display Adapter.
(ii) MFLOPS — Million Floating Point Operation Per Second.

(iii) ASIC — Application Specific Integrated Circuits.
(iv) INGRES — Interactive Graphics Relational System.
(v) B2C — Business to Customer
(vi) ALGOL — Algorithmic Language
(vii) EBCDIC — Extended Binary Coded Decimal Interchange .
(viii) SAP — Standard Auditing Practices
(ix) APRANET — Advanced Research Project Agency Network.
(x) MODEM — Modulator Demodulator
(xi) RISC — Reduced Instruction Set Computing.
(xii) A/D — Analog to Digital
(xiii) DHTML — Dynamic Hyper Text Markup Language.
(xiv) SQL — Structured Query Language.
(xv) WORM — Write Once Read Many.

Q. 17. (a) Match Column I with relevant terms in Column II :

Column I	*Column II*
(A) Domain name	**(i) Transferring a file from a host computer to user's computer.**
(B) Home Page	**(ii) Output device.**
(C) Inverted tree	**(iii) Provides information about location of a document.**
(D) Download	**(iv) Term associated with magnetic tape.**
(E) SVGA	**(v) First hypertext document that is displayed when the user follows a link to the web server.**
(F) URL	**(vi) Hierarchical data structure.**
(G) IBG	**(vii) Relating to official provider of information and files.**
(H) Track ball	**(viii) Bistable device.**
(I) Filp-flop	**(ix) A website enabling users to access various level of information.**
(J) Search Engine	**(x) Term associated with magnetic tape.**

Q. 17. (b) Fill in the blanks :

(i) An extra bit in a byte that enables the computer to check for internal errors is called _____ bit.
(ii) A computer network in which there is no host and in which all stations are equal is called a _____ network.
(iii) ORACLE is a software package for _____ .
(iv) Laser printer is a _____ printer.
(v) Microsoft excel is a _____ package.
(vi) Eliminating errors of a program is called _____ .
(vii) Intranet is a in-house version of _____ .
(viii) Hybrid testing is also known as _____ testing.
(ix) _____ is an electronic device that converts digital signal to analog signal and vice-versa.
(x) An _____ is a boundary shared by human beings and computer.

(xi) Bootstrapping means loading _____ in Computer after switching on the power.

(xii) Digital signature is the form of _____ function.

(xiii) The logic of a computer programme including the sequence of instructions is known as _____ .

(xiv) _____ rate is the number of signal transitions per period of time.

(xv) _____ is a switch or control code that turns an event on or off by repeated action or use.

Answer 17. (a)

(A) – vii
(B) – v
(C) – vi
(D) – i
(E) – ii
(F) – iii
(G) – iv
(H) – x
(I) – viii
(J) – ix

Answer 17. (b)

(i) parity
(ii) ring
(iii) DBMS
(iv) non impact
(v) spreadsheet
(vi) debugging
(vii) internet
(viii) sandwitch
(ix) Modem
(x) interface
(xi) Operating System
(xii) hash
(xiii) algorithm
(xiv) Baud
(xv) Toggle

Q. 18. Discuss briefly the following term with reference to Information Technology :

(a) ASCII Code

(b) Stored Program Concept

(c) Toggle

(d) Parity bit

(e) Reference files

Answer 18.

(a) ASCII Code : It stands for American standard code for information interchange. It is used to represent data in main memory of computer. It uses the right most seven bits of the 8 bits to represent numbers, letters and special characters.

(b) Stored program concept : Computers can perform variety of mathematical calculations without error. They can sort data, merge lists, search files, make logical decisions and comparisons. However, computer is devoid of any original thinking. It is provided with a set of instructions. These instructions are stored in primary memory and executed under the command of the control unit of CPU. This is known as stored program concept.

(c) Toggle : It is a switch or control code that turns an event on or off by repeated action or use. It also means to turn something on or off by repeating the same action.

(d) Parity bit : It is an additional redundant bit that is used to provide a check on the integrity of a data representation. It helps in detecting any errors that may occur while transmitting a binary data.

(e) Reference files : These files contain keys of records in other files. In order to retrieve a record from a file, the reference file is first searched to find out in which file a record can be located.

Q. 19. (a) What is Information? How does it differ from Information System.

(b) Explain why information system die.

(c) Define the term system stress and system change.

Answer 19. (a)

Information is data that has been processed into meaningful form so that it can be effectively interpreted and help the user in decision making. Information consists of data, text, images, voice etc. On other hand, Information System is the vehicle that supplies necessary information for decision making. The information system is to feed the management for control purpose. The activities in an information system are :

(i) collection ,storing, and processing of data

(ii) generation of information reports

(iii) dissemination of information to right users

Answer 19. (b)

Information Systems die due to changes in information requirement and information becoming outdated due to :

(i) changes in business environment

(ii) changes in users' expectation

(iii) changes in technology

(iv) deterioration in software quality due to passage of time

Answer 19. (c)

Systems, whether they be living or artificial systems, organizational systems, information systems, or systems of controls, change because they undergo stress. A stress is a force transmitted by a system's supra-system that causes a system to change, so that the supra-system can better achieve its goals. In trying to accommodate the stress, the system may impose stress on its subsystems, and so on.

There are two basic forms of stress which can be imposed on a system, separately or concurrently :

1. A change in the goal set of the system. New goals may be created or old goals may be eliminated.
2. A change in the achievement levels desired for existing goals. The level of desired achievement may be increased or decreased.

For example, the goal set for a computer system may change if a requirement is imposed by management (the supra-system) for system data to be shared among multiple users rather than be available only to a single user.

When a supra-system exerts stress on a system, the system will change to accommodate the stress, or it will become pathological; that is, it will decay and terminate.

Systems accommodate stress through a change in form; there can be structural changes or process changes. For example, a computer system under stress for more shareability of data may be changed by the installation of terminals in remote locations – a structural change. Demands for greater efficiency may be met by changing the way in which it stores data – a process change.

It is very unlikely that system changes to accommodate stress will be global change to its structure and processes. Instead, those responsible for the change will attempt to localize it by confining the adjustment processes to only one or some of its subsystems.

Q. 20. Distinguish between the following :

(a) Hardware and software.

(b) Analog computer and Digital computer.

Answer 20. (a)

Hardware	Software
Physical components of a computer system are called hardware.	Collection of programs designed for specific needs is called software.
Input devices, processing unit, output devices and auxiliary storage devices are different categories of hardware.	Software can be divided into three types- application software, system software and general-purpose software.
Keyboard, mouse, printer, CPU, RAM are example of hardware	Financial Accounting software, operating system, MS-WORD etc. are examples of software.
Hardware is manufactured/assembled by hardware manufacturing companies/ hardware vendors.	Software is developed by software development firms.
Hardware is independent of software.	Software cannot be developed/used without hardware i.e. software is dependent on hardware.
Hardware repair requires hardware engineer.	Software development/modification requires software professionals like application programmer and system programmer.
It is bulky and requires more storage space.	Software can be copied on CD/DVD, which is lightweight and transportable.
Hardware is supported by uninterrupted power supply (UPS).	Software operation requires requisite hardware.
Hardware can be assembled, Indian branded or of MNC brand.	Software can be licensed or pirated.

Answer 20. (b)

Analog computer and Digital computer.

Analog computer	Digital computer
Analog computers process data input in a continuous form. Data such as voltage, resistance or temperature and pressure etc. are represented in a computer as a continuous, unbroken flow of information. In engineering and scientific applications where quantities to be processed exist in wave forms or continually rising and falling voltages, pressure and so on, analog computers are very useful.	Digital computers**,** on the other hand, count and accept letters or numbers through various input devices that convert the data into electric pulses, and perform arithmetic operations on numbers in discrete form. In addition to performing arithmetic operations, they are also capable of storing data for processing, performing logical operations, editing or deleting the input data and printing out the result of its processed routine at high speed.

Q. 21. (a) What do you understand by Quality in regard to software? Describe briefly the main tools which are generally employed for quality assurance of software.

(b) State and briefly explain the various stages of developing an in-house program.

Answer 21. (a)

Software is a set of instructions given to the computer system so as to get the desired processing of the input data. Software can be procured from the market or it can be developed in-house. However, there are certain attributes which a software must possess so as to be useful adequately. The quality of the software is determined by presence of the following attributes:

- It should be error free
- It should satisfy the user's needs.
- It should be compatible with the processing system.
- The output of the software must be accurate.
- It should have in-built error checks.
- It should be cost –effective.

Apart from the above, it should be reliable, correct, accurate, easily understandable, and easily modifiable.

Tools for quality assurance of software :

- **Test-Run**

  The first tool for quality assurance of software is to test-run the software so as to make an assessment of the effectiveness and speed with which it works.

- **Audit Run**

  A complicated test-case can be prepared with a known output and the same can be checked by running the software.

- **Virus Check**

  Virus scanner should be used to ensure that the software is free from viruses.

- **Authorisation**

  Pass-word based authority to use the software is yet another tool for quality assurance.

Answer 21. (b)

An In-house development of programs commonly involves the following six stages:

(i) **Program Analysis :** In this stage, the programmer ascertains the input, processing and output required for a particular application. The programmer then determines whether the proposed application can be programmed at all. It is not unlikely that the proposal is shelved for modifications on technical grounds.

(ii) **Program design :** In this stage the programmer develops the general organization of the program as it relates to the main functions to be performed. Out of several other tools available to him input, output, file layouts and flowcharts are quite useful at this stage. These are provided to the programmer by the systems analyst.

(iii) **Program Coding :** The logic of the program outlined in the flowchart is converted into program statements or instructions at this stage. For each language, there are specific rules concerning format and syntax. There are special sheets for writing the program instructions in each language. The format of these sheets facilitates writing error-free programs. The programmers broadly pursue three objectives: simplicity, efficient utilization of storage and least processing time. Future changes and development of the programs should be kept in mind.

(iv) **Debug the program :** The process of debugging a program refers to correcting the language syntax and diagnostic errors so that the program compiles cleanly. A clean compile means that the program can be successfully converted from the source code written by the program into machine language instructions. Debugging consists of four steps :

(A) Inputting the source program to the compiler,

(B) Letting the compiler find errors in the program,

(C) Correcting lines of codes that are in error; and

(D) Resubmitting the corrected source program as input to the compiler.

These are followed by use of structured walkthroughs, testing of the program and review of the program code for adherence to standards.

(v) **Program documentation :** The writing of narrative procedures and instructions for people who will use software is done throughout the program life cycle. The procedures and instructions should be reviewed and approved by the authorized persons. The documentation should be prepared in such a way that the user can clearly understand the instruction given in Program documentation.

(vi) **Program maintenance :** The requirements of business data processing applications are subject to continual change. This calls for modification of the various programs. There are usually separate categories of programmers called maintenance programmers who are entrusted with this task.

Q. 22. (a) Describe briefly four categories of the major tools that are used for system development.

(b) Write short notes on the following :

(i) Data Dictionary

(ii) Program documentation

Answer 22. (a)

The major tools used for system development can be grouped into four categories based on the systems features each document has. These are :

(i) Components and flows of a system

(ii) User interface

(iii) Data attributes and relationships

(iv) Detailed system process.

Each of these categories are briefly discussed below:-

(i) **System components and flows :** For system analysts these tools are helpful to document the data flow among the major resources and activities of an information system. System flow charts are typically used to show the flow of data media as they are processed by the hardware devices and manual activities. A system component matrix provides a matrix framework to document the resources used, the activities performed and the information produced by information system. A data flow diagram uses a few simple symbols to illustrate the flow of data among external entities.

(ii) **User interface :** Designing the interface between end users and the computer system is a major consideration of system analysts while designing the new system. Layout forms and screens are used to construct the formats and contents of input / output media and methods. Dialogue flow diagrams analyse the flow of dialogue between computers and people. They document the flows among different display screens generated by alternative end user responses to menus and prompts.

(iii) **Data attributes and relationships :** These tools are helpful to define, catalogue and design the data resources in information systems. A data dictionary catalogs the description of the attributes of all data elements and their relationship to each other as well as to external systems. Entity – relationship diagrams are also used to document the number and type of relationship among the entities in a system. File layout forms document the type, size, and names of the data elements in a system. Grid charts help in identifying the use of each type of data element in input / output or storage media of a system.

(iv) **Detailed system process :** These tools are used to help the programmer to develop detailed procedures and processes required in the design of a computer program. Decision trees and decision tables use a network or a tabular form to document the complex conditional logic involved in choosing among the information processing alternatives in a system. Structure charts document the purpose, structure and hierarchical relationships of the modules in a program.

Answer 22. (b)

(i) **Data Dictionary :** It is a computer file that contains descriptive information about the data items in the files of a business information system. In other words, it is a computer file about data. The information included in each record of a Data Dictionary may include the following about an item :

(I) Codes describing the data item's length, data type and range.

(II) Identity of the source documents used to create the data.

(III) Names of the computer files storing the data item.

(IV) Identity of individuals/programs permitted to access the data item for the purpose of file maintenance, upkeep or inquiry.

(V) Identity of programs/individuals not permitted to access the data item.

(VI) Names of the computer programs that modify the data item.

It has variety of uses. It serves as an aid to documentation and is also useful for securities. It helps accountants and auditors in establishing audit trails and in planning the flow of transaction data through the system. Finally, it serves as an important aid in investigating or documenting internal control procedures.

(ii) **Program documentation :** The writing of narrative procedures and instructions for people who will use software is done throughout the program life cycle. User documentation should also be reviewed for understandability. Program design and a set of technical design specifications must include the following :

I. A brief narrative description of what the program should do.

II. A description of the outputs, inputs and processing to be performed by the program.

III. A deadline for finishing the program.

IV. The identity of the programming language to use and the coding standards to follow.
V. A description of the system environment into which the program should fit.
VI. A description of the testing required to certify the program for use.
VII. A description of documentation that must be generated for users, maintenance programmers and operational personnel.

Q. 23. (a) Which areas of DBMS should be addressed while maintaining a database? Explain.
(b) What is the importance of "Data Volume" and "Usage Analysis" in the design of a database?
(c) Who are the end users in a database environment?

Answer 23. (a)

Following areas of DBMS managements are be considered when trying to maintain a well-tuned database :

(i) Installation of database
- Correct installation of the DBMS product.
- Ensuring that adequate file space is available.
- Proper allocation of disc space for database.
- Allocation of data files in standard sizes for I/O balancing.

(ii) Memory Usage – One should know about following memory management issues :
- How the DBMS uses main memory?
- What buffers are being used?
- What needs the programs in main memory have?
- Knowledge of above issues can help in efficient usage of memory.

(iii) Input / Output (I/O) contention
- Achieving maximum I/O performance is one of the most important aspects of tuning. Understanding how data are accessed by end-users is critical to I/O contention.
- Simultaneous or separate use of input and / or output devices.
- Clock speed of CPU requires more time management of I/O.
- Spooling/Buffering etc. can be used.
- Knowledge of how many and how frequently data are accessed, concurrently used database objects need to be striped across disks to reduce I/O contention.

(iv) CPU Usage
- Multi programming and multi processing improve performance in query processing
- Monitoring CPU load.
- Mixture of online/back ground processing need to be adjusted.
- Mark jobs that can be processed in run off period to unload the machine during peak working hours.

Answer 23. (b)

Data-volume and usage analysis i.e. frequency-of-use statistics are critical inputs to the physical database design process. The volume and frequency statistics are generated during the systems analysis phase of the systems development process when systems analysts are studying current and proposed data processing and business activities. The data-volume statistics represent the size of the business, and should be calculated assuming business growth over at least a several-year period. The access frequencies are estimated from

the timing of events, transaction volumes, and reporting and querying activities. Since many databases support ad hoc accesses, and such accesses may change significantly over time, the access frequencies tend to be less certain than the volume statistics. Fortunately, precise numbers are not necessary. What is crucial is the relative size of the numbers, which will suggest where the greatest attention needs to be given in order to achieve the best possible performance. Data volume and usage analysis helps in taking decisions regarding the following :

- Hardware configuration including Processor speed and Hard disk capacity
- File organization and Indexing field
- Selection of a database structure like Hierarchical, Network or Relational database structure
- Selection of DBMS/RDBMS like Foxpro, MS-Access, Oracle or SQL.

Answer 23. (c)

End users are the persons who require access to the database for querying, updating, and generating reports. Databases exist primarily for their use. Depending on the nature of use, end users may be categorized under four heads as under :

- Occasional or casual users who learn only a few of the facilities used repeatedly.
- Naïve or parametric users who constitute majority of users who are constantly querying and updating the database for standard types of transactions. Their knowledge is limited to the use for their specific requirement of standard nature.
- Sophisticated users like engineers, scientists, analysts etc. who use the facility to meet their complex requirements. They learn most of the features of DBMS to fulfill their special requirement.
- Stand-alone users maintaining personal database who become expert in using the specific software package by day-to-day use.

Q. 24. (a) Describe the following terms :

(i) Bandwidth

(ii) Routers

(iii) Packet switching

(iv) Domain Name

Answer 24. (a)

(i) **Bandwidth :** Bandwidth represents the difference between the highest and lowest frequencies that can be used to transmit data. In other words, it refers to a channel's information carrying capacity. It is usually measured in bits per second (bps).

(ii) **Routers :** Routers are hardware devices used to direct messages across a network. They also help to administer the data flow by such means as redirecting data traffic to various peripheral devices or other computers by selecting appropriate routes in the event of possible network malfunctions or excessive use.

iii) **Packet Switching :** It is a sophisticated means of data transmission capacity of networks. In packet switching, all the data coming out of a machine is broken up into chunks. Each chunk has the address of the location it came from and also the address of the destination. This technique is used to move data around on the Internet.

(iv) **Domain Name :** It refers to the unique name that identifies an internet site. Domain name always have two or more parts, separated by dots. The part on the left is the most specific and the part on the right is most general. A given machine may have more than one domain name but a given domain name points to only one machine. E.g. icwai.org; studies.icwai.org.

Q. 24.(b) Distinguish between :

(i) MODEM and Multiplexer.

(ii) Client-Server Model and Peer- to -Peer Model

(iii) Synchronous and Asynchronous Data Transmission

Answer 24. (b)

(i)

MODEM	Multiplexer
Modem stands for Modulator/Demodulator. It is a device that converts a digital computer signal into an analog telephone signal (i.e. it modulates the signal) and converts an analog telephone signal into a digital computer signal (i.e. it demodulates the signal) in a data communication system. Modems are required to tele-communicate computer data with ordinary telephone lines because computer data is in digital form but telephone lines are analog. Modems can be categorized into internal and external modems.	**Multiplexer** is a device that enables several devices to share one communication line. A number of devices are connected to the multiplexer. Multiplexer scans each device to collect and transmit data on a single line to the CPU. It also communicates transmission from the CPU to the appropriate terminal linked to the multiplexer. Devices connected to the multiplexer are polled and periodically asked whether there is any data to transmit. Data collected from all terminals are transmitted on same communication line.

(ii)

Client-Server model	Peer-to-Peer model
1. In this model, number of computers, known as clients are connected to a single host computer known as server.	In this model, all the computers are interconnected with each other. There is no concept of server and clients. All computers behave as server as well as clients.
2. It uses a dedicated server which provides various services to clients like hardware, software and data access. Different types of servers can be File, Fax, Print or Database server.	It uses non-dedicated server. Non-dedicated server can also be used as a node for data entry, processing and output operations.
3. Clients can share disk storage and printers attached with the server.	All computers can share the data/resources of each other.
4. It is suitable for large organization having large number of nodes.	It is suitable in small organization having less number of nodes upto ten.
5. Data transfer speed is more.	Data transfer speed is less which decreases even further with the increase in number of computers.
6. Failure of server results in break-down of entire network.	Failure of one computer will not affect the working of other, only the data stored on the faulty computer will not be accessible to other computers.
7. Server can not be used for data entry/result purposes, hence it can be said that all the computers are not fully employed.	All the computers are fully employed.

8. Clients are required to be connected with server in a particular structure like Star Network.	Computers can be connected at any convenient point in the network like Ring Network.
9. Clients can be dumb terminal or Intelligent terminals.	All computers are intelligent terminals.
10. This architecture is employed where data security is of prime importance.	This architecture is used when security is not a bigger issue.

(iii)

Synchronous Data Transmission	Asynchronous Data Transmission
Under Synchronous Transmission bits are transmitted at fixed rate. The transmitter and receiver both use the same clock signals for synchronization. Synchronous transmission allows characters to be sent down the line without start-stop bits. It allows data to be send as a multi-word blocks. It uses a group of synchronization bits, which is placed at the beginning and at the end of each block to maintain synchronization. Timing is determined by a modem. It is faster way of data transmission and many data words can be transmitted per second. However, the synchronous device is more expensive as it must be smart enough to differentiate between the actual data and the special synchronous characters.	In **asynchronous transmission,** each data is accompanied by stop (1) and start (0) bits that identify the beginning and ending of the word. When no information is being transmitted i.e. sender device is idle, the communication line is usually high i.e. there is continuous stream of 1. Asynchronous transmission is a reliable transmission system as the extra start and stop bits ensure that the sender and receiver remain in step with one another. It does not require smart device to differentiate between actual data and start/stop bit. However, it is inefficient as the transmission speed is slowed down when there is huge volume of information to be transmitted.

Q. 24. (c) Explain the concept of communication protocols.

Answer 24. (c)

Communication protocols are sets of rules or conventions that must be adhered to by both the communicating parties to ensure that the information being exchanged between them is received and interpreted correctly. A protocol defines the following three aspects of digital communication.

(i) ***Syntax*** – The format of data being exchanged, character set used, type of error correction used, type of encoding scheme being used.

(ii) ***Semantics*** – Type and order of messages used to ensure reliable and error-free information transfer.

(iii) ***Timing*** – Define data rate selection and correct timing for various events during data transfer.

Communication protocols are defined in layers, the first of which is the physical layer or the manner in which node in a network are connected to one another. Both the network software and network-interface card have to adhere to a network protocol. The RS-232 C connector is the standard for some communication protocols. Subsequent layers, the number of which vary between protocols, describe how messages are packaged for transmission, how messages are routed through network, security procedures and the manner in which messages are displayed.

A number of different protocol codes are in use. For example, X.12 is the standard for electronic data interchange (EDI) X.75 is used for interconnection between networks of different countries, and XMODEM is used for uploading and downloading files. The set of most common protocols used on the Internet is called TCP/IP.

Q. 25. (a) ***"*A DSS supports the human decision-making process rather than providing a means to replace human decisions". State your opinion on this issue.**

(b) State how would you use system approach to solve problems?

Answer 25. (a)

A decision support system (DSS) is defined as a system that provides tools to managers to assist them in solving semi structured and unstructured problems in their own way. A DSS is not intended to make decisions for managers, but rather to provide managers with a set of capabilities that enables them to generate the information required by them in making decisions. The DSS are characterised by following three properties:

(i) **Semi-structured / Unstructured decisions –** Structured decisions are those that are easily made from a given set of inputs. Unstructured decisions and semi-structured decisions are decisions for which information obtained from a computer system is only a portion of the total knowledge needed to make the decision. The DSS is particularly well adapted to help with semi-structured / unstructured decisions. In DSS, the problem is first defined and formulated. It is then modelled with DSS software. The model is run on the computer to provide results. The modeller, in reviewing these results, might decide to completely reformulate the problem, refine the model, or use the model to obtain other results.

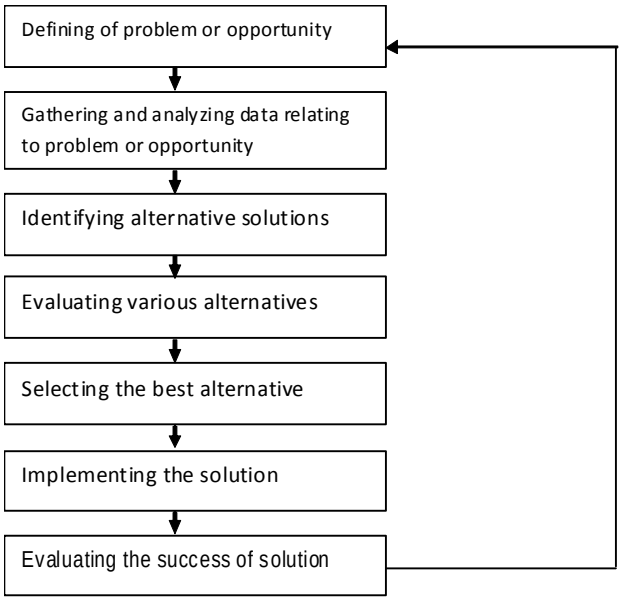
(ii) **Ability to adapt to changing need –** Semi-structured / unstructured decisions often do not conform to a predefined set of decisions-making rules. Because of this, their decision support system must provide for enough flexibility to enable users to model their own information needs. The DSS designer understands that managers usually do not know in advance what information they need and, even if they do, those information needs keep changing constantly. Thus, rather than locking the system into rigid information producing requirements, capabilities and tools are provided by DSS to enable users to meet their own output needs.

(iii) **Ease of Learning and Use –** Since decision support systems are often built and operated by users rather than by computer professionals, the tools that company possesses should be relatively easy to learn and use. Such software tools employ user-oriented interfaces such as grid, graphics, non-procedural 4GL and easily read documentation. These interfaces make it easier for user to conceptualize and perform the decision making process.

Answer 25. (b)

The system approach to management is in fact a way of thinking about management problems. It visualizes an organization as a group of interacting and interdependent parts with a purpose. Managers are not in a position to deal with individual parts separately since action of one part is going to affect other parts. Each problem should be examined in its entirety to the extent possible and economically feasible from the point of view of the overall system of which the problem under consideration is one part. Under this approach, a manager should make conscious attempt to understand the relationship among various parts of the organization and their role in supporting the overall performance of the organization. Before solving problem in any financial area, or in any specific sector of the organization, he should understand fully how the overall system would respond to changes in its component parts.

To understand how the system approach to problem solving is applied, let us consider the problem of long delays between receipts of orders and delivery in some hypothetical company. To seek a solution for the problems by applying systems approach, we would make use of the following steps as shown in the figure given below :



(i) Defining of the problem : The problem involved here is of inordinate delay between the receipt of orders and their delivery. This problem affects the vendor in various ways, e.g., a bad reputation, loss of customers, reduction in profits etc.

(ii) Gathering and analyzing data : The problem of delay may be because of following reasons:

(a) Excessive orders in the hand of vendors

(b) Shortage of power

(iii) Identification of alternative solutions : To overcome the stated problem by system approach, suppose the following two solutions exist :

(a) Refusals of orders, in case the total size of the orders exceeds the plant capacity of one shift.

(b) To run the plant in double shift to meet the commitment in time. Any shortfall in power supply may be met by installing a generator.

(iv) Evaluation of alternative solutions : Out of the two solutions as stated above, the second solution say accounts for an overall increase in the profitability of the concern after off-setting additional cost for the generator produced power. It also helps in retaining customers and growth of the concern.

(v) Selection of the best alternative : Under this step, the management closely examines the alternatives and chooses the best alternative. In this case, the second alternative is finally chosen.

(vi) Implementation of the solution : The implementation of the solution requires the necessary policy changes. Besides this, the resources required to run the plant in double shift and installation of the generator are also to be arranged. Finally, appropriate procedures are developed to exercise smooth production and timely supply to customers. The concerned officers are accordingly instructed.

Q. 26. (a) Discuss the various factors on which the information requirements of executives depend.

(b) Discuss various constraints that come in the way of operating an effective M.I.S. How to overcome these constraints?

Answer 26. (a)

The factors on which information requirements of executives depend are discussed below :

I. Operational function : The grouping or clustering of several functional units on the basis of related activities into a sub-system is termed as a operational function. For example, in a business enterprise, marketing is an operational function, as it is the clustering of several functional units like market research, advertising, sales analysis and so on. Likewise, production, finance, personnel etc. can all be considered as operational functions. Information requirement depends upon operational function. The information requirements of different operational functions vary not only in content but also in characteristics. In fact, the content of information depends upon the activities performed under an operational function. For example, in the case of production, the information required may be about the production targets to be achieved, resources available and so on. Whereas in the case of marketing function, the content of information may be about the consumer behaviour, new product impact in the market etc.

The characteristics which must be possessed by particular information too are influenced by an operational function. For example, the information required by accounts department for preparing payroll of the employees should be highly accurate.

II. Type of decision making : Organizational decisions can be categorized as programmed and non-programmed ones.

Programmed decisions : Decisions which are of repetitive and routine nature are known as programmed decisions, for example, preparation of payroll and disbursement of pay through bank account, for taking such decisions, guidelines and rules required are provided in the form of a procedure manual.

Non-programmed decisions : Decisions which are unstructured, involve high consequence, complex or a major commitment are known as non-programmed decisions, for example, new product line; capital budgeting etc. Non-programmed decision making has no pre-established decision procedure. Also, it is difficult to completely specify the information requirements for taking these decisions.

III. Level of management activity: Different levels of management activities in management planning and control hierarchy are –Strategic level, tactical level and operational level.

Strategic Level : Strategic level management is concerned with developing of organizational missions, objectives and strategies. These three components are part of strategic plan and are output of the strategic planning process. Through strategies, top management tries to relate a company with its environment. It is essentially decisions regarding what products to produce and market. Based on strategic decisions, resources will be allocated to the various divisions and units in the organisation.

Tactical Level : Tactical level lies in middle of managerial hierarchy. At this level managers plan, organize, lead, and control the activities of other managers. They coordinate the activities of a sub-unit, for example marketing. They also ensure that resources are obtained and used efficiently in the accomplishment of the organizational objectives.

Supervisory Level : This is lowest level in managerial hierarchy. The managers at this level coordinate the work of others who are not themselves managers. They ensure that specific tasks are carried out effectively and efficiently.

At strategic level, information is required on the trends in the external environment (economic, technological, political and social) and on the functioning of the internal organizational sub-systems. The nature of information required at tactical level is less diverse and complex. Much of the information required is internal in nature. Supervisory level managers mostly need internal information on operational aspects of the functioning of activity units.

Answer 26. (b)

Following constraints come in the way of operating an effective MIS :

I. **Non availability of qualified staff :** The most important requirement for operating an effective MIS is that of qualified system and management staff. These officers should understand the views of their fellow officers. Moreover, experts should be capable of understanding the objectives of the organization and provide a desired direction for installing and operating system. This problem may be overcome by grooming internal staff. The grooming of staff should be preceded by proper selection and training.

II. **Selection of Sub system of MIS :** Experts usually face the problem of selecting the sub system of MIS to be installed and operated upon.

This constraint could be overcome by identifying the need and importance of the function for which MIS can be installed first.

III. **Non Cooperation from staff :** This is a very crucial problem. It should be handled carefully and tactfully. This problem may be solved by educating the staff about the utility of MIS. The task should be carried out by organizing lectures, showing films and explaining the utility of the system. Besides this, some persons from staff should also be involved in the development and implementation of the system.

IV. **High turnover of MIS experts :** High turnover is on account of several factors such as pay packet, promotion chances, future prospects, behaviour of top managers etc.

This problem can be handled by creating the better working conditions and paying at least at par with similar *organizations*.

V. **Non-standardised approach :** Due to varied objectives of the business organizations, the approach adopted by experts for designing and implementing MIS is a non standardized one. Though in this regard, nothing can be done at the initial stage, but by and by standardization may be arrived at, for the organizations in the same industry.

VI. **Difficulty in qualifying the benefits of MIS :** Due to the difficulties in quantifying the benefits of MIS, the justification of the cost involved is difficult. Therefore, this raises the questions by departmental managers about the utility of MIS. They forget that MIS is a tool which is essential to fight out competition and the state of uncertainty that surrounds business today.

This constraint can be resolved by educating the top managers and telling them about the advantages of MIS. Moreover, the example from similar industries could be brought to the notice of top executives which are having better profits.

Q. 27. (a) What is work-in-process control system? Describe briefly the system interfaces, files and inputs, and reports involved in this system.

(b) What is outsourcing? What are the benefits expected from outsourcing?

Answer 27. (a)

The work-in-process control system assigns materials, labour and overhead costs to production jobs or products. In a job order system, each cost is assigned to a specific job. In a process costing system, costs are assigned to departments and then to products. The objectives of a work-in-progress system are to cost jobs through the manufacturing process and provide management with information to assist in controlling cost and measuring the performance of departments or other units within the factory. Therefore, to function properly, the system needs information concerning materials requisitioned for each job, labour employed on each job, overhead costs allocated to each job and the production status of each job.

System Interfaces

The work-in-process control system interfaces directly with the payroll, general ledger, finished goods inventory control, production scheduling and materials inventory control systems. Labour cost distribution and factory overhead allocation are inputs from pay-roll and the general ledger systems respectively. Aggregate work-in-process inventory transferred to finished goods is sent from work-in-process control to the general ledger. Once manufacturing is complete, jobs are transferred from work-in-process control to finished goods inventory control.

Authorization to start production along with a bill of materials, specifications, production schedule, and budgeted standard costs are transferred from the production scheduling system. Job status reports are available to this system. Direct and indirect materials are requisitioned from the materials inventory control system.

Files and Inputs

A typical work-in-process system in a manufacturing firm contains a job file that has one record for each job in the manufacturing process. The record contains information regarding job identification number, customer identification, promised completion date, estimated shipping date, promised shipping date, total estimated material cost, total standard labour cost and total standard overhead cost etc.

The job detail file contains in-depth information about each job. When authorization to start a job is received from production scheduling, a record is created for the job. A bill of materials, a machine schedule and a labour schedule are entered into the file.

Reports

The work-in-process control system produces job cost, job status and department performance reports periodically. A job cost report contains a detailed summary of the costs incurred to date, the budgeted cost, and estimated completion dates for each job in this system. Reports are helpful in saving time because we get all the information in summarized form.

Answer 27. (b)

Outsourcing may be defined as the use of parties, external to the organization, to provide goods or services to the organization. Outsourcing in today's economic environment is considered as an important means of improving an organisation's competitiveness and profitability. By outsourcing an organization can pay more attention to its core competencies and take advantage of other organisation's core competencies.

Any organizational function may be a point of consideration for outsourcing , e.g. legal services, security , any manufacturing process, supply of components for products, and even the information system itself.

The benefits expected from outsourcing are :

- Exercising greater control, e.g vendors being more responsive to user needs, sharing economics of scale achieved by the vendor etc.
- Innovative approach because of access to new technology and expertise expected from the vendor.
- Economy in procurement price. For smaller firms, overhead costs are much lower.
- Bulk requirement can be distributed among a number of vendors, thereby improving delivery time.
- Concentrating on core competencies and downsizing efforts.
- Competitiveness and better customer services.

Q. 28. (a) A large manufacturing company maintains a conference room with modern equipments and facilities for presentation. It has shortlisted three IT companies for development of its website and invited them for a brief presentation (not exceeding 30 minutes)" before its top management. Each presentation will be followed by a question answer session for about 15 minutes. On behalf of one of the shortlisted companies you are required to determine :

(i) Overall objectives of presentation.

(ii) Points to be covered in the presentation.

(iii) Specialist personnel to be included in the team.

(iv) Questions expected during question – answer session.

(b) What are the benefits expected to be derived on implementation of ERP?

Answer 28. (a)

(i) **Overall objective of the presentation** :

- A professional approach with best utilisation of the time allotted.
- Careful selection of the team to impress the customer about expertise of the IT company.
- Collection of relevant information about the client's company and present a probable horizon of the Website of the client's company.
- To meet probable expectation of the customer viz. quality of work, very reasonable time for development and competitive price.
- To stress on clientele, continuity in business, and price economy resulting from core competencies and scale of operation.
- To secure the order.

(ii) **Points to be covered in the presentation :** Introduction about the IT company

- Background.
- Reliability and stability stressing continuity for long in the field.
- Capabilities of providing total IT solution - hardware, system development, software, implementation, training, maintenance of software & hardware, and future upgradation.
- Clientele - national and international projects handled.

Points to be covered about the client's company :

- Overview of the client's company.
- Present shortcomings.
- Objectives of the study, approach, methodology and work-plan.
- Scopes under 'Total IT solution' / package approach, phases and time frame.
- Probable coverage and features in the website including statistical feedback, exhibits of good websites developed by the **IT** company alongwith some internationally reputed websites in the same trade.
- Reasonability of the service charge compared to the substantial benefit to the client, stress on core competencies, economy of scale, best professionals maintained, prospect for immediate implementation etc.
- E-commerce services provided by the IT company etc.
- Question-answer session
- Thanks giving

Audio-visual presentation with the help of laptop (having multimedia features) with LCD projection screen will be most effective specially when it is meant for top level executives. Impression is to be created within the precious allotted time of 30 minutes and the quality of presentation is to be superb and match with current technological standard. Internet connection may be established for visiting various Websites mentioned in the presentation and explaining E-commerce services.

(iii) **Specialist personnel to be included in the team :**

- Senior executive as team leader of the presentation before the top management of the customer company.
- Specialist in website development
- Techno-commercial expert to deal with techno-commercial questions during question-answer session.
- Technical staff to monitor equipments, electrical connections, charts etc. for the presentation.

(iv) **Questions on the following topics are expected during the question-answer session :**

- Various aspects of package approach.
- Instances / evidences of customer satisfaction, reference etc.
- Development time.
- Training.
- Maintenance aspect of the website.
- Protective features – contingency plan, firewall etc.
- Indication of prices for the various options, commercial terms etc.
- E-commerce – cost-benefit.

Answer 28. (b)

The benefits that are expected to be achieved by implementing ERP packages are :

- They make best uses of various resources
- Reduce paper documents by providing online formats for quickly entering and retrieving information.
- Improves timeliness of information by permitting posting daily instead of monthly.
- Greater accuracy of information with detailed content, better presentation, satisfactory for the auditors.
- Improved cost control.
- Faster response and follow up on customers
- More efficient cash collection.
- Better monitoring and quicker resolution of queries.
- Help to achieve competitive advantage by improving its business process.
- Improves supply demand linkage with remote locations and branches in different countries.
- Improves international operations by supporting a variety of tax structures, invoicing schemes, multiple currencies etc.
- Improves information access and management throughout the enterprise.

Q. 29. (a) What are five control objectives of an Operating system?

(b) State and explain the four back up and recovery features necessary in a DBMS.

(c) Write short note on Encryption techniques.

Answer 29. (a)

Five Control Objectives of an operating system are :

(i) The operating system must protect itself from users**:** User applications must not be able to gain control of, or damage in any way, the operating system, thus causing it to cease running or destroy data.

(ii) The operating system must protect users from each other : One user must not be able to access, destroy, or corrupt the data or programs of another user.

(iii) The operating system must protect users from themselves **:** A user's application may consist of several modules stored in separate memory locations, each with its own data. One module must not be allowed to destroy or corrupt another module.

(iv) The operating system must be protected from itself **:** The operating system is also made up of individual modules. No module should be allowed to destroy or corrupt another module.

(v) The operating system must be protected from its environment: In the event of a power failure or other disaster, the operating system should be able to achieve a controlled termination of activities from which it can later recover.

Answer 29. (b)

The four backup and recovery features necessary in a DBMS are discussed below :

(i) **Database backup :** The backup features makes a periodic backup of the entire database. This is an automatic procedure that should be performed at least once a day. The backup copy should be stored in a secure remote area.

(ii) **Transaction log :** This feature provides an audit trail of all processed transactions. It lists transactions in a transactions log file and records the resulting changes to the database in a separate database change log.

(iii) **Checkpoint feature :** The checkpoint facility suspends all data processing while the system reconciles the transaction log and the database change log against the database. At this point the system is in a "quiet state". Checkpoints occur automatically several times an hour. If a failure occurs, it is usually possible to restart the processing from the last check point. Thus, only a few minutes of transaction processing must be repeated.

(iv) **Recovery Module :** The recovery module uses the logs and backup files to restart the system after a failure.

Answer 29. (c)

Encryption Technique : It is the conversion of data into secret code for storage in databases and transmission over networks. The sender uses an encryption algorithm to convert the original message called clear text into a coded equivalent called cipher text. At the receiving end, cipher text is decoded back into clear text. The encryption algorithm uses a key, which is a binary number ranging typically from 56 to 128 bits in length. The more bits in the key, the stronger is the encryption method. Two general approaches used are private key and public key encryption.

Private Key Encryption : Data encryption standard (DES) uses a single key known to both sender and the receiver of the message. To encode a message, the sender provides the encryption algorithm with the key, to produce a cipher text message. The encoded message is transmitted to the receiver, which decodes the message with a decryption program that uses the same key employed by the sender.

In DES approach, a perpetrator may discover the key and intercept and decipher the message. The more individuals who know the key, the greater is the probability of it falling into wrong hands.

Public Key Encryption : It uses separate keys for encoding messages and for decoding them. Each recipient has a private key that is kept secret and a public key to encrypt the message. The receiver then uses his or her private key to decrypt the message. Users never need to share their private keys to decrypt messages, thus reducing the likelihood that they fall into the hands of a criminal.

Q. 30. (a) Define the following computer Fraud and Abuse technique :

(i) Hacking

(ii) Logic time bomb

(iii) Spamming

(iv) Cracking

(v) Internet terrorism

Answer 30. (a)

(i) *Hacking :* It refers to unauthorised access to and use of computer system usually by means of a personal computer and telecommunication network.

(ii) *Logic time Bomb :* It refers to the program that lies idle until some specified circumstance or a particular time triggers it. Once triggered, the bomb sabotages the system by destroying programs, data or both.

(iii) *Spamming :* It refers to a situation where the same message is e-mailed to everyone on one or more Usenet news groups or LISTSERV lists.

(iv) *Cracking :* Unauthorized access to and use of computer systems, usually by means of a personal computer and a telecommunications network is called cracking. Crackers are hackers with malicious intentions.

(v) *Internet terrorism :* Using internet to disrupt electronic commerce and to destroy company and individual communications is referred as internet terrorism.

Q. 30. (b) Define the following terms with reference to Section 2 of Information Technology Act, 2000 :

(i) Key Pair.

(ii) Digital Signature.

(iii) Secure System

Answer 30. (b)

(i) *Key pair :* In an asymmetric crypto system, comprising of a private key and its related public key. These keys are so related that the public key can be used to verify a digital signature created by the private key.

(ii) *Digital signature :* It refers to authentication of any electronic record by a subscriber by means of an electronic method or procedure in accordance with the provision of section 3.

(iii) *Secure system :* It means computer hardware, software and procedures which are reasonably secure from the unauthorized access and misuse, provide a reasonable level of reliability and correct operation and adhere to generally accepted security procedures.

Q. 30. (c) State the objectives IT Act, 2000.

Answer 30. (c)

The IT Act 2000, passed by both the houses of Indian Parliament in May 2000 and subsequently received the assent of the President in August 2000, contains the Cyber Laws. It provides the legal infrastructure for e-commerce and it is important to understand the various perspectives of the Act.

The objectives of the Act are :

- To grant legal recognition to transactions carried out through electronic data interchange and other means of electronic communication commonly referred to as “electronic commerce” replacing the paper-based communication;

- To give legal recognition to Digital Signature for authentication of any information or matter which requires authentication under any law;
- To facilitate electronic filing of documents with Government Departments;
- To facilitate electronic data storage;
- To facilitate and give legal sanction to electronic funds transfers between banks and financial institutions;
- To give legal recognition for keeping of books of account by Bankers in electronic form;
- To amend the Indian Penal Code, the Indian Evidence Act, 1872; the Banker's Book Evidence Act, 1891 and the Reserve Bank of India Act, 1934.

Q. 31. (a) Briefly describe the various objectives to be met while performing an IS audit.

(b) What are the review areas of an IS Auditor.

Answer 31. (a)

While performing an IS audit, auditors should ascertain that the following objectives are met:

(i) Security provisions protect computer equipments, programs, communications and data from unauthorized access, modifications or destruction.

(ii) Program development and acquisition is performed in accordance with management's general and specific authorization.

(iii) Program modifications have the authorization and approval of the management.

(iv) Processing of transactions, files, reports and other computer records is accurate and complete.

(v) Source data that is inaccurate or improperly authorised is identified and handled according to prescribed managerial policies.

(vi) Computer data files are accurate, complete, and confidential.

Answer 31. (b)

The IS auditors may focus on following review areas :

(i) **Computerised systems and applications :** The auditor should verify that systems and applications are appropriate to the users' needs, efficient and adequately controlled to ensure valid, reliable, timely and secure input, processing and output at current and projected levels of system activity.

(ii) **Information Processing Facilities :** This facility must be controlled to ensure timely, accurate and efficient processing of applications under normal and potentially disruptive conditions.

(iii) **Systems Development :** An IS auditor should ensure that systems under development meet the objectives of the organization, satisfy user requirements and provide efficient, accurate and cost effective systems and applications. The auditor should also ensure that these systems are written, tested and installed in accordance with generally accepted standards for systems development.

(iv) **Management of Information Systems :** MIS must develop an organizational structure and procedures to ensure a controlled and efficient environment for information processing. This plan should also specify the computers and peripheral equipments required to support all functions in an economic and timely manner.

(v) **Client/Server, Telecommunications and Intranets :** In a client/server environment, all applications that can be dedicated to a user are put on the client. All resources that need to be shared are put on the server. Auditors must ensure that controls are in place on the client as well as on the server and on the network. Auditors must provide the same level of control assurance in an Internet/Intranet environment as in a client/server environment, with special emphasis on TCP/IP and HTTP.

INTERMEDIATE EXAMINATION

(REVISED SYLLABUS - 2008)

GROUP - II

Paper-10 : APPLIED INDIRECT TAXATION

Q.1. (a) Fill in the blanks :

(i) Audit of SSI units is conducted once in _____ years.

(ii) _____ is called as general bond with surety/ security for removal of goods without payment of duty.

(iii) MRP provisions are not applicable for packaged commodities meant for _____ .

(iv) Service tax came into force from _____ Finance Act.

(v) Services provided by Central or State Government are taxable unless these services are _____ .

(vi) Service tax liability is exempted if te turnover is less than or equal to _____ .

(vii) Kerosene sold through public distribution system will attract VAT rate _____ .

(viii) Duty drawback on re-export is allowable if goods are re-exported within _____ years.

(ix) Where security has been furnished to the central sales tax authority in the form of a surety bond, death of surety should be intimated within _____ days of such occurrence and fresh surety bond furnished within _____ days.

(x) Composition scheme will be applicable on the dealer having annual turnover less than _____ In the preceding financial year.

Q.1. (b) State with reasons, whether True or False :

(i) Brand name owner is a manufacturer even though under contract a third party completely manufactures the product.

(ii) Insurance charges from the place of depot to the place of buyer shall form part of assessable value.

(iii) Sales Tax is leviable on sale of stocks, shares and securities traded by a dealer in shares.

(iv) A person who manufactures gold ornaments with the gold supplied by the customer is not a dealer under CST Act.

(v) Valuation audit can be ordered by the Superintendent of Central Excise.

(vi) Additional duty of customs u/s 3(5) of the Customs Act is payable only on import of industrial products and not on import of agricultural product.

(vii) Hides and skins are 'declared goods'.

(viii) In case of transactions of taxable service with an associate enterprises, service tax is required to be paid not on receipt basis, but on receipt or date of credit/debit entries in the books of account, whichever is earlier.

(ix) Provisional assessment can be initiated by Excise Department.

(x) Exemption from Excise duty does not mean exemption from registration.

Answer 1. (a)

(i) Two to Five

(ii) B-1 bond

(iii) Industrial or institutional consumers.

(iv) 1994

(v) Statutory services.

(vi) Rs. 10,00,000

(vii) 4%

(viii) Two years

(ix) 30, 90.

(x) Rs. 50 lakhs.

Answer 1. (b)

(i) **False** — Brand name owner is **not** a manufacturer even though under contract a third party completely manufactures the product.

(ii) **False** — Insurance charges from the place of depot to the place of buyer shall **not** form part of assessable value.

(iii) **False** — As per definition of goods under CST, the term does not include stocks, shares and securities**.**

(iv) **True** — Where the assessee is an ornament maker with the gold supplied by the customer, he is not a dealer but only a contractor for work and labour.

(v) **False** — Valuation audit can be ordered by the Asst. or Deputy Commissioner of Central Excise after getting the prior permission of Chief Commissioner of Central Excise.

(vi) **False** — The 4% special CVD, u/s 3(5) of the Customs Tariff Act, 1975 was imposed last year only on ITA goods and their parts/components. This has been extended to all imports vide customs notification no. 19/2006 – Cus dated 1.2.2006. It will apply to both agricultural and industrial products.

(vii) **True** — These are declared goods u/s 14.

(viii) **True** — Service tax is required to be paid on transaction with associated enterprises either on receipt of payment or making credit/debit entries in the books of accounts, whichever is earlier.

(ix) **False** — Assessee has to request for provisional assessment.

(x) **True** — These two are independent of each other. Registration and compliance of following excise procedures is necessary even of a product is exempt from duty, unless exemption from registration been granted under rule 9(2).

Q. 2. (a) Distinguish between tax avoidance and tax evasion.

(b) State the main ingredients which make tax planning a legitimate exercise.

(c) A registered dealer was eligible to purchase certain goods at concessional rate of CST. However, through oversight, the goods were not included in his registration certificate. He issued C form for purchase of the goods. State the consequences.

Answer 2. (a)

The broad areas of distinctions are :

Tax avoidance :

(i) Any planning of tax which though done strictly according to legal requirement but defeats the basic intention of the Legislature behind the statute, could be termed as an instance of tax avoidance.

(ii) Tax avoidance takes into account the loopholes of law.

(iii) Tax avoidance is tax hedging.

(iv) Tax avoidance is legitimate but an element of malafide motive is involved.

(v) Tax avoidance is intentional tax planning before actual tax liability arises.

Tax evasion :

(i) All methods by which tax liability is illegally avoided is termed as tax evasion.

(ii) Tax evasion is an attempt to evade tax liability with help of unfair means/ methods.

(iii) Tax evasion is tax omission.

(iv) Tax evasion is unlawful and an assessee guilty of tax evasion may be punished under the relevant laws.

(v) Tax evasion is intentional attempt to avoid payment of tax after the liability to tax has arisen.

Answer 2. (b)

Tax planning is a perfectly legitimate exercise if it complies with under-mentioned ingredients :

(i) Tax planning should not violate the basic intention of Legislature behind the statute.

(ii) Tax incentives availed of by the assessee is within the ambit of legitimate tax planning.

(iii) Planning of financial affairs by a series of transactions (doctrine of form) each having individual legitimacy and composite effect produced as a whole (doctrine of substance) following the true spirit of law, is perfectly legitimate.

(iv) Tax planning should not involve use of colourable devices for reducing tax liability.

Answer 2. (c)

Mere eligibility to purchase goods at concessional rate is not sufficient. The goods must be mentioned in the registration certificate. As per section 10 (c) of CST Act, false representation when purchasing any goods that the class of goods are covered by the registration certificate, is an offence. As per section 10 (a), furnishing a false certificate is an offence. If certificate of registration of dealer does not cover item of goods purchased in inter state sale, benefit of exemption under section 6 (2) of CST Act is not available – *State of TAmilnadu v. Trade International (1999) 113 STC 70 (Mad HC DB).* Knowingly purchasing goods which are not covered in registration certificate under 'C' form is an offence – *Business Consultancy v. State of TAmilnadu – (1994) 94 STC 176 (Mad HC DB).* Penalty is imposable if 'C' form is issued in respect of goods not included in registration certificate - *State of TAmilnadu v. Shyal Chemicals (1998) 108 STC 396 (Mad HC DB).*

Thus, dealer will have to pay differential sales tax, plus penalty can be imposed.

Q. 3. (a) Explain distinguishing features between provisions of 'pilferage' and 'loss or destruction of goods' under Customs Act.

(b) Briefly discuss the validity of the following statements :

(i) 2,000 units of raw material were purchased on which duty paid was Rs. 32,000. 20 units were damaged during the course of unloading, rendering them unfit for consumption or sale. Cenvat credit can be claimed in respect of all the units.

(ii) Lump sum payment and annual royalty for transfer of technical know-how for manufacturing goods in includible in the assessable value.

(c) Prestige Internationals Ltd. manufacture coffee makers. From their plant at Bangalore the products are moved to various depot. The company packs them in plain white carton from the factory, for protecting the goods during transportation. At the depots, the plain cartons are discarded and put inside a printed carton before effecting sales. The company includes the value of printed carton in the assessable value, but not the cost of plain white cartons. Is the same correct under the Central Excise Act, 1944 ?

Answer 3. (a)

Difference in sections 13 and 23 (1) can be summarized as follows :

Section 13 - Pilferage	Section 23 – Loss or destruction of goods
Pilferage means loss arising out of theft	Such loss may arise by fire, natural calamity etc.
Section 13 deals with pilferage	Section 23 (1) deals with loss or destruction of goods, except pilferage.
No duty is payable at all under section 13, but liability revives for duty if goods are restored.	Duty is payable under section 23 (1), but it may be remitted by Asst. Comm. Of Customs. Thus, unless remitted, duty has to be paid under section 23 (1)
Importer does not have to prove pilferage.	Burden of proof is on importer to prove loss or destruction.
Pilferage should be before order for clearance is made.	Loss or destruction can be at any time before clearance.
Loss must be only due to pilferage.	Loss or destruction may be due to fire, accident etc., but not pilferage e.g., loss by leakage is covered under section 23.
Under section 13, normally duty is not paid. However, if duty is paid before examination of goods, refund can be claimed if goods are found to be pilfered during examination but before order for clearance is made.	Under section 23 (1), if duty is paid, then refund can be obtained only if remission is granted by Customs Authorities. Thus, remission under section 23 (1) is at the discretion of Customs Authorities. [Of course, the discretion has to be exercised judiciously].
Section 13 is not applicable for warehoused goods.	Section 23 (1) is applicable for warehoused goods also [As goods transferred to warehouse are not 'cleared for home consumption'].

Answer 3. (b)

(i) The statement is incorrect. 20 units out of the intended inputs were destroyed prior to their issue to production and hence cannot be construed as "used in or in relation to manufacture". Cenvat credit cannot be claimed in respect of these 20 units. For the rest of the units, i.e. 1,980 units Cenvat credit can be claimed.

(ii) The statement is not correct. Lump sum payment and annual royalty for transfer of technical know-how - As per rule 9 of the Customs Valuation Rules. 1989, the transaction value is inflated by cost c services and expenses as specified. Under rule 9(1)(c) royalties and licence fee related t the imported goods that the buyer is required to pay as a condition of sale of goods being valued, is added to the

transaction price. It is to be noted that only such amount c royalties and licence fee which relate to the imported goods is to be added back. In this case the lump sum payment and annual royalty are related to the manufacture of good and do not relate to the imported goods. Hence, this amount is not includible in this assessable value.

Answer 3. (c)

As per section 4(4)(d)(i) of the Central Excise Act, 1944, in relation to excisable goods, 'Value' includes, where the goods are delivered at the time of removal in packed condition, the cost of such packing, excepting the cost of packing which is durable in nature and is returnable to the assessee by the buyer. The explanation to the clause enjoins that 'packing' means the wrapper, container, bobbin, pin, spool, reel or wrap beam or any other thing in which the excisable goods are wrapped, contained or wound.

In the problem, the plain carton packing is only to protect the goods during transportation from the factory to the depots; the intention is to avoid damage to the printed cartons if used in the first stage of transportation itself. At the depots, the plain cartons are discarded and the coffee maker is put inside a printed carton before effecting sales. The cost of printed cartons has been correctly included by the assessee in the assessable value of the goods, the cost of plain white cartons is not includible. Reliance can be placed on the discussion in the case of Eureka Forbes Ltd. vs. CCE 1999 (114) ELT 140.

Q. 4. (a) What are the essential requirements of 'penultimate sale for export' under Central Sales Tax Law?

(b) Whether CENVAT credit will be allowed in respect of the duty paid on inputs or input service used in the manufacture of intermediate products by a job worker?

(c) The registered offices of the assessee and one of the bulk buyers of the assessee were located in the same premises. Further, the factory of the assessee was located in the industrial area owned by the bulk buyer of the assessee, forf which the assessee used to pay a suitable rent. The assessee gave 40% discount to the said bulk buyer. The Department questioned this discount on the ground that the two parties were related persons.

Answer 4. (a)

Export often effected through specialized agencies like Export Houses etc., termed as 'Merchant Exporters' under EXIM policy. Such indirect exports also m=need exemption from taxes to make the products competitive. Hence, such penultimate sale, i.e., sale preceding the sale occasioning export is also deemed to be in the course of export u/s 5 (3) of CST Act and is exempt from CST.

Exemption to penultimate sale is subject to the condition that the penultimate sale (i.e. last but one sale) is (a) for purpose of complying with agreement or order in relation to export and (b) such sale is made after the agreement or order in relation to export and (c) same goods which are sold in penultimate sale should be exported. In other words, the final exporter should be in possession of export order from foreign buyer and should take delivery of goods from the supplier making penultimate sale solely for execution of such export order and export the same goods.

In Consolidate Coffee Ltd. v. Coffee Board – AIR 1980 SC 1468, it was held that all the aforesaid conditions must be satisfied for availing exemption u/s 5 (3) of CST Act. It was also held that 'agreement or order in relation to export' means or refers to the agreement with a foreign buyer and not an agreement or order with a local party containing the covenant to export.

Only penultimate sale is exempt but purchases earlier to penultimate sale are not exempt and purchase tax is payable if prescribed.

There must be a pre-existing agreement or order to sell the specified goods to a foreign buyer, last purchase must be after the agreement with foreign buyer and the last purchase must be made for complying with the pre-existing order. Only then the transaction is covered under section 5 (3), i.e., it is treated as a

'penultimate sale'. The same goods, which are purchased must be sold. Thus, when fresh frog legs were purchased and these were exported after removing skin, cleaning and freezing, it was held that 'same goods' were sold and purchases of frog was eligible u/s 5 (3).

Answer 4. (b)

Rule 3(1) provides that CENVAT credit will be allowed of the duties, tax or cess paid on inputs/ input service used in the manufacture of intermediate products by a job worker if –

(i) The job worker is availing the exemption given under Notification No. 214/86 – CE, and

(ii) The said intermediate products are received by the manufactures of final products for use in or in relation to the manufacture of final products.

Answer 4. (c)

The buyer and seller will be related persons only when there is a holding and subsidiary company concept is exist or persist as per Rule 10 of the Central Excise Valuation 9DPEG) Rules 2000or there should be legal relationship between the individuals (like husband and wife or brother and sisters). In the given case there is no mutuality of interest between the two parties (like sharing of profits, flow of funds etc.). therefore, discount @ 40% is called uniform discount which is allowed to deduct from the total value for the purpose of finding the Assessable Value [CCEx v. Damnet Chemicals Pvt. Ltd. 2007 (216) ELT 3 (SC)].

Q. 5. (a) One of the plants of the tax-payer produces ferrous sulphate, chromium sulphate and sulphur-di-oxide during the prepration of khaki dye. These are intermediate goods/semifinished goods and are not marketable. Central excise authorities demand excise duty on the ground that the tax-payer was manufacturing these goods and clearing them for internal consumption. Your advice as a consultant is sought by the tax-payer.

(b) Explain the mode of valuation when goods are sold partly to related persons and partly to independent buyers?

(c) M/s. Super Infotech imported a consignment of computer software and manuals valued at Rs. 50 lakhs and contended that the actual value was only Rs. 15 lakhs while the balance amount represented license fee for using the software at multiple locations and as such customs duty is payable only on the actual value of Rs. 15 lakhs. Is the contention, raised by M/s. Super Infotech, correct? Discuss.

Answer 5. (a)

In CCE vs. Ambalal Sarabhai Enterprises (1989) 43 ELT 214(SC), the Supreme Court declared that intermediate product will not be dutiable if it cannot be marketed in that condition. On the facts of the given case, which is similar to the case sited above, the Central Excise Authorities are not correct in their view.

Answer 5. (b)

There is no specific rule covering such a contingency. Transaction value if respect of sales to unrelated buyers cannot be adopted for sales to related buyers since as per section 4(1) transaction value is to be determined for each removal. For sales to unrelated buyers valuation will be done as per Section 4(1)(a) and for sale to the related buyers residuary Rule 11 read with Rule 9 (or Rule 10) have to be followed. Rule 9 cannot be applied in such cases directly since it covers only those cases where all the sales are to related buyers only.

Answer 5. (c)

According to Rule 10(1)(c), royalties and license fees relatable to the imported goods shall be included in the price actually paid or payable for such goods. However, charges for right to reproduce will not be included in the assessable value.

The facts of the case are similar to that in State Bank of India v. CC [2000] 115 ELT 597 (SC) wherein the Supreme Court has held that –

(i) Since no separate value of the software has been indicated in the agreement except the license fee, therefore, the price was payable for only allowing the SBI to use the software in a limited way at its own centers for a limited period and therefore the same is called as license fees. Total cot incurred including the license fee for the countrywide use would be the transaction value on which Customs duty is to be paid.

(ii) The interpretative notes provide for exclusion of reproduction royalty. Countrywide use of the software and reproduction of software are two different things and license fee for countrywide use cannot be considered as charges for right to reproduce the imported goods because reproduction and use are two different things.

Accordingly, the total cost incurred, including the license fee for countrywide use of software, would be the transaction value on which customs duty was to be charged.

In view of what has been stated above, the contention raised by M/s. Super Infotech is incorrect. The amount of license fees relatable to the use of software at multiple locations is not reproduction royalty and hence, not excludible from the value of the consignment of computer software and manuals. M/s. Super Infotech shall be liable to pay customs duty on the total sum of Rs.50 lakhs.

Q. 6. (a) An importer has imported certain goods and while determining the assessable value, landing charges @ 1% of CIF value were added. The importer has claimed that actual landing charges are much lower than 1% of the CIF value in his case. You have been asked to advise whether the importer can file a bill of entry by adding actual landing charges instead of notional 1% of CIF value or not.

(b) While importing goods under Duty Free Import Authorisation (DFIA), should any customs duty be paid? Is the DFIA transferable?

(c) What is 'redemption fine' in lieu of confiscation? What is the limit for imposing redemption fine under section 125(1) of the customs Act, 1962?

Answer 6. (a)

The importer cannot file Bill of **Entry by** adding actual landing charges. Rule 3(2)(b) of Customs Valuation Rules, 1989 has statutorily laid down **a fixed 1% charge on free on** board value (F.O.B **Value)** of the **goods** plus the cost of transport plus the **cost of** insurance.

In *Wipro Ltd. Vs ACC,* it **was** held **that** handling charges of 1% of **CIF** Value, which is very nominal, are not arbitrary. It **has been** fixed under the power **conferred by the** Parliament on the rule making authority and such an act cannot be **considered beyond** the power conferred by **Section** 14(1) or Section **156** of the **Customs Act.** 1963. Accordingly, the importer should have filed Bill of Entry by adding the **statutorily fixed** 1% charges in the CIF value regardless **of the** actual handling charges being much lower in the present case.

Answer 6. (b)

Duty Free Import Authorisation (DFIA) has been introduced w.e.f. 1.5.2006. It is issued to allow duty free import of inputs, fuel, oil, energy sources, catalyst required for export products. Imports under DFIA will be exempted from payment of basic customs duty, additional customs duty/ excise duty, education cess, anti-dumping duty and safeguard duty, if any.

After export obligation is fulfilled, the scrip can be made transferable by Regional Authority. After endorsement f transferability, duty free inputs (except fuel) can be transferred.

Answer 6. (c)

Section 125(1) of Customs Act provides that whenever confiscation of goods is ordered, the adjudicating officer may give option to owner of goods to pay 'fine' in lieu of confiscation, if the importation or exportation of goods was prohibited. However, if importation or exportation of goods was not prohibited, the option to pay redemption fins shall be given to owner of goods. This is called 'redemption fine'. After payment of redemption fine, the goods are returned to the owner of goods. Section 125(2) of Customs Act makes it clear that where any fine in lieu of goods is imposed, the owner of goods or the person from whom the goods were seized, is liable to pay duty and charges in respect of such goods, in addition to the fine.

As per proviso to section 125(1) of Customs Act, fine shall not exceed the market price of goods less duty chargeable thereon [Of course, duty and charges (e.g. demurrage, storage charges, interest etc.) in respect of such goods is also payable, which is made clear in section 125(2) of Customs Act].

Q. 7. (a) The assessee imported capital goods and deposited them in warehouse. The said goods were not removed from the warehouse within the period permitted under section 61(1)(a) i.e., five years. Subsequently, the assessee filed an application for relinquishment of title of such warehoused goods.

The Department contended that since the assesee did not file an application for extension of warehousing period before the expiration of five years u/s 61(1)(a), after expiration of the said period, the goods could no longer be termed as' warehoused goods'. Therefore the assessee lost its title to the same and consequently it lost its right to relinquish its title thereto. It was further claimed that the relinquishment of title tot eh said goods ought to have been made by the assessee before the expiration of the warehousing of title and not thereafter and therefore the said goods were 'deemed to have been improperly removed from warehouse'. Consequently, the assesee became liable to pay duty, penalty and interest with respect to the said goods u/s 72 (1)(b) of the Customs Act.

(b) How will the value of goods be determined in a case where the price of goods is not known at the time and place of removal?

(c) Answer in brief the following questions relating to export without payment of duty other than to Nepal and Bhutan under Rule 19 of the Central Excise Rules, 2002 :

(i) What is the type of bond to be executed ? Who is exempted from furnishing such bond?

(ii) What is the export document for export clearance ? How many copies are required to be prepared for it?

(iii) What will be the duty payable, if goods are not exported within six months after clearance?

Answer 7. (a)

This High Court observed that the owner of the goods (importer) though loses control over the goods when he deposits them in the warehouse, but he does not lose his title or ownership to such goods so long as they remain in the warehouse either during the continuance of the warehousing period or even after its expiration.

The High Court pointed out that the provisions of section 23(2) and proviso to section 68 make it clear that upon relinquishment of his title to any imported goods, including the warehoused goods, the owner of such goods shall not be liable to pay duty thereon and whwn the owner is not liable to pay duty, the question of paying any interest on the duty and penalty would not arise. The Court however made it clear that interest and rent payable u/s 68 would be recoverable from the date of deposit of the goods in the warehouse to the date of relinquishment of title to goods. Thus, the High Court dismissed the Department's appeal.

CCus. V. i2 Technologies Software (P) Ltd. 2007 (217) ELT 176 (Kar).

Answer 7. (b)

Rule 4 of the Central Excise Valuation Rules, 2000 provides that in a case where the price of goods is not know at the time and place of removal, then valuation shall be done on the basis of the value of such goods (i.e. other goods of the same class of the same manufacturer), sold by the assessee for delivery at any other time nearest o the time of removal of goods in question. However adjustments in the value can be made on account of difference in the dates of delivery of such goods (i.e. other goods of the same class of the same manufacturer) and the goods in question as thought reasonable by the proper officer. Such a situation arises when the goods are not sold at the time of removal.

Answer 7. (c)

(i) Form B-1 Bond required, the bond value should be at least equal to the duty thereon. Merchant exporter-executes this bond for export without payment of duty.

The manufacturer exporter need not to furnish this bond, they can furnish a letter of undertaking (LUT) in form UT-1.

(ii) ARE-1 Form is the document for export clearance, it is to be prepared in sextuplicate.

(iii) If the goods are not exported within six months form the date of clearance from the factory, the exporter should pay the duty along with interest.

Q. 8. (a) Ms/ Naturocare Ltd. manufacturing a product called 'Himtaj Oil' (HO). The assessee contended that the product HO was a medicament under Chapter sub-heading 3003.31 of the CETA, 1985.

However, the stand of the Department was that the said product was a cosmetic/ toiletry preparation classifiable under Chapter heading 33.06, by considering common parlance test.

State whether stand taken by the department is correct in law?

(b) What is the meaning of 'normal transaction value' according to Central Excise Valuation (Determination of Price of Excisable Goods) Rules, 2000?

(c) Explain whether profits made by dealer on transportation/insurance by charging more than the amount spent on actual transport/ insurance is includible in the assessable value for the purpose of Section 4 of the Central Excise Act, 1944.

Answer 8. (a)

As long as product has popular meaning and understanding which is attached to such products by those using the product and not to the scientific and technical meaning of the terms and expressions used. Hence, it is important to note how the consumer looks a t a product and his perception in respect of such product.

Moreover, merely because there is some change in the tariff entries, the product may not change its character. Therefore, it has to be classified as a hair oil and falls under cosmetics.

Hence, the Department stand is correct. CCEx., Nagpur v. Shree Baidyanath Ayurved Bhawan Ltd. 2009 (237) E.L.T. 225 (S.C.).

Answer 8. (b)

As per valuation rule 2(b), 'normal transaction value' means the transaction value at which the greatest aggregate quantity of goods are sold. The term 'GREATEST AGGREGATE QUANTITY' is used in rule 7 of Customs Valuation Rules. This rule states that while considering selling price of imported goods in India, unit price at which greatest aggregate quantity of identical or similar goods are sold to unrelated persons in India should be the basis. If ' normal transaction value' from the depot on date of removal from factory is not ascertainable, nearest day when clearance of identical goods were effected from depot or other place should be taken into consideration.

Answer 8. (c)

It was held in Baroda Electric Meters Ltd. v. CCEx [1997] 94 ELT 13 (SC) that where freight actually paid is less than the amount collected by way of freight and transportation charges, the differential amount will not be includible in the assessable value, since it is a profit made by dealer on transportation/ insurance by charging more than the amount spent on actual transport/ insurance will not be includible in the assessable value.

This judgment is applicable even now. Rule 5 provided for the deduction of average or equalized freight, which is computed as per principles of costing taking into account historical data. If average freight system is prevalent, the assessee would charge average freight from the buyer and get deduction therefore from the transaction value. However, the amount of average freight charged from buyer may exceed actual cost of transport incurred by the assessee. Thus, such excess charged form buyer i.e. profit made on transportation, shall not be includible in the assessable value.

Q. 9. (a) Whether sale of ready built flats is taxable under 'construction of complex service'?

(b) Write short note on - Rules for deciding subsidy or dumping margin.

(c) Astha Ltd. supplies raw material to a job worker Chaya Ltd. After completing the job-work, the finished product of 6,000 packets are returned to Astha Ltd. putting the retail sale price as Rs. 25 on each packet. The product in the packet is covered under MRP provisions and 40% abatement is available on it. Determine the assessable value under Central Excise Law from the following details :

Cost of raw material supplied	**Rs. 30,000**
Job worker's charges including profit	**Rs. 10,000**
Transportation charges for sending the raw material to the job worker	**Rs. 3,000**
Transportation charges for returning the finished packets to Astha Ltd.	**Rs. 3,000**

Answer 9. (a)

In the case of Greenview Land & Buildcon limited v. CCEx., Chandigarh 2008 (11) STR 113 (Tri –Del.)

The assessee was engaged in construction of complex without engaging any contractor or service provider in relation to it. The entire work was carried out by appellant as developer and builder and ready built flats were sold.

Tribunal observed that as per CBEC Circular No. 96/7/2007-S.T. dated 23-8-2007, if no other person is engaged in construction work and the builder/promoter/developer/any such person undertakes construction work on his own without engaging the services of any other person, then in such cases, (i) service provider and service recipient relationship does not exist, (ii) services provided are in the nature of self-supply of services. Therefore, Tribunal held that sale of ready built flats in the instant case was not taxable under 'construction of complex service'.

Answer 9. (a)

Rules for deciding subsidy or dumping margin - Central Government has been empowered to make rules for determining (a) subsidy or bounty in case of bounty fed goods (b) the normal value and export price to determine margin of dumping in case of dumping. Accordingly, Customs Tariff (Identification, Assessment and Collection of Anti-dumping duty on Dumped Articles and for determination of Injury) Rules, 1995 [Customs Notification No. 2/95 (N.T.) dated 1-1-95] provide detailed procedure for determining the injury in case of dumped articles.

Procedure for fixing anti dumping duty - After the 'designated authority' is satisfied about prima facie case, he will give notice to Governments of exporting countries. Opportunity to inspection of documents and making representations will be given to interested parties who are likely to be affected. Designated

Authority will first give preliminary finding and then final finding within one year. Provisional duty can be imposed on basis of preliminary finding which can continue upto 6 months, extendable to 9 months. Additional duty may be imposed on basis of the final finding.

As per rule 18 of Anti-Dumping Duty Rules, Central Government has to issue a notification fixing anti-dumping duty within three months from date of notification issued by designated authority.

Answer 9. (a)

In case of goods covered under MRP provision under section 4A of the Act, the valuation thereof will be done in accordance with the provisions of the said section and not as per the section 4, since section 4A has overriding effect over the provisions of section 4.

Accordingly, the assessable value of the goods shall be (Amounts in Rs.) –

Retail sale price of each packet	25
Less : 40% abatement	10
Assessable value per packet	15
Total assessable value (Rs. 15 × 6,000)	90,000

Q. 10. (a) Is service tax leviable on fee collected by Public authorities while performing statutory functions under the provisions of law?

(b) X Ltd. made an application under section 32E of the central Excise Act, 1944 to the settlement commission. The settlement commission was not satisfied saying that the application had not made a true and full disclosure of his duty liability and the manner in which same was arrived at was also not correct and rejected the application. The assessee contended that obligation to make truthful disclosure of duty liability would arise only after the application was admitted and not before that. Is plea taken by the assessee acceptable in law?

(c) In respect of a capital goods received by the manufacturer in July 2008 (duty paid Rs. 1,00,000), 50% i.e. Rs. 50,000 credit was taken in November 2008, balance 50% credit was taken in April 2009. The capital goods was installed in January 2009 and were sold as second hand capital goods after use in July 2010.The duty paid at the time of purchase has been utilized against payment of duty in the year 2008-09 and 2009-10. What is the total amount of excise duty, if any, payable by the manufacturer at the time of removal of capital goods?

Answer 10. (a)

There are some services which are assigned to and rendered by the Public authorities or in the nature of 'statutory functions'. To name few service, Regional Transport Officers (RTO) issue fitness certificate to motor vehicles, Directorate of Boilers inspects issue certificates for boilers or Explosive Department inspects and issues certificate for petroleum storage tank, LPG/CNG tank in terms of provisions of the relevant laws. The authorities performing such functions are required to collect fee for the services and deposit the same into the account of government. Such activities are purely in public interest and are undertaken s mandatory and statutory functions. These are not to be treated as services provided for a consideration. Therefore, such activities assigned to and performed by a public authority under the provisions of any law, do not constitute taxable services. Any amount/ fee collected in such cases are not to be treated as consideration for the purpose of levy of service tax.

Answer 10. (b)

The application can be accepted only when Settlement Commission was satisfied that the applicant had made a full and true disclosure of duty liability and the manner in which same was arrived at. The object

behind the enactment of the provisions relating to settlement was the creation of a forum for self-surrender. The Settlement Commission was constituted as an extraordinary measure for providing an opportunity to such persons to make a true confession and to have matters settled once for all.

Therefore, assessee's plea that obligation to make truthful disclosure of duty liability would arise after application was admitted and not before that, was not acceptable. Cus. & CCEx Settlement Commissioner v. Mars Therapeutics & Chem. Ltd. 2008 (223) ELT 363 (AP).

Answer 10. (c)

If capital goods are removed as second hand capital goods after use, the manufacturer or output service provider shall pay an 'amount' (not 'excise duty') equal to Cenvat credit taken on the said capital goods, reduced by 2.5% for each quarter of a year or part thereof from the date of taking the Cenvat credit, except in case of computers (w.e.f. 13.11.2007)

Here, quarters involved are 8 (2008-1, 2009-4, 2010-3) for first 50% and 6 (2009-3, 2010-3) for balance 50%.

Thus, assessee can get deduction of 20% of first Rs. 50,000 (Rs. 10,000) and 15% of balance Rs. 50,000 (Rs. 7,500). He has to pay 'amount' of Rs. 82,500 (1,00,000 – 10,000 – 7,500).

The buyer can avail Cenvat credit of this 'amount' as made clear in rule 3(6) of Cenvat Credit Rules. Hence, seller should clear the second hand capital goods under 'invoice' charging 'amount' in invoice (not excise duty).

Q. 11. (a) When does a small service provider require to register under the Service Tax Act, but not liable to collect and pay Service Tax?

(b) A manufacturer who exports goods gets his inputs without payment of duty under Notification No. 43/2001 CE(NT) dated 26.02.2001. Briefly state with reasons whether the manufacturer could export goods under claim of rebate under Rule 18 of the Central Excise Rules, 2002.

(c) Discuss whether Cenvat credit can be availed in respect of goods used for manufacture of capital goods within the factory and in respect of inputs for effluent treatment plant.

Answer 11. (a)

The service provider has to register himself under service tax once the value of taxable services breaches the threshold limit of Rs. 9 lakhs. However, service tax need not be collected and paid till the value of taxable services exceeds Rs. 10 lakhs.

Answer 11. (b)

The conditions governing the procurement of inputs without payment of duty under Notification No. 43/2001 CE (NT) dated 26.06.2001 specifically mandate that such inputs and goods manufactured or processed using such inputs should be exported without payment of duty under Rule 19(1) OF THE Central Excise Rules, 2002 and the procedure for export without payment of duty should be followed.

Therefore, in the given case, the manufacturer cannot export the goods, manufactured out of inputs procured without payment of duty, under claim of rebate under Rule 18 of Central Excise Rules, 2002.

Answer 11. (c)

As per explanation 2 to definition of 'input', 'Input' includes goods used in the manufacture of capital goods which are further used in the factory of the manufacturer but shall not include cement, angles, channels, Centrally Twisted Deform Bar (CTD) or Thermo Mechanically Treated bar (TMT) and other items used for construction of factory shed, building or laying of foundation or making of structure for support of capital goods.

In Indian Farmers Coop Ltd. v. CCE – 86 ELT 177 (SC) + AIR 1996 SC 2542 = 1996 (5) SCC 488 + 15 RLT 498, it has been held that treatment of effluents is an essential and integral part of the process of manufacture of plant. The apparatus used for such treatment of effluents in a plant manufacturing a particular end-product is part and parcel of the manufacturing process. Hence, inputs used in the effluent treatment plant will be treated as 'used in the manufacture'. It was also held that inputs used indirectly in the manufacture will also be 'in the manufacture'. It is not essential that to qualify itself as a raw material, it had necessarily and in all cases to go into and be found in the end-product.

Q. 12. Mr. Bakshi, a service provider, has provided services of RS. 4,00,000 in 2009-10. Out of this, Rs. 2,50,000 are taxable output services and Rs. 1,50,000 are exempt output services. Service tax paid on his input services (excluding education cess and SAH education cess) is Rs. 4,000 which do not include any service specified in rule 6(5) of Cenvat credit rules. Rate of basic service tax is @ 10%.

Calculate the service tax in each of the following cases :

(i) If out of Rs. 4,000 of service tax paid by Mr. Bakshi on his input services, Rs. 1,000 are in respect of exempt output services and Rs. 3,000 pertains to taxable output services.

(ii) Mr. Bakshi not maintains separate books of account and willing to pay an 'amount'.

(iii) Mr. Bakshi wants to pay amount by reversing proportionate amount of input tax credit [Rule 6(3)(ii)].

Answer 12.

Calculation of service tax payable :

Case – (i)

	Rs.
Taxable output services	2,50,000
Service tax @ 10% on Rs. 2,50,000	25,000
Less : Cenvat credit allowed (on taxable output service)	3,000
Net service tax payable	22,000

Case – (ii)

If the service provider is not maintaining separate books of account and using common input service to provide taxable as well as exempted output services, he can opt to pay 'amount' of 6% of 'value of exempted services' [Rule 6(3)(i)].

		Rs.
Taxable output services		2,50,000
Service tax @ 10% on Rs. 2,50,000	(a)	25,000
Exempted output services		1,50,000
'Amount' @ 6% on RS. 1,50,000	(b)	9,000
Total service tax liability	(a + b)	34,000
Less : Cenvat credit allowed		4,000
Net service tax plus amount payable		30,000

Case – (iii)

If assessee intends to pay amount on proportionate basis as provided in rule 6(3)(ii) (w.e.f. 1.4.2008), the 'amount' is to be calculated as provided in rule 6(3A) of Cenvat Credit Rules. He has to pay 'amount' provisionally on monthly basis. At the year-end, he has to calculate exact amount and pay difference if any or adjust excess amount paid.

Calculation of percentage of exempted services on total services :

1,50,000/ 4,00,000 = 37.50%

	Rs.
Pay an amount @ 37.5% on Rs. 4,000	1,500
Service tax @ 10% on Rs. 2,50,000	25,000
Total liability of service tax	26,500
Less : Cenvat credit allowed	4,000
Net service tax liability	22,500

Note : Service tax is subject to education cess @ 2% and SAH education cess @ 1%.

Q. 13. (a) Fresh Drink Ltd. manufactured a 'syrup' containing soft-drink concentrate and sugar and sold the same to their marketing subsidiary M/s. Soft Drink Marketing Co. A part of the syrup was sold to others also. The marketing company would sell the same to retailers.

The marketing company used to lease out dispensing machines to retailers. The dispensing machine was used for dilution and carbonation of the syrup for sale of soft-drink to consumers.

Fresh Drink Ltd. paid central excise duty on its transaction value i.e. sale price to marketing subsidiary. Department held that since the assessee and the marketing subsidiary were related person, therefore, the assessable value shall be the sale price of the marketing subsidiary, that too without deducting discounts allowed by marketing subsidiary to its buyers. Further, the lease rental paid by the retailers to the marketing subsidiary towards dispensing machine was also held includible in assessable value.

Whether the Department was correct in computing the assessable value of the goods?

(b) Explain whether assembly amounts to manufacture.

(c) Can a branch office avail the Cenvat credit in respect of inputs used in providing taxable services when, the bills in respect of the said input is in the name of head office?

Answer 13. (a)

When trade discount has been indicated in the invoices at the time of sale and there is no flowback/return of trade discount to the assessee-seller or its related person, the assessable value shall be computed after deducting such trade discount. Even if the valuation was sought to be made based on the sale price of the related person, the deduction of discount couldn't be denied.

Sale of syrup and leasing of dispensing machine are separate activities with separate considerations. Even the definition of 'transaction value' doesn't permit the inclusion of consideration for different activity in the assessable value of excisable goods. 'Transaction value' includes any additional amount charged as price, by reason of or in connection with the sale of the goods under assessment; it doesn't include amounts charged in connection with or by reason of sale of other goods or provision of other services. Therefore, the lease charges cannot be included in the assessable value of the syrup.

CCEx. V. Pepsico India Holdings (P) Ltd. [2009] 234 ELT 385 (SC).

Answer 13. (b)

Assembly of the components/ parts resulting in the emergence of a finished product which has a distinct character and use will amount to manufacture. The basic test is whether the process of assembling of the parts or components resulted in the transformation which has made the product to have a distinct character and use and having a separate entry in the tariff. If this condition is satisfied then 'manufacture' is said to have taken place.

For instance, in B.P.L. India ltd. c. CCEs [2002] 143 ELT 3 (SC), it was held by the Apex court that the assembly of imported kits into VTRs and colour monitors by using the fasteners constituted the process of manufacture, since pursuant to such process, a transformation has taken place in the hands of technical experts, which made the product have distinct character and use.

However, if the assembly of the duty paid parts or components does not result in the emergence of an entirely new and distinct article having a different characteristics it will not result in to manufacture.

Answer 13. (c)

Credit where inputs/ capital goods received by one office of output service provider, but, purchase invoice received by another office of such service provider [Rule 7A] : If –

(i) A provider of output service receives any inputs or capital goods, but,

(ii) The invoice towards purchase of inputs and capital goods is received by another office or premises of the such provider of output service,

Then, the provider of output service can take credit on such inputs and capital goods on the basis of an invoice or a bill or a challan issued by such another office or premises of such provider of output service.

For this purpose, such another office or premises shall follow the same procedure/ conditions as are applicable to a first stage dealer or a second stage dealer under the Act or any rules made thereunder.

Q. 14. (a) Discuss whether Cenvat credit will be admissible in the following cases :

(i) Inputs contained in waste etc.

(ii) Inputs burnt up or consumed in manufacture & not retaining identity in end-product.

(iii) Materials used for maintaining factory building.

(b) M/s. A Ltd., manufacturing excisable goods, paid the differential duty, suo moto, to the Department as the prices of the said goods were revised with retrospective effect. The Revenue took the view that the assessee was liable to pay interest on differential duty under section 11 AB of the Central Excise Act, 1944 and penalty thereof. The assessee replied that there was no question of charging interest and penalty as the payment of differential duty was made by it at the time of issuing supplementary invoice to the customers.

Discuss, whether the view taken by the Revenue is justifiable.

(c) Which goods are not covered under VAT?

Answer 14. (a)

(i) Inputs contained in waste etc. – YES, Cenvat credit shall be admissible in respect of amount of inputs contained in any of the waste, refuse or by-product. Similarly, Cenvat credit should not be denied even if intermediate product is exempt from duty. The basic idea is that Cenvat credit is admissible so long as inputs are used in or in relation to the manufacture of final products.

(ii) Inputs burnt up or consumed in manufacture & not retaining identity in end-product – YES, Cenvat credit is admissible on inputs used in or in relation to manufacture of final product whether or not they are contained in the final product. Thus, inputs burnt up or consumed in manufacture process and not retaining identity in the end product will be eligible for Cenvat credit. [Eastern Electro Chemical Industries v. CCEx. (2005) 181 ELT 295 (SC)]

(iii) Materials used for maintaining factory building – NO. Goods used in or in relation to manufacture of final products and also goods used in the manufacture of capital goods qualify as 'inputs' and credit is admissible thereon. Immovable properties are not 'capital goods', the only exception being storage tank. Hence, materials used for maintaining factory building are not 'inputs' because neither they are used in or in relation to manufacture of final product nor in manufacture of capital goods.

Answer 14. (b)

If, before service of notice on him, the assessee voluntarily pays the full amount of duty, which is not levied or short-levied or not paid or short-paid or erroneously refunded, along with interest due under section 11AB –

(i) On the basis of his own ascertainment of the duty or on the basis of duty ascertained by a Central Excise officer, and

(ii) Informs the Central Excise Officer or the proper officer of such payment in writing,

Then, no show cause notice will be served on him in respect of the duty and interest so paid. [Section 11A(2B)].

Section 11A(2B) further provides that no penalty under any of the provision of this Act or the rules made thereunder shall be imposed in respect of payment of duty under this sub-section and interest thereon.

Section 11AB provides that in case any duty has not been levied or short-levied or not paid or short-paid or erroneously refunded, then, interest is payable thereon @ 13% p.a. Such interest for late payment is payable even in cases of fraud, collusion, willful mis-statement or suppression of facts or contravention of any of the provisions of the Act or the rules made thereunder and also in cases of voluntary payment of duty.

So, in the given case, no show cause notice would be issued on M/s. A Ltd., but it should pay the interest and no penalty will be levied.

Answer 14. (c)

Generally, all goods, including declared goods, are covered under the VAT-laws of respective States and, thus, get the benefit of input-tax credit. However, the following goods are outside the VAT are –

(i) Petrol, diesel, Aviation Fuel (ATF) or other motor spirit,

(ii) Liquor and

(iii) Lottery tickets.

These will continue to be taxed under the State-tax Act or any other State Act or even by making special provisions in the Vat Act itself at uniform floor rates described by the Empowered Committee. Thus, the States may or may not bring these commodities under VAT laws. However, it has been agreed that all these commodities will be subjected to 20% rate of tax.

Q. 15. (a) Write a note on Taxpayers' Identification Number (TIN)?

(b) What is carrying over of input-tax credit? When is refund of unutilized input-tax credit allowed?

(c) Write short note on – Value of goods and tooling supplied by buyer under the Customs Act.

Answer 15. (a)

TIN is a 11-digit numerical code allotted to every dealer obtaining registration under the VAT-law. It is the registration number, which is intended to identify a tax payer.

The 11-digit numerical code shall be made as follows :

(i) First 2 –digits: State code as used by the Union Ministry of Home Affairs

(ii) Next 9-digits : Code allotted by each state to the registrant.

TIN will facilitate computer applications, such as detecting stop filers and delinquent accounts. TIN is required to be stated on each invoice, hence, TIN will help cross-check information on tax payer compliance, for example, the selective cross-checking of sales and purchases among VAT taxpayers.

Answer 15. (b)

Input-tax credit is to be utilized, sequentially, as under –

(i) For payment of VAT;

(ii) Excess credit remaining, if any, can be adjusted against CST for the relevant period.

If, after set-off against VAT and CST payable for the concerned period, there remains any excess of input VAT credit, the same will be eligible to be carried forward to the next tax-period and so on upto the next financial year.

If there is any excess unadjusted input tax credit at the end of second year, then the same is required to be claimed as refund. However, some States grant refund after the end of first financial year itself.

Answer 15. (c)

Value of goods and tooling supplied by buyer – If buyer has supplied goods free of cost or at reduced cost in connection with production or export of goods, these should be included. The good may be (i) materials, components, parts and similar items incorporated in imported goods, (ii) tools, dies moulds and similar items used in production of imported goods (iii) consumables used in production of imported goods [Rule 9(1)(b)(i), (ii) and (iii)].

The inclusion is necessary as price of imported goods would certainly have been higher if the parts etc. were not supplied by buyer. Section 12, which is charging section, specify that 'Customs duty' is on 'goods'. Section 14 specifies that value of 'such goods ordinarily sold' should be considered. Thus, 'ordinary price' of 'such goods' can be ascertained only after adding cost of such free material supplied by buyer.

Ascertaining cost of tooling – Cost of tooling supplied by importer to exporter should be ascertained as follows : (i) If importer has purchased the tooling from unrelated seller, the purchase cost should be considered or (ii) if he has manufactured the tooling himself, the cost of production of tooling should be considered. If the tooling was previously used by importer, its original cost of purchase or cost of production should be suitably reduced (e.g. by suitably depreciating the cost) to reflect its present cost.

Q. 16. (a) A, a non-resident intends to import certain goods but has some doubts about their classification. B has obtained an Advance Ruling under Chapter V-B of the Customs Act, 1962 from the authority for advance rulings on a identical product. A proposes to adopt the same ruling in his case.

A has sought your advice as a consultant whether he could adopt the said ruling as given in case of B.

(b) When an advance ruling will be held as void ab initio?

(c) The Metro Airport used to collect 'users fee" @ Rs. 750/- for every outgoing international passenger. No users fee was payable by domestic passengers and/or international passengers reaching the Airport from any foreign destination.

The Department sought to levy service tax thereon under 'Airport Services'.

The Metro Airport contended that the user's fee is not for any service rendered, a s the same is not charged from all passengers (to whom equivalent services are provided) but is charged only from outgoing international passenger. The assessee submitted that the same is charged in view of Board of Director's decision to collect users development fee 'for enhancing the revenue of the Airport to cope up with the expenditure and debt servicing?

Discuss, whether the view taken by the Department is correct.

Answer 16. (a)

Applicability of advance ruling [Sec 23E (corresponding Customs section 28)] : The Advance ruling pronounced by the Authority is binding only –

(i) On the applicant who had sought it.

(ii) In respect of the matter for which advance ruling was obtained.

(iii) On the Commissioner, and the authorities subordinate to him, in respect of the applicant.

Hence, in the given case, the ruling obtained by B shall be applicable only on B and on the Commissioner of Customs and his subordinate authorities in relation to the matter in respect of which the advance ruling was pronounced. Therefore, A cannot adopt the ruling as given in case of B and he has to obtain advance ruling in respect of his own case.

Answer 16. (b)

Section 23F (Corresponding Customs section 28K) provides that if, on a representation made to it by the Commissioner or otherwise, the authority for advance ruling finds that the advance ruling was obtained by the applicant by fraud or misrepresentation of facts, then, the Authority may, by order, declare the advance ruling to be void ab initio i.e. from the beginning itself.

When an advance ruling is declared to be void under this section, then, all the provisions of this Act shall apply to the applicant as if such advance ruling had never been made, and, for this purpose, the period beginning with the date of such advance ruling and ending with the date of order of declaration of the advance ruling as void, shall be excluded.

Answer 16. (c)

It was clear from the decision of the Board of Directors that purpose of users fee was to augment revenue for the Airport and was not towards consideration for any service rendered to the outgoing international passenger. This was so especially because the airport had rendered its services equally to all passengers (incoming and outgoing – domestic and international) while the users fee was charged only from outgoing international passengers.

Section 67defining value of taxable services for charging service tax says that the value of service shall be gross amount charged by the service provider for the service provided to the recipient. Since collection of users fee was not for any specific service rendered by them, but was a flat rate of charge to one category of passengers namely, outgoing international passengers, it could not be said that the amount so collected was by way of service charge. Hence, no service tax was payable.

Q. 17. Real Construction, a real estate developer, is engaged in construction of a residential complex (consisting of more than 20 houses) named Southern Green for Superior Builders. Other details are as follows :

	Rs.
Contracted price (excluding VAT, if leviable)	**50,00,000**
Steel supplied by Superior Builders to Real Construction	**2,00,000**
Excise duty paid on capital goods used in providing construction service	**80,000**
Excise duty paid on inputs used in relation to construction service	**34,000**
Service tax paid on input services used in construction service	**50,000**

Find out the net service tax payable by X Ltd. if —

(i) Contracted Price involves the transfer of property in goods and materials worth Rs. 5,00,000 and VAT Rs. 20,000, X Ltd opted for payment of service tax on composition scheme.

(a) if the contract execution of works contract has already started on or before the date of 7-7-2009,

(b) if the contract execution of works contract has been started after 7-7-2009

(ii) Contract does note involve the transfer of property. However, X Ltd opted to avail the abatement @ 67%.

Answer 17.

(i) (a) Contract involves the transfer of property and composition scheme opted.

		Rs.
Contract Price	=	50,00,000
Service Tax 4.12% × 50,00,000	=	2,06,000
Less : Input tax credit on input capital goods Rs. 80,000 × 50%	=	40,000
Input tax credit on input services	=	50,000
Net liability on output service	=	1,16,000

Note : input tax credit on input goods not allowed.

(i) (b) Contract involves the transfer of property and composition scheme opted.

		Rs.
Contracted Price	=	50,00,000
Add : Material supplied by Superior Builders	=	2,00,000
		52,00,000
Service Tax 4.12% × 52,00,000	=	2,14,240
Less : Input tax credit on input capital goods Rs. 80,000 × 50%	=	40,000
Input tax credit on input services	=	50,000
Net liability on output service	=	1,24,240

Note : input tax credit on input goods not allowed.

(ii) Contract does not involve the transfer of property and abatement claimed.

	Rs.
Contracted Price	50,00,000
Add : Material supplied by Superior Builders	2,00,000
Gross Amount	52,00,000
Less : abatement @ 67%	34,84,000
Net amount	17,16,000
Service tax payable = 17,16,000 × 10.30%	= Rs. 1,76,748

CENVAT credit on input goods, capital goods and input services are not allowed.

Q. 18. S Ltd. give the following details for the month of March, 2011.

Particulars	**Purchases**	**Sales**
Intra State	**8,00,000 (12.5%)**	**6,00,000 (4%)**
Intra State	**5,00,000 (CST – 2%)**	**9,00,000 (CST – 2%)**

Out of Rs. 8 lakhs Intra state purchases Rs. 75,000 were from unregistered dealer; Rs. 50,000 from registered dealers who opt for composite scheme; Rs. 25,000 worth goods used in manufacturing of taxable goods intended for exports.

Compute the VAT Credit available for set off and carry forward purposes.

Answer 18.

Computation of eligible purchases for computation of VAT credit.

Particulars	**Amount Rs.**	**Remark**
Intra State purchases		
- From unregistered dealer	75,000	Ineligible purchase
- From registered dealer who opt for composite scheme	50,000	Ineligible purchase
- Goods used in manufacturing of taxable goods intended for exports	25,000	Eligible purchase
- Others	6,50,000	Eligible purchase
Intra State purchase	5,00,000	Ineligible purchase

Total Eligible purchases is Rs. 6,75,000.

Computation of VAT credit eligible for cary forward.

Particulars		**Notes**	**Amount Rs.**	**Amount Rs.**
a	Eligible purchase		6,75,000	
b	Input tax paid @ 12.5% (Input tax)	a * 12.5%		84,375
c	Intra state sales during the month		6,00,000	
d	Tax @ 4% on sales of goods	c * 4%		24,000
e	Net VAT liability during the month	d – b, if positive		Nil
f	Input credit after set-off	b – d		60,375
g	Inter-state sales		9,00,000	
h	CST liability to be paid on inter-state sales	g * 2%		18,000
i	**Credit to be carried forward**	f – h		**42,375**

Q. 19. The manufacturer purchases the input material from a unit of Free Trade Zone (100% EOU). This is considered as deemed import. Hence he has to pay Customer duty, Additional customs duty etc. Hence cenvat credit for such a deemed importer is allowed.

Suppose the Assessable value of the goods purchased from a unit of Free Trade Zone for Rs. 1,000. Say the customs duty is 10%, the Additional Customs Duty is 10.30% (i.e. BED plus applicable cess). These good attract value added tax @ 4%. Then the Cenvat credit will be as follows :

Answer 19.

Particulars	Rate of duty	Amount Rs.	Duty Rs.	Remarks
Assessable value		1000		
Add : BCD 50% of 10%	5%	50	50	1,000 × 5/100
CVD :				
Add : Basic Excise Duty	10%	105	105	[1,050 × 10/100]
Add : Education cess	2%	2.10	2.10	[105 × 2/100]
Add : SAH Education cess	1%	1.05	1.05	[105 × 1/100]
Sub total		1158.15	158.15	
Add : Education cess	2%	3.163	3.163	[158.15 × 2/100]
Add : SAH Education cess	1%	1.58	1.58	[158.15 × 1/100]
Sub total		1,162.89	162.89	
Add : Spl. CVD		Nil	Nil	No. Spl. CVD since, VAT payable in the state
Sub total		1,162.89	162.89	
Add : Education cess	2%	3.26	3.26	[162.89 × 2/100]
Add : SAH Education cess	1%	1.63	1.63	[162.89 × 1/100]
Total		**1144.**84	144.84	

Cenvat credit could be allowed to the buyer (i.e. manufacturer) who procures from EOU is as follows :

CVD to the extent of Basic Excise Duty	Rs. 150.00
Spl. CVD	Rs. Nil
Education cess	Rs. 3.26
SAH Education cess	Rs. 1.63
Total Cenvat Credit allowed	Rs. 154.89

Note : (1) Special Additional Customs Duty (known as SAD or Spl. CVD) under Section 3(5) of the Customer Tariff Act will be payable if goods cleared in DTA are exempt from sales tax or VAT. If VAT or sales tax is payable, Spl. CVD is not payable (*vide* Notification No. 23/2003-CE, dated 31.3.2003).

Q. 20. An importer has imported a machine from UK at FOB cost of 10,000 UK pounds. Other details are as follows :

(a) Freight from UK to Indian port was 700 pounds.

(b) Insurance was paid to insurer in India : Rs. 6,000

(c) Design and development charges of 2,000 UK pounds were paid to a consultancy firm in UK.

(d) The importer also spent an amount of Rs. 50,000 in India for development work connected with the machinery.

(e) Rs. 10,000 were spent in transporting the machinery from Indian port to the factory of importer.

(f) Rate if exchange as announced by RBI was : Rs. 68.82 = 1 UK pound.

(g) Rate of exchange as announced by CBE &C (Board) by notification u/s 14(3)(a)(i) : Rs. 68.70 = 1 UK pound

(h) Rate at which bank recovered the amount from importer : Rs. 68.35 = 1 UK pound.

(i) Foreign exporters have an agent in India. Commission is payable to the agent in Indian Rupees @ 5% of FOB price.

Customs duty payable was 10%. If similar goods were produced in India, excise duty payable as per tariff is 14%. There is an excise exemption notification which exempts the duty as is in excess of 10%. Education cess is as applicable. Special CVD is payable at applicable rates. Find customs duty payable. How much Cenvat can be availed by importer, if he is a manufacturer?

Answer 20.

UK Pounds	
FOB value	10,000
Add : Design & development charges	2,000
Add : Ocean freight	700
Total C & F	12,700
	Rs.
Total in Rs. @ 68.70 × 12,700	8,72,490
Add : Insurance	6,000
Add : Commission paid to foreign exporter agent [@5% x 10,000 UK Pounds × 68.70]	34,350
Cost, Insurance and freight	9,12,840
Add : Loading and unloading charges @ 1% on 9,12,840	9,128
Assessable value	9,21,968
Add : Basic customs duty @ 10% x 9,21,968	92,197
	10,14,165
Add : Additional customs duty (CVD) [@10.30% × 10,14,165]	1,04,459
	11,18,624
Add : Education cess @ 2% on (92,197 + 1,04,459)	3,933
Add : Secondary and higher secondary cess	1,967
	11,24,524
Add : Special additional customs duty [@ 4% x 11,24,524]	44,981
Imported value	11,69,505

Types of duties	Value (Rs.)	Remarks
Basic customs duty	92,197	No, cenvat credit allowed
Additional customs duty (CVD)	1,04,459	Cenvat credit allowed
Special additional customs duty	44,981	Cenvat credit allowed

Note :

(i) If the importer is only a dealer, he can get refund of special additional duty of Rs. 44,981, on the basis of payment of VAT.

(ii) Design and development work done in India and transport costs within India are not to be considered for purposes of 'Customs Value'.

(iii) Excise duty rate has to be considered after considering excise exemption notification.

(iv) Assessable value and final duty payable should be rounded off to nearest rupee.

(v) Basic excise duty plus education cess plus SAH is equal to Additional Customs Duty (CVD).

Q. 21. Tarun & Co. is a dealer in an electronic product, chargeable to CSt at 2%. For the year ended 31.3.2010, the dealer has shown total turnover (including CST) at Rs. 38,76,000. IN the above, the dealer has treated the following amounts thus :

	Rs.
(i) Dharmada collected from buyers, shown separately in invoice	**28,000**
(ii) Weighment charges incidental to sale	**14,000**
(iii) Central excise duty collected (including cess)	**2,06,000**

The dealer has recorded the following amount in separate folios in the ledger :

(i) Packing charges (these have been collected from buyers through debit notes)	**45,000**
(ii) Cash discount allowed to buyer	**18,000**
(iii) Indemnity/ guarantee charges collected from buyer to cover loss during transit	**12,000**
(iv) Marine insurance premium for transporting goods to the premises of buyers, collected from buyers	**32,000**

Determine the total and taxable turnover under CST Act, 1956 for the financial year 2009-10. You required to show the treatment of each and every item distinctly.

Answer 21.

Determination of turnover for CST purposes	**Rs.**
Turnover including CST as per books	38,76,000
Less : CST included in above 38,76,000 × 2/102	76,000
Turnover as per books excluding CST	38,00,000
Add : Packing charges	45,000
Marine insurance	32,000
Taxable turnover	38,77,000
Add : CST @ 2% of 38,77,000	77,540
Total turnover	39,54,540

Q. 22. (a) An Assessee, who is a multiple service provider, files only a single return. State with reasons whether he can do so?

(b) Write short notes on – Meaning of "Accessory" for excise duty purposes.

(c) An exporter exported 2,000 pcs. Of leather bags @ Rs. 750 per pc. All Industry rate of drawback is fixed on average basis i.e. @ 11% of FOB subject of maximum of Rs. 80 per pc. The exporter found that the actual duty paid on inputs was Rs. 1,95,000. He has approached you, as a consultant, to apply under rule 7 of the drawback rules for fixation of 'special brand rate'. Advise him suitably.

Answer 22. (a)

A single half yearly return would suffice even if the assessee provides more than one service. However, details in the relevant columns in Form ST-3/ST-3A should be furnished separately for each of the taxable

service for which the service tax assessee is liable to file the returns. Therefore, he can file a single return for the multiple services provided by him.

Answer 22. (b)

Accessory means 'an object or device not essential in itself but adding to beauty, convenience or effectiveness of something else.

The meaning of the term 'accessory' has been considered in various judgements.

Accessories of a machine promotes the convenience and better utilization of the machine but nevertheless they are not machine itself – CCE v ACER India Ltd. (2004) (172 ELT 289: 2004 AIR SCW 5495). In this case, it was held that software is not part of computer even if it is preloaded on computer.

In Mehra Bros v. Joint Comm. AIR 1991 SC 1017, it was held that accessory is an adjunct or an accompaniment or an addition for convenient use of another part of main article, or adds beauty, elegance or comfort for the use of main article, or a supplementary or secondary to the main or primary importance. In this case, it was held that car seat cover is an accessory of automobile.

It was also held that it is not necessary that the accessory must add to the conveniences or effectiveness of the article as whole (i.e. if it adds conveniences or effectiveness to only one part of the main article, that is enough).

In United Copies (India) P Ltd. v CST (1996) 101 STC 536 (SC), it was held that accessory means a person or thing that aids subordinately, an adjunct, appurtenance, accompaniment. In this case, it was held that rubber flap is not an accessory of motor car. It may be accessory of 'tyre' was mentioned separately, court did not pursue the issue whether accessory of part is part of main vehicle.

Answer 22. (c)

Drawback amount Rs. 1,65,000 (i.e. 2,000 x 750 x 11%) or Rs. 1,60,000 (i.e. Rs. 80 x 2,000) whichever is less.

Therefore duty drawback allowed is Rs. 1,60,000

All industry duty drawback rate = 82.05% [(1,60,000/1,95,000) x 100%]

Exporter is not eligible to apply for special brand rate.

Special brand rate of duty is applicable only when all industry rates do not cover 80% of the duties paid by the exporter.

Q. 23. (a) State whether the principle of 'unjust enrichment' shall be applicable in the following cases –

(i) Refund of duty paid on raw materials, which have been captively consumed.

(ii) Refund of duty paid on provisional basis under Central Excise.

(iii) Refund of amount paid as pre-deposit for filing appeal.

(iv) Refund of excess interest paid by the assessee.

(b) What is the time limit for confirmation of demand sought to be raised by a show-cause notice?

Answer 23. (a)

(i) YES – It has been held in UOI v Solar Pesticides (P) Ltd. [2000] 116 ELT 401 (SC) that the burden of duty can be passed on either directly or indirectly. In case the raw materials, on which the refund arises, have been captively con summed and the finished goods manufactured thereform are sold, it is presumed that the incidence of duty has been passed on. Hence, the doctrine of 'unjust enrichment' shall be applicable to refund of duty paid on captively consumed raw materials also.

(ii) YES – Rule 7 of Central Excise Rules, 2002 provides that in case the duty is paid on provisional basis and a situation of refund arises, then, such a refund will be granted to the manufacturer only if he has not passed on the incidence of duty to any other person. Hence, the concept of doctrine of 'unjust enrichment' is applicable for duty assessed on provisional basis also.

(iii) NO – Until the pendency of the appeal, the amount deposited as a condition of pre-deposit cannot be termed as duty. Hence, the refund thereof cannot be termed as refund of 'duty' and thus, such refund does not fall within the ambit of section 11B. thus, the doctrine of 'unjust enrichment' and time limit of section 11B/ 27 is not applicable to refund of such pre-deposit. – CCEx v. Atul Industries [2004] 168 ELT 353 (Tri).

(iv) YES – Customs Section 27 (and excise section 11B also) speaks of duty as well as interest, if any, paid thereon. Therefore, the refund of excess interest paid by assessee is also hit by bar of unjust enrichment.

Answer 23. (b)

Where a show-cause notice has been served on any person under section 11A, then, the proper officer shall, where it is possible to do so, confirm the demand within the following time limit –

(i) In case any duty/ interest has not been levied or paid or has been short-levied or short-paid or erroneously refunded, by reason of fraud, collusion or any willful mis-statement or suppression of facts, or contravention of any of the provisions of this Act or of the rules made threunder, with an intent to evade payment of duty, within one year from the date of service of show cause notice; or

(ii) In any other case, within a period of six months from the date of service of the show cause notice.

Q. 24. (a) What are the appealable orders to Supreme Court?

(b) Mr. Sandip Roy, an Indian resident, aged 40 years, returned to India after visiting Canada on 20.5.2011. He had been to Canada on 02.05.2011. On his way back to India he brought following goods with him –

(i) His personal effects like clothes etc. valued at Rs. 40,000

(ii) 1 litre of Wine worth Rs. 1,000

(iii) A video cassette recorder worth Rs. 11,000

(iv) A microwave oven worth Rs. 20,000

What is the customs duty payable?

Answer 24. (a)

Section 35L of the Central Excise Act, 1944 states that the following types of orders are appealable t the Supreme Court –

(i) Any judgement of High Court delivered in an appeal made u/s 35G, in any case which, on its own motion or on an oral application made by or on behalf of the party aggrieved, immediately after passing of the judgement, the High Court certifies to be a fit one for appeal to the Supreme Court; or

(ii) Any order passed by the Appellate Tribunal relating, among other things, to the determination of any question having a relation to the rate of duty of excise or to the value of goods for purposes of assessment.

In case the judgement of the High Court is varied or reversed by the Supreme Court, then the judgement of Supreme Court shall prevail.

In case the High Court doesn't certify it to be fit case for appeal to the Supreme Court, a Special Leave Petition can be filed before the Supreme Court as provided by Constitution of India.

Answer 24. (b)

Under Rule 3 of the Baggage rules, Mr. Roy, being of more than 10 years of age with stay of more than 3 days, is eligible for the following general free allowance –

(i) Used personal effects of any amount; and

(ii) Other articles, other than those mentioned in Annex. I, upto a value of Rs. 25,000

Hence, the duty payable by Mr. Roy shall be –

	Rs.
Personal effects like clothes etc.	NIL
Wine upto 2 ltrs. Can be accommodated in GFA	1,000
Video cassette recorder is dutiable	11,000
A microwave oven	20,000
Total dutiable goods imported (that can be accommodated in GFA)	32,000
Less : General Free Allowance under Rule 3	25,000
Balance goods on which duty is payable	7,000
Customs duty payable @ 36.05%	2,524

Q. 25. The goods manufactured by ABC Ltd., which were liable to duty @ 20.6%, have been exempted therefrom with effect from 1.3.2011. Its inputs are available at a fixed rate and are liable to excise duty @10.30%. On 1.3.2011 –

(i) Inputs (1,000 units) purchased for Rs. 1,10,300 (inclusive of duty) are lying in stock;

(ii) The stock under process (WIP) is 500 units (100% complete as to inputs);

(iii) Finished goods (1,250 units) are lying in stock (input-output ratio is 1:1); and

(iv) The balance in CENVAT receivable a/c. is. Rs. 1,64,800.

The department has demanded reversal of credit taken on inputs referred to above. However, the company contends that credit once validly is indefeasible and cannot be required to be reversed. Decide.

What would be your answer if the balance in CENVAT receivable a/c. as on 1.3.2011 is RS. 20,000.

Answer 25.

It is well-established law that credit once validly taken is indefeasible and cannot be required to be reversed – CCEx v. Dai Ichi Karkaria Ltd. [1999] 112 ELT 353 (SC). But, the same is subject to the specific provisions of the Act or rules made thereunder. If the statutory provisions require reversal of credit in particular circumstances, the credit has to be reversed in accordance therewith.

Accordingly, in view of specific provisions of Rule 11(3) of the CENVAT Credit Rules, 2004, since the final products of ABC Ltd. have been absolutely made exempt from excise duty, therefore, the company shall have to pay an amount eual to CENVAT credit taken on inputs lying in stock or in process or contained in final product lying in stock and balance credit, if any, shall lapse. Accordingly, ABC Ltd., will have to pay amount computer as follows :

	Rs.
Inputs lying in stock (Credit = 1,10,300 x 10.30 ÷ 110.30) (Net purchase price, exclusive of excise duty per unit = 1,00,000 ÷ 1,000 units = Rs. 100 per unit)	10,300
Inputs in process (100 per unit x 500 units x 10.30%)	5,150
Inputs contained in finished goods lying in stock (100 per unit x 1250 units x 10.30%)	12,875
Amount to be paid by ABC Ltd.	28,325

The aforesaid amount can be paid by utilizing the balance in CENVAT Credit A/c. The balance credit 1,64,800 – 28,325 = Rs. Rs. 1,36,475 shall lapse.

If balance in CENVAT receivable is Rs. 20,000 : If the balance in CENVAT receivable a/c. as on 1.3.2011 is Rs. 20,000, then the manufacturer will have to pay in cash an amount = Rs. 28,325 – Rs. 20,000 = Rs. 8,325.

Q. 26. Compute assessable value for Central Excise purposes of Product A whose details are given below. Out of 1,000 units manufacture, 800 units of product A have been cleared to a sister unit for further production of excisable goods on assessee's behalf; the balance 200 units are lying in stock -

	Amount (Rs.)
Direct material consumed (inclusive of excise duty @ 10.30%)	**2,20,600**
Direct labour & direct expenses	**1,80,000**
Works overheads (inclusive of quality control costs of Rs. 25,000 and research & development costs of Rs. 75,000)	**1,60,000**
Administrative overheads (60% related to production)	**1,50,000**
Packing cost of primary as well as secondary packing	**40,000**
Net value of non-excisable inputs received free of cost from sister unit for manufacture of A	**80,000**
Value of moulds, dies etc. received free of cost from sister unit for manufacture of A (25% of the value related to current production)	**2,00,000**
Interest and financial charges	**86,000**
Abnormal losses (not included above)	**14,000**
VRS compensation to labour/ employees (not included above)	**1,00,000**
Selling and distribution costs (including advertisement)	**36,000**
Realizable value of scrap/ wastage	**10,000**

Answer 26.

Calculation of cost of production in terms of Rule 8 of Valuation Rules, 2000 **(Amount in Rs.)**

Direct material consumed (net of excise duty, assuming that CENVAT credit of inputs has been availed [2,20,600 x 100 ÷ 110.30]	2,00,000
Direct labour and direct expenses	1,80,000
Works overheads (depreciation, quality control costs and research & development costs also form part of 'cost'	1,60,000
Administrative overheads (only those relatable to production form part of 'cost')	90,000
Packing cost of primary as well as secondary packing (it forms part of 'cost')	40,000
Inputs received free of cost from sister unit (they also form part of 'cost' for the purpose of Rule 8 as per CAS – 4; as their value is 'cost' of product A	80,000
Amortized cost of moulds, dies etc. received free of cost from sister unit will form part of 'cost' (since 25% related to current year production, hence, 25% of the total value of moulds and dies, etc. is includible in the 'cost')	50,000
Interest and financial charges (do not form part of cost)	Nil
Abnormal losses (do not form part of cost)	Nil
VRS compensation to labour/ employees (they shall also not form part of 'cost', as it is non-recurring cost arising due to unusual or unexpected occurrence of events)	Nil
Selling and distribution costs (do not form part of cost)	Nil
Realizable value of scrap/ wastage (deductible from cost)	– 10,000
Cost of production of 1,000 units (as per CAS – 4)	7,90,000
Cost per unit	790
Add : 10% notional profit margin as per Rule 8	79
Assessable value under Rule 8 (110% of cost of production) (per unit)	869
Assessable value of 800 units cleared to sister unit	6,95,200

Q. 27. (a) Ajay purchases raw materials from Varun and Tarun for manufacturing goods. Ajay sells goods to wholeseller Ram. Ram sells goods to Rahim, a retailer, who sells goods to consumers. Calculate the amount of VAT collected by the government from the following particulars based on the fact that Tarun charges VAT @ 4% and other sellers charge VAT @ 12.5%.

	Price without VAT (Rs.)
Raw material supplied :	
Varun to Ajay	**5,000**
Tarun to Ajay	**8,000**
Manufactured goods sold :	
Ajay to Ram	**18,000**
Ram to Rahim	**25,000**
Rahim to consumers	**30,000**

(b) A, an unit in SEZ, received services as covered u/s 65(105) from various service provider in relation to the authorized operation in the SEZ. At the time of making payment, service provider ask it to pay the service tax, however, it argues that service tax is not liable on taxable services provided to it. Now, you are approached to confirm the contention of A with the following details :

Place where such services consumed	Amount (Net of tax)
(i) Within the SEZ	**Rs. 5,00,000**
(ii) Partially within the SEZ and partially out of the SEZ	**Rs. 3,00,000**
(iii) Wholly out of the SEZ	**Rs. 6,00,000**

Answer 27. (a)

Computation of total amount of VAT collected by the Government :

Particulars	VAT rate	Value without VAT	VAT	Input tax credit	Balance payable
On Input					
Varun to Ajay	12.5%	5,000	625	–	625
Tarun to Ajay	4%	8,000	320	–	320
On sale of final product					
Sale by Ajay to Ram	12.5%	18,000	2,250	945	1,305
Sale by Ram to Rahim	12.5%	25,000	3,125	2,250	875
Sale by Rahim to consumers	12.5%	30,000	3,750	3,125	625
Total VAT payable to the government					3,750

Answer 27. (b)

Notification No. 9/2009 dated 3.3.2009 as amended by Notification No. 15/2009 dated 20.5.2009 states that if taxable services provided to SEZ units are consumed partially or wholly outside SEZ then exemption is granted by way of refund. Accordingly, A is required to pay service tax on services received in relation to authorized operation which was consumed partially or wholly outside SEZ. Thus, A is required to pay service tax as given below :

Particulars	Working	Tax (in Rs.)
Services consumed within the SEZ	Exempted	Nil
Services consumed partially within the SEZ and partially out of the SEZ	Rs. 3,00,000 * 10%	30,000
Services consumed wholly out of the SEZ	Rs. 6,00,000 * 10%	60,000
Service tax before cess		90,000
Add : Education cess	Rs. 90,000 * 2%	1,800
Add : Secondary higher education cess	Rs. 90,000 * 1%	900
Service tax to be paid to the parties		92,700

However, such service tax shall be claimed as refund by A subject to fulfillment of certain conditions.

Q. 28. (a) The appellant wrongly classified the storage tank, motor rails and platforms manufactured by him under chapter heading 73.09 by taking it to the storage of general use. Later on, he claimed the classification under chapter heading 84.19 on the ground that storage tank concerned, was actively used for manufacturing activity of the plant and was an integral part of the manufacturing process, therefore, ought to be classified under chapter 84.19.

Adjudication Authority disallowed the assessee's claim of CENVAT credit in respect of the input/ capital goods used for the construction of tank by taking the classification of the product under Chapter 73. Its primary contention was that classification once opted by the manufacturer could not be altered subsequently.

(b) Mr. X is a manufacturer of machineries. Selling price of the Machinery is Rs. 1,50,000, which includes the following :

Packing charges	**Rs. 10,000**
Transport from the manufacturer to the buyer's place	**Rs. 15,000**
Excise duty	**@ 10%**
Education Cess	**@ 2%**
Secondary and Higher Education Cess	**@ 1%**

Find the Assessable Value and Excise duty payable.

Answer 28. (a)

The assessee classifying the product under one classification wrongly has the right to rectify the classification later on. The Department cannot stop the change of classification by stating that the classification earlier claimed was erroneous. Therefore, the assessee's contention was justified under the Central Excise Law. With regard to claiming of Cenvat credit the High Court (Rajasthan) said that the Adjudication Authority should first decide the question of proper classification of the product in question and think of eligibility of Cenvat credit. [Guljag Industries Ltd. v. Union of India, Rajasthan HC 2008 (224) ELT 38 (Raj)].

Answer 28. (b)

Selling Price	Rs. 1,50,000
Less : Transport chages	Rs. 15,000
Balance	Rs. 1,35,000
Let assume assessable value be X Assessable value	X
Excise duty @10%	0.10X
Education Cess @2%	0.002X

SAH Cess @1%	0.001X
Balance	1.103X
Assessable value	1,35,000 × 1/1.103
Assessable value	Rs. 1,22,393
Basic Excise Duty @10%	12,239
Education cess @2%	Rs. 245
SAH cess @1%	Rs. 122
Total excise duty	Rs. 12,606

Q. 29. Mr. X an importer imported certain goods CIF value was US $ 20,000 and quantity 1,000 Kgs. Exchange rate was 1 US $ = Rs. 50 on date of presentation of Bill of Entry. Customs Duty rates are—

(i) Basic Customs Duty 10%

(ii) Education Cess 2%

(iii) SAH Education cess 1%

There is no excise duty payable on these goods if manufactured in India. As per Notification issued by the Government of India, anti-dumping duty has been imposed on these goods. The anti-dumping duty will be equal to difference between amount calculated @ US $ 30 per kg and 'landded value' of goods.

Compute Customs Duty liability and anti-dumping liability.

Answer 29.

Part - I	**Rs.**
Total CIF Price US $ 20,000 × Rs. 50	10,00,000
Add : Landing charges @ 1% × 10,00,00	10,000
Assessable Value	10,10,000
Basic duty @ 10%	1,01,000
Sub total	11,11,000
Add : Education cess 2% on 1,01,000	2,020
Add : Secondary and Higher Education Cess [@1% on 1,01,00]	1,010
Value of imported goods	11,14,030
Total Customs Duty payable is Rs. 1,04,030.	
Part - II	
Rate as per Anti Dumping Notification is Rs. 15,00,000	
[US $ 30 per kg × 1,000 Kgs × Rs. 50]	
Part - III	
Computation of anti-dumping duty	
Rate as per Anti Dumping Notification	15,00,000
Less : Value of imported goods as computed above	(11,14,030)
Anti Dumping Duty payable	3,85,970

Q. 30. (a) The assessee imported certain goods and paid countervailing duty (CVD) on them. Credit of such duty was availed of by the assessee on the basis of the invoice evidencing such payment. The consignment of the goods was received directly in the factory but the actual quantity of the imported goods was marginally less than the actual quantity stated in invoice. The Assistant Commissioner contended that the assessee would not be entitled to the credit on the goods received short in the factory.

(b) The goods imported by the importer were destroyed by fire while they were in the custody of the custodian appointed u/s 45(1) of the Customs Act. The importer claimed insurance compensation from insurance company and the insurance company, by doctrine of subrogation, claimed the compensation from the custodian as well as the customs authorities, contending that both were liable to damage.

Whether custodian alone or Customs authorities alone or both are jointly and severally liable to damages?

Answer 30. (a)

If the transit loss is found to be normal loss (in the given case it is ½ %) then the full credit of CVD paid by the assessee in respect of the goods can be availed as Cenvat credit if these goods are used in the manufacture of dutiable final product. [Union of India v. Bhilwara Spinning Ltd. 2008 (222) ELT 362 (Raj)].

Answer 30. (b)

The Customs Act contains provisions enabling temporary storage of goods before clearance for home consumption or for warehousing. The custodian appointed u/s 45 is not an independent authority to deal with imported goods; he is to act as per directions of Proper Officer. Therefore, as per the scheme of the act, the Customs authorities exercise complete control over imported goods in possession of custodian till clearance for home consumption or warehousing or transshipment. The fact that section 45(3) casts duty liability on custodian on pilferage of goods doesn't mean that customs authorities are not answerable to loss of goods, as the imported goods statutorily remain in the custody of the customs authorities and such customs authorities become bailee vis-à-vis importer.

Any arrangement made by Customs Authorities for proper storage of imported goods, by appointing the custodian, would not absolve its liability to account for the loss, if any, of such imported goods even if such goods were in possession of custodian. Further since custodian is statutorily appointed by Customs, hence, even custodian is answerable to the Customs Department for any loss of destruction of such goods.

Hence, Customs Department as well as the custodian are jointly and severally liable for the loss caused to imported goods. However, internal division of liability amongst Customs Department and custodian may be governed by agreement between them.

[Mysore Sales International Ltd. v. United India Insurance Co. Ltd. (2009) 243 ELT 161 (Kar.)]