

PAPER – 5 : ADVANCED MANAGEMENT ACCOUNTING

QUESTIONS

Decision Making- Quality Management

1. ABC Road Carriers is a transporting company that transports goods from one place to another. It measures quality of service in terms of :

- (i) Time required to transport goods
- (ii) On-time delivery
- (iii) Number of lost or damaged cartons.

To improve its business prospects and performance the company is seriously considering to install a scheduling and tracking system, which involves an annual outlay of ₹ 1,25,000. The company furnishes the following information about its present and anticipated future performance:

	Current	Expected
On-time delivery	85%	95%
Variable costs per carton lost or damaged	₹ 55	₹ 55
Fixed costs per carton lost or damaged	₹ 45	₹ 45
Number of cartons lost or damaged	2,500	1,200

The company expects that each half per cent point increase in on-time performance will result in revenue increase of ₹ 9,000 per annum. Contribution margin of 45% is required. Should ABC Road Carriers acquire and install the new system? Also calculate additional amount of revenue required if benefits from new system is equal to cost & Contribution margin is 47.5%.

Pricing of Finished Product

2. RST Ltd. are specialists in the manufacture of sports goods. They manufacture croquet mallets but purchase the wooden balls, iron arches and stakes required to complete a croquet set.

Mallets consist of a head and handle. Handles use 2.5 board feet per handle at ₹ 50 per board foot. Spoilage loss is negligible for the manufacture of handles. Heads frequently split and create considerable scrap.

A head requires 0.40 board feet of high quality lumber costing ₹ 60 per board foot. Spoilage normally works out to 20% of the completed heads. 4% of the spoiled heads can be salvaged and sold as scrap at ₹10 per spoiled head.

In the department machining and assembling the mallets, 6 men work 8 hours per day for 25 days in a month. Each worker can machine and assemble 12 mallets per

uninterrupted 40 minutes time frame. In each 8 hours working day, 15 minutes are allowed for coffee-break, 8 minutes on an average for training and 9 minutes for supervisory instructions. Besides 10% of each day is booked as idle time to cover checking in and checking out changing operations, getting materials and other miscellaneous matters. Workers are paid at a comprehensive rate of ₹6 per hour.

The department is geared to produce 20,000 mallets per month and the monthly expenses of the department are as under:

	₹
Finishing and painting of the mallets	20,000
Lubricating oil for cutting machines	600
Depreciation for cutting machine	1,400
Repairs and maintenance	200
Power to run the machines	400
Plant Manager's salary	9,400
Other overheads allocated to the department	60,000

As the mallets are machined and assembled in lots of 250, prepare a total cost sheet for one lot and advise the management on the selling price to be fixed per mallet in order to ensure a minimum 33.33% margin on the selling price.

Linear Programming

3. ANZ Ltd produces two types of product the XM and XL. Resource requirements for production are given below in the table. There are 12,800 hours of assembly worker hours available per month. 5,600 hours of paint time and 2,400 hours of inspection time. Regular customers bill demand at least 300 units of the XL type and 180 units of the XM type.

Product	Profit/contribution ₹	Assembly time Hrs.	Paint time Hrs.	Inspection time Hrs.
XL	100	2.4	1.6	0.4
XM	150	3.2	1.8	0.4

Formulate and solve the given Linear programming problem to determine product mix on a weekly basis (Assume 4 weeks in the month).

Pricing Policy

4. (a) Fox Ltd has Division A and Division B. The Division A produces Components which it sells to 'outside' customers and also transfers to the Division B. The Division B produces a product called the 'Zoom' which incorporates a Fox component in its

design.

Details of the production and operating costs for the next year are forecasted to be as follows.

Division A's	Division B's
Annual fixed costs ₹ 15,00,000	Annual fixed costs ₹ 25,000
Variable cost per component ₹ 175	Variable cost per 'Zoom' ₹ 350, (excludes transfer costs)

Both Divisions have surplus capacity. Market analysis has indicated that the demand from 'outside' customers for Fox Ltd's products is as follows:

- (i) 4,500 components are sold at a unit selling price of ₹ 350; sales change by an average of 5 components for each ₹ 1 change in the selling price, per component;
- (ii) 500 'Zoom' are sold at a unit selling price of ₹ 1,100; sales change by an average of 125 'Zoom' for each ₹75 changes in the selling price per 'Zoom'. It is a established practice for the Division A to transfer components to the Division B at 'market selling price'.

You are required to calculate the, Unit selling price of a 'Zoom' that should be set in order to maximize Fox Ltd's profit. Selling price should also be exact to the nearest paisa. [Note: If $P = a - bQ$ then $MR = a - 2bQ$]

Activity-Based Costing:

- (b) A manufacturing company produces Ball Pens that are printed with the logos of various companies. Each Pen is priced at ₹ 5. Costs are as follows:

Cost Driver	Unit Variable Cost (₹)	Level of Cost Driver
Units Sold	2.5	-
Setups	225	40
Engineering hours	10	250

Other Data:

Total Fixed Costs (conventional) ₹ 48,000

Total Fixed Costs (ABC) ₹ 36,500

Required:

1. Compute the break-even point in units using activity-based analysis.
2. Suppose that company could reduce the setup cost by ₹ 75 per setup and could reduce the number of engineering hours needed to 215. How many units must be sold to break even in this case?

Backflush Costing:

5. (a) What do you mean by backflushing in JIT system. Explain the problems with backflushing which must be corrected before it will work properly.
- (b) Give Backflush Costing Journal Entries in respect of following transactions:
- (i) Raw Material were purchased ₹ 3,20,000
 - (ii) Material placed into production
 - (iii) Actual Direct Labour Cost ₹ 50,000
 - (iv) Actual Overhead Cost ₹ 4,50,000
 - (v) Conversion Cost applied ₹ 4,70,000
 - (vi) All Units were completed & Sold
 - (vii) Variance is Recognized

Pricing Strategy-Quoting for an order

6. A Company has two production departments KTS and KTW. Standards for the forthcoming year is as follows:

	Department KTS	Department KTW
Direct labour hours available per period	12,000	8,000
Standard wage rate per hour	₹ 3	₹ 2.5
Expected learning curve	80%	70%
Standard variable overheads per hour	₹10	₹ 6
Standard fixed overheads per hour	₹11	₹7
Direct labour hours required for first 100 units	36	18

The direct materials are introduced in Department KTS. The company has following quote for purchase of direct material:

Level of Outputs (Units)	Price of direct material per unit of output
100	₹ 36.00
200	₹ 32.40

Overtime, if required is paid at the time and half. The overhead rates as given above do not include overtime premium.

It is the policy of the company to add profit margin as under in quoting the prices:

Department	Percentage
KTS	10% of labour & 15% overhead cost
KTW	

The company has received a special order. Special tooling costs of the order amount to ₹5,500. If this order is for 200 units or less, it will be executed in the period which has a workload of 7,680 direct labour hours in Department KTS and 4,200 direct labour hours in Department KTW.

Required:

If the company decides to get the work executed entirely within the company, what price, on cost-plus basis, should be quoted for the order, if it consists of 100 Units, 200 units

Standard Costing:

7. GFE Associates undertake to prepare Property Tax returns. They use the weighted average method and actual costs for financial reporting purpose. However, for internal reporting, they use a standard cost system. The standards, on equivalent performance, have been established as follows:

Labour per return 10 hrs. @ ₹30 per hour

overhead per return 10 hrs. @ ₹15 per hour

For June 2012 performance, budgeted overhead is ₹108,000 for the standard labour hours allowed.

The following additional information pertains to the month of June 2012:

June 1	Returns in process (25% complete)	180 Nos.
	Returns started in Jun	820 Nos.
June 30	Returns in process (80% complete)	200 Nos.
Cost Data		
June 1	Returns in process:	
	Labour	₹ 16,000
	Overheads	8,000
June 1 to 30	Labour (4,000 hrs.)	2,00,000
	Overheads	1,00,000

You are required to compute:

- For each cost element, equivalent units of performance and the actual cost per equivalent unit.
- Actual cost of returns in process on June 30
- The standard cost per return, and
- The labour rate Variance, labour efficiency variance, overhead volume and overhead expenditure variance.

Budget- Optimum Product-Mix:

8. Aakar Ltd. furnishes you the following information relating to four varieties of products manufactured by them during the year 2011

	A	B	C	D
Output (units)	32,000	20,000	16,000	24,000
	₹Per Unit			
Selling Price	300	600	750	500
Direct Materials	60	140	160	60
Direct Wages	50	80	150	60
Variable Overhead	100	160	300	120
Fixed Overhead	100	160	300	120

Anticipation of the company for the Budget for the year 2012 is as follows:

- (a) Expected increments are as follows in pursuant of Inflation:
- (i) Direct Material 10%
 - (ii) Direct Wages 20%
 - (iii) Variable Overheads 20%
- (b) Fixed Overhead will increase by ₹160,000
- (c) The market will take up an increase of 10% in the selling price, if Volume of Sales in quantities is maintained at the same level as in the year 2011

In order to fight inflation the Marketing Team puts forth the following proposals:

- (a) Product A: The price of product A will be further increased by 20% (making in all a total increase of 30%) resulting thereby in a reduction in the volume of Sales by 10%
- (b) Product B: Substitution on direct materials of product B by cheaper materials will bring about a reduction in direct material cost by ₹30 per unit. This will reduce the sales volume in units by 10%.
- (c) Product C: An allowance of special sales commission of 4% on the increased price on all quantities sold will increase the sales volume by 20%
- (d) Product D: A reduction in selling price by 10% on the price of 2011 will yield an increase in sales volume by 30%

The direct labour hour rate in 2011 is ₹4.00 per hour and the number of direct labour hours cannot be increased in the year 2012.

You are required to:

- (a) Present a statement showing Profitability for the year 2011.
- (b) Prepare a budget for the year 2012 after taking into consideration the effects of inflation in costs and prices only.
- (c) Evaluate the proposals put forth by the Marketing Team and set an optimum product mix after taking into consideration the inflation in costs and prices but subject to the constraint of available labour hours.

Decision Making on Setup of Local Service Centre:

9. PT Ltd. produces and markets Air Conditioner. It ensures after sales service through PK Ltd. The big appliances are serviced at customer's residence while small appliances are serviced at workshop of PK Ltd.

The material supplied to PK Ltd. is charged at cost at 15%. PK Ltd. charges customers at 20% over the above price. For labour, the company receives 8% of the rate fixed for work done under the after-sales service agreement and 10% of the rate fixed in case of jobs not covered under the agreement from PK Ltd. 65% by value of the total work undertaken by PK Ltd. was for big appliances and rest accounted for small appliances during the previous year.

The company decides to carry out all or some of the work itself and has chosen one area in the first instance. During the previous year the company earned a profit of ₹1,08,000 as detailed below from PK Ltd. for the area chosen:

	Materials ₹	Labour ₹
Under after –sales service agreement	30,000	50,000
For jobs not covered under the agreement	10,000	18,000

The company forecasts same value of work in that area for the ensuing period. The following three options are under consideration of the management:

- (1) To set up a local service Centre to provide service for small appliances only. The existing system is to continue for big appliances.
- (2) To set up a local services Centre to provide service for big appliances only. The existing system is to continue for small appliances.
- (3) To set up a local service Centre to provide service to all appliances. The existing system then stands withdrawn.

The relevant costs for carrying out jobs under the above options are as under:

(₹'000)

	Option -1	Option -2	Option -3
Heat, rent, light etc.	55	25	70
Management costs	50	42	80
Service staff costs	110	210	355
Transport costs	18	120	110

You are required to find out the most profitable option.

Costing of Service Sector:

10. (a) Technocraft has just completed repair work on Car No. DL 7CL 2001 of Mr. 'M'. The parts used to repair the vehicle cost ₹250. The company's 20% mark up rate on parts covers parts-related overhead costs. Labour involved 5 hours of time from a Technocraft service engineer whose wages are ₹80 per hour. The current overhead work up rate on labour is 80%. You are required to compute how much Mr. 'M' will be billed for his car repairs.

Rate of Return Pricing:

- (b) Excel Ltd. specialises in the manufacture of Printers. They have recently developed a technology to design a new Printer. They are quite confident of selling all of the 4,000 units that they would be making in a year. The capital equipment that would be required will cost ₹12.5 lakhs. It will have an economic life of 4 years and no significant terminal salvage value.

During each of the first four years promotional expenses are planned as under:

Year	1	2	3	4
Advertisement (₹)	50,000	50,000	30,000	15,000
Other expenses (₹)	25,000	25,000	45,000	60,000

Variable costs of producing and selling the unit would be ₹125 per unit.

Additional fixed operating costs incurred because of this new product are budgeted at ₹ 37,500 per year.

The company's profit goals call for a discounted rate of return of 15% after taxes on investments on new products. The income tax rate on an average works out to 30%. You can assume that the straight line method of depreciation will be used for tax and reporting. Work out an initial selling price per unit of the product that may be fixed for obtaining the desired rate of return on investment.

Present value of annuity of Re. 1 received or paid in a steady stream throughout 4 years in the future at 15% is 2.854.

Unit Costing and Inter Firm Comparison:

11. What are the advantages of Uniform Costing? State its limitations.

Transfer Pricing

12. Division A is a profit centre, which produces four products P, Q, R and S. Each product are sold in the external market also. Data for the period is as follows:

	P	Q	R	S
Market Price per unit (₹)	350	345	280	230
Variable cost of Production per Unit	330	310	180	185
Labour Hours required per Unit	3	4	2	3

Product S can be transferred to division B but the maximum quantity that might be required for transfer is 2,000 units of S.

The maximum sales in the external market are:

P	3,000 units
Q	3,500 units
R	2,800 units
S	1,800 units

Division B can purchase the same product at a slightly cheaper price of ₹ 225 per unit instead of receiving transfers of product S from division A.

What should be transfer price for each unit for 2,000 units of S, if the total labour hours available in division A are:

- (i) 24,000 hours?
(ii) 32,000 hours?

Transportation Problem

13. Gopal Dairy Ltd. has three plants producing dairy products and four outlets. The cost of transporting dairy products from different production plants to the outlets, production capacity of each plant and requirement at different outlets is shown in the following cost-matrix table:

Plants	Outlets				Production Capacity
	A	B	C	D	
X	6	8	6	5	600

Y	4	4	8	4	800
Z	3	7	2	8	600
Requirements	600	400	300	700	2,000

Determine a transportation schedule so that the cost is minimized.

The cost in the cost matrix is given in thousand of rupees.

The Assignment Problem

14. The ICAI decides to hold special seminars on four contemporary topics for its members: Ind. AS, Goods and Service Tax (GST), Negative list in Service tax and Direct Tax Code (DTC). Such seminars should be held once in a week in the afternoons. However, scheduling these seminars (one for each topic, and not more than one seminar per afternoon) has to be done carefully so that the number of members unable to attend is kept to a minimum. A careful study indicates that the number of members who cannot attend a particular seminar on a specific day is as follows:

	Ind. AS	GST	Negative list	DTC
Monday	40	30	50	20
Tuesday	30	20	30	30
Wednesday	50	10	20	20
Thursday	20	30	10	30
Friday	10	20	10	30

Find an optimal schedule of the seminars. Also find out the total number of members who will be missing at least one seminar.

CPM/ PERT

15. Consider the schedule of activities and related information as given below, for the construction of a Residential building:

Activity	Expected Time (Months)	Variance	Expected Cost (Millions of `)
1-2	6	1	10
2-3	4	1	4
3-6	3	1	6
2-4	5	2	8
1-5	4	1	3
5-6	4	1	13

4-6	8	5	18
5-7	6	8	8
7-8	9	9	15
6-8	3	1	3

Assuming that the cost and time required for one activity is independent of the time and cost of any other activity and variations are expected to follow normal distribution.

Draw a network based on the above data and calculate:

- Critical path
- Expected cost of construction of the building
- Expected time required to build the building
- The standard deviation of the expected time

Simulation

16. An investment company wants to study the investment projects based on market demand profit and the investment required, which are independent of each other. Following probability distributions are estimated for each of these three factors.

Annual demand (units'000)	45	35	30	25	15	60	75
Probability	0.05	0.10	0.15	0.35	0.20	0.10	0.05

Profit per unit	5.00	6.00	8.00	7.00	12.00
Probability	0.10	0.30	0.25	0.25	0.10

Investment Required (In thousand of rupees)	4,000	3,200	3,500
Probability	0.20	0.45	0.35

Using simulation process, repeat the time 10 times, compute the investment on each that taking these factors into trial. What is the highest likely return? Use the following random numbers:

(30, 12, 16)	(50, 09, 69)	(63, 94, 26)	(27, 08, 74)
(64, 60, 61)	(28, 28, 72)	(31, 23, 57)	(54, 85, 20)
(64, 68, 18)	(32, 31, 87)		

In the bracket above, the first random number is for annual demand, the second one is for profit and the last one is for the investment required.

Learning Curve Theory

17. KD Sports manufactures cricket bat purely carried out by manual labour. It has a capacity of 16,000 units. It estimates the following cost structure:

Direct material	₹35 / unit
Direct labour (1.5 hour / unit)	₹24 / unit
Variable overhead	₹15 / unit

Fixed overheads at maximum capacity is ₹ 2,25,000.

It is estimated that at the current level of efficiency, each unit requires one and half hour for the first 4,000 units. Subsequently it is possible to achieve 80% learning rate. The market can absorb the first 4,000 units at ₹150 per unit.

Due to government incentive scheme for small entrepreneurs, variable overheads shows a non linear relationship at 16,000 units level and estimated rate of the variable overheads at this level is ₹10 per unit.

What should be the minimum selling price acceptable for an order of 12,000 units for a prospective client?

Budgetary Control:

18. What do you mean by performance budgeting. How is it different from traditional budgeting. Discuss.

CPM/ PERT:

19. What is difference between PERT & CPM?

Behavioural aspects of Standard Costing:

20. Please Explain following Statements:
- "Fear of adverse variances forces managers to give undue importance to material price, labour rate and efficiency and capacity utilization. These concepts are detrimental to the modern day world class manufacturing environment characterised by concepts of JIT and TQM".
 - "Traditional costing does not provide the management with what is the allowable cost; rather it emphasizes on the standard or actual costs".

SUGGESTED ANSWERS/HINTS

1. Should ABC Road Carriers acquire and install the new system?

	₹
Additional Costs of the new scheduling & tracking system p.a.	1,25,000
Additional Revenue from Improvement in on-time performance	1,80,000

(₹9,000 x 10%/0.5%)		
Contribution from Additional Annual Revenue (45% x ₹ 1,80,000)...	(A)	81,000
Cost Saving in respect of Cartons [(2,500-1,200) x ₹ 55]...	(B)	71,500
Total Benefits (A+B)		1,52,500

As Expected Benefits are more than the cost. Accordingly company should install the new system.

Calculation of additional amount of revenue required if benefits from new system is equal to cost & Contribution margin is 47.5%:

		₹
Costs of the new scheduling & tracking system	(A)	1,25,000
Cost Saving in respect of Cartons	(B)	<u>71,500</u>
Contribution Margin	(A – B)	53,500
Contribution Margin %		47.5
Corresponding Additional Revenue		1,12,632

2. RST Ltd.

Cost Sheet of one lot of 250 Croquet Mallets

	₹	₹	₹
Direct material:			
Handles (2.5 feet x 250 units x ₹50)		31,250	
Heads (1.20 x 250 x 0.40 x ₹60)	7,200		
(Refer to working note 1)			
Less: Scrap recovery			
(4% x 50 x ₹10)	<u>20</u>	<u>7,180</u>	38,430
Direct labour:			
(8 Hrs x ₹ 6 x 250 / 120)			<u>100</u>
(Refer to working note 2)			
Prime cost			38,530
Factory & other overheads:			
Variable, Finishing & painting			

(20,000 x 250 / 20,000)			
(Refer to working note 3)			250
Fixed			
(₹72,000 x 250 / 18,000)			<u>1,000</u>
(Refer to working note 4)			
Total cost			39,780
Price quotation:			
Cost per mallet (₹39,780 / 250 Units)			159.12
Add: Profit 50% on			79.56
(33.33% margin on selling price means 50% on cost)			
Selling price			<u>238.68</u>

Working notes:

- Since 20% of completed heads are spoiled, output of 1 unit requires input of $1 + 0.20 = 1.20$ units; so, total heads processed: $1.20 \times 250 = 300$, of which spoiled heads are 50
- Total time in a day: 8×60 480 minutes

Less : Idle time 48 minutes

Coffee break 15 minutes

Instructions 9 minutes

Training 8 minutes 80 minutes

Productive time per day: 400 minutes

Therefore, mallets to be produced per man per day: $(400/40 \times 12) = 120$ units

Since mallets are produced at the rate of 120 mallets per man day, so total monthly production will be: $120 \text{ units} \times 6 \text{ men} \times 25 \text{ days} = 18,000$ mallets
- Finishing and painting overheads are assumed to be variable for the production of 20,000 mallets
- All the other expenses are fixed and are to be absorbed by 18,000 mallets of monthly production
- Weekly Hours Available:

Assembly time:	$12,800/4$	=	3,200 hours
Paint time:	$5,600/4$	=	1,400 hours
Inspection time	$2,400/4$	=	600 hours

Let x_1 and x_2 denote the number of units produced per week of the product 'XL' and 'XM' respectively.

Maximise $Z = 100x_1 + 150x_2$

Subject to

$2.4x_1 + 3.2x_2 \leq 3,200$ or $24x_1 + 32x_2 \leq 32,000$ -(i)

$1.6x_1 + 1.8x_2 \leq 1,400$ or $16x_1 + 18x_2 \leq 14,000$ -(ii)

$0.4x_1 + 0.4x_2 \leq 600$ or $4x_1 + 4x_2 \leq 6,000$ -(iii)

$x_1 \geq 300$ -(iv)

$x_2 \geq 180$ -(v)

Let

$x_1 = y_1 + 300$

$x_2 = y_2 + 180$ where $y_1, y_2 \geq 0$

Maximize $Z = 100(y_1 + 300) + 150(y_2 + 180)$ or $Z = 100y_1 + 150y_2 + 57,000$

Subject to:

$24(y_1 + 300) + 32(y_2 + 180) \leq 32,000$

$16(y_1 + 300) + 18(y_2 + 180) \leq 14,000$

$4(y_1 + 300) + 4(y_2 + 180) \leq 6,000$

and $y_1, y_2 \geq 0$

Adding slack variables s_1, s_2, s_3 , we get

Maximize $Z = 100y_1 + 150y_2 + 0s_1 + 0s_2 + 0s_3 + 57,000$ subject to

$3y_1 + 4y_2 + s_1 = 2,380$

$8y_1 + 9y_2 + s_2 = 2,980$

$y_1 + y_2 + s_3 = 1,020$

Table -1

C_j	Basic Variable	Solution Values	100	150	0	0	0	Minimum Ratio
C_b			y_1	y_2	s_1	s_2	s_3	
0	s_1	2,380	3	4	1	0	0	595
0	s_2	2,980	8	9	0	1	0	←331.11
0	s_3	1,020	1	1	0	0	1	1,020
$C_j - Z_j$			100	150↑	0	0	0	

Table II

C_j	Basic Variable	Solution Values	100	150	0	0	0
C_b			y_1	y_2	s_1	s_2	s_3
0	s_1	1,055.56	-5/9	0	1	-4/9	0
150	y_2	331.11	8/9	1	0	1/9	0
0	s_3	688.89	1/9	0	0	-1/9	1
$C_j - Z_j$			-33.33	0	0	-150/9	0

Since all the elements in the $C_j - Z_j$ are either zero or negative, table II gives an optimum solution which is $y_1 = 0$ and $y_2 = 331.11$

Substituting these values we get

$$x_1 = 0 + 300 = 300$$

$$x_2 = 180 + 331.11 = 511.11 \text{ and the value of objective function is}$$

$$Z = 100 \times 300 + 150 \times 511.11$$

$$= ₹1,06,666.50$$

4. (a) Assumed Selling Price 'P', Quantity 'Q'

The Marginal Cost of a 'Zoom' is ₹525 i.e. (175+350)

Demand Function for 'Zoom'

$$P = 1,400 - (75/125) \times Q$$

(Refer to working note)

$$\text{Revenue (R)} = Q \times [1,400 - 3/5 \times Q]$$

$$\text{Marginal Revenue (MR)} = 1,400 - (6/5) \times Q$$

$$\text{Marginal Cost (MC)} = 525$$

Profit is maximum where Marginal Revenue (MR) equals to Marginal Cost (MC)

$$1,400 - (6/5) \times Q = 525$$

$$Q = 729.17 \text{ Units}$$

$$P = ₹962.50$$

Unit selling price should be ₹962.50 to get maximum profit.

Working Note:

$$\text{Price at which, There will be no Sale} = 1,100 + 75/125 \times 500 = ₹1,400$$

(b) 1. Break Even Units:

$$[\text{Fixed Costs} + (\text{Setup Cost} \times \text{Setups}) + (\text{Engineering Cost} \times \text{Engineering Hours})] / (\text{Sale Price} - \text{Variable Cost})$$

$$= [36,500 + (\text{₹ } 225 \times 40) + (\text{₹ } 10 \times 250)] / (\text{₹ } 5 - \text{₹ } 2.5)$$

$$= 19,200 \text{ units}$$

$$2. = [36,500 + (\text{₹ } 150 \times 40) + (\text{₹ } 10 \times 215)] / (\text{₹ } 5 - \text{₹ } 2.5)$$

$$= 17,860 \text{ Units}$$

5. (a) Backflushing requires no data entry of any kind until a finished product is completed. At that time the total amount finished is entered into the computer system, which multiplies it by all the components listed in the bill of materials for each item produced. This yields a lengthy list of components that should have been used in the production process and which is subtracted from the beginning inventory balance to arrive at the amount of inventory that should now be left on hand. Back the entire production process. Given the large transaction volumes associated with JIT, this is an ideal solution to the problem.

However, there are some serious problems with backflushing that must be corrected before it will work properly. They are :

1. Production reporting: The total production figure entered into the system must be absolutely correct, or else the wrong component types and quantities will be subtracted from stock. This is a particular problem when there is high turnover or a low level of training to the production staff that records this information, which leads to errors.
2. Scrap reporting: All abnormal scrap must be diligently tracked and recorded; otherwise these materials will fall outside the backflushing system and will not be charged to inventory. Since scrap can occur anywhere in a production process, a lack of attention by any of the production staff can result in an inaccurate inventory. Once again, high production turnover or a low level of employee training increases this problem.
3. Lot tracing: Lot tracing is impossible under the backflushing system. It is required when a manufacturer need to keep records of which production lots were used to create a product in case all the items in a lot must be recalled. Only a picking system can adequately record this information. Some computer systems allow picking and backflushing system to coexist, so that pick transactions for lot tracing purpose can still be entered in the computer. Lot tracing may then still be possible if the right software is available; however, this feature is generally present only on high-end systems.
4. Inventory accuracy : The inventory balance may be too high at all times because the backflushing transaction that relieves inventory usually does so

only once a day, during which time other inventory is sent to the production process; this makes it difficult to maintain an accurate set of inventory records in the warehouse. Of all the issues noted here, the worst is a situation where the production staff is clearly incapable of providing sufficiently accurate scrap or production reporting for the backflushing system. If there is an easily traceable cause, such as less capable workers on a particular shift, moving a few reliable employees into these positions can provide immediate relief from the problem. It may even be possible to have an experienced shift supervisor to collect this information. However, where this is not possible for whatever reason, computer system users experience backflushing garbage in, garbage out (GIGO)—entering inaccurate information rapidly eliminates any degree of accuracy in the inventory records, requiring many physical inventory counts to correct the problem. Consequently, the success of a backflushing system is directly related to a company's willingness to invest in a well-paid, experienced well educated production staff that undergoes little turnover.

(b)

		₹	₹
For Raw Material purchased:			
Raw Material in Process A/c	Dr	3,20,000	
To Accounts Payable			3,20,000
For Material placed into production:			
No Entry			
For actual Direct Labour cost:			
Combined with Overhead			
For actual Overhead cost :			
Conversion Cost Control	Dr	5,00,000	
To Payroll			50,0000
To Accounts Payable			4,50,000
For conversion cost applied:			
No Entry			
For completion of units:			
Finished Goods	Dr	7,90,000	
To Raw Material in Process A/c			3,20,000
To Conversion Control Account			4,70,000
For units sold:			
Cost of Goods Sold	Dr	7,90,000	
To Finished Goods			7,90,000

For Recognition of Variance:			
Cost of Goods Sold	Dr	30,000	
To Conversion Control Account			30,000

6. Statement showing recommended Selling Price:

	100 Units (per Unit)		200 units (per Unit)	
Department KTS:		₹		₹
Direct Labour	36hrs.x ₹3	108.00	36Hrs.x 0.80 x ₹3	86.40
Overtime Premium#		0.00		10.80
Total Labour Cost (A)		108.00		97.20
Variable Overheads	36hrs.x ₹ 10	360.00	36 Hrs. x 0.80 x ₹ 10	288.00
Fixed Overheads	36hrs.x ₹ 11	396.00	36 Hrs. x 0.80 x ₹11	316.80
Total Overheads (B)		756.00		604.80
Department KTW:				
Direct Labour	18hrs.x ₹ 2.5	45.00	18 Hrs. x 0.70 x ₹2.5	31.50
Overtime Premium		0.00		0.00
Total Labour Cost (C)		45.00		31.50
Variable Overheads	18hrs.x ₹ 6	108.00	18 Hrs. x 0.70 x ₹6	75.60
Fixed Overheads	18hrs.x ₹ 7	126.00	18 Hrs. x 0.70 x ₹7	88.20
Total Overheads (D)		234.00		163.80
Special Tool (E)	₹ 5,500 / 100	55.00	₹ 5,500 / 200	27.50
Direct Material (F)		36.00		32.40
Profit:				
On Labour (10%)	₹ (108 + 45)x 10%	15.30	₹(97.20 + 31.50) x 10%	12.87
On Overheads (15%)	₹ (756+234)x15%	148.50	₹ (604.80 +163.80) x 15%	115.29
Total Profit (G)		163.80		128.16
Recommended Selling Price		1,397.80		1,085.36
(A+B+C+D+E+F+G)				

#Statement showing overtime premium:

	Department KTS	Department KTW
Direct Labour Hours Available	12,000	8,000

7. (a) Statement showing cost elements equivalent units of performance and the actual cost per equivalent unit:

Detail of Returns	Detail of Input Units	Details	Equivalent Units					
			Output Units	Labour		Overheads		
				Units	%	Units	%	
Returns in Process at start	180	Returns completed in June	800	800	100	800	100	
Returns started in June	820	Returns in process at the end of June	200	160	80	160	80	
	1,000		1,000	960		960		
Costs:				₹		₹		
From previous month				16,000		8,000		
During the month				2,00,000		1,00,000		
Total Cost				2,16,000		1,08,000		
Cost per equivalent unit				225.00		112.50		
Note: Since company follows Weighted Average Method, the stages of completion of returns at the beginning of June has been ignored.								

(b) Actual cost of returns in process on June 30:

	Numbers	Stage of completion	Rate per return (₹)	Total (₹)
Labour	200 returns	0.80	225.00	36,000
Overhead	200 returns	0.80	112.50	<u>18,000</u>
				<u>54,000</u>

(c) Standard Cost per Return:

Labour 10 Hrs x ₹30 per hour = ₹ 300

Overhead 10 Hrs x ₹15 per hour = ₹ 150

450

(d) Computation of Variances:

Statement showing output (Jun only) element wise	Labour	Overhead
Actual performance in June in terms of equivalent units as Calculated above	960	960
Less: Returns in process at the beginning of June in terms of equivalent units i.e. 25% of returns (180)	<u>45</u>	<u>45</u>
	<u>915</u>	<u>915</u>

Variance Analysis:

Labour Rate Variance

= Actual Time x (Standard Rate – Actual Rate)

= Standard Rate x Actual Time – Actual Rate x Actual Time

= ₹ 30 x 4,000 hrs. – ₹ 2,00,000 = ₹ 80,000(A)

Labour Efficiency Variance

= Standard Rate x (Standard Time – Actual Time)

= Standard Rate x Standard Time – Standard Rate x Actual Time

= ₹ 30 x (915 units x 10 hrs.) – ₹ 30 x 4,000 hrs. = ₹ 154,500(F)

Overhead Expenditure or Budgeted Variance

= Budgeted Overhead – Actual Overhead

= ₹ 108,000 – ₹ 100,000

= ₹ 8,000(F)

Overhead volume Variance

=Recovered Overhead – Budgeted Overhead

=915 Units x 10 hrs. x ₹ 15 – ₹ 108,000 = ₹ 29,250(F)

8. (a) Statement of profit of 2011

	A	B	C	D	Total
Sales Units	32,000	20,000	16,000	24,000	92,000
	(₹In Lacs)				
Sales	96.00	120.00	120.00	120.00	456.00
Direct Material	19.20	28.00	25.60	14.40	87.20
Direct Wages	16.00	16.00	24.00	14.40	70.40
Variable Overhead	32.00	32.00	48.00	28.80	140.80
	67.20	76.00	97.60	57.60	298.40
Contribution	28.80	44.00	22.40	62.40	157.60
Fixed Overhead	32.00	32.00	48.00	28.80	140.80
Profit/(Loss)	(3.20)	12.00	(25.60)	33.60	16.80

Direct Labour Hours per Unit	12.50	20.00	37.50	15.00	
Direct Labour Hours Required	400,000	400,000	600,000	360,000	1,760,000

(b) Statement of Budget 2012 (After Impact of Inflation)

	A	B	C	D	Total
Sales Units	32,000	20,000	16,000	24,000	92,000
	(₹In Lacs)				
Sales	105.60	132.00	132.00	132.00	501.60
Direct Material	21.12	30.80	28.16	15.84	95.92
Direct Wages	19.20	19.20	28.80	17.28	84.48
Variable Overhead	38.40	38.40	57.60	34.56	168.96
	78.72	88.40	114.56	67.68	349.36
Contribution	26.88	43.60	17.44	64.32	152.24
Fixed Overhead (140.80+1.60)					142.40
Profit/(Loss)					9.84

Direct Labour Hours	400,000	400,000	600,000	360,000	1,760,000
Contribution per Labour Hour (₹)	6.72	10.90	2.91	17.87	8.65

(c) Statement of Profit 2012 on the basis of Proposals of Marketing Team

	A	B	C	D	Total
Sales Units	28,800	18,000	19,200	31,200	97,200
(₹ In Lacs)					
Sales	112.32	118.80	158.40	140.40	529.92
Less: Commission	-	-	6.34	-	6.34
	112.32	118.80	152.06	140.40	523.58
Direct Material	19.01	22.32	33.79	20.59	95.71
Direct Wages	17.28	17.28	34.56	22.46	91.58
Variable Overhead	34.56	34.56	69.12	44.93	183.17
	70.85	74.16	137.47	87.98	370.46
Contribution	41.47	44.64	14.59	52.42	153.12
Fixed Overhead					142.40
Profit/(Loss)					10.72

Labour Hrs. Required	3,60,000	3,60,000	7,20,000	4,68,000	1,908,000
Contribution per Labour Hours (₹)	11.52	12.40	2.03	11.20	

Revised Position on the basis of the 'Proposal of Marketing Team' and Product Mix after taking into consideration the 'Inflation in Costs and Prices' but subject to the 'Constraint of Available Labour Hours'.

	A	B	C*	D*	Total
Sales Units	28,800	18,000	16,000	24,000	86,800
(₹ In Lacs)					
Sales	112.32	118.80	132.00	132.00	495.12
Less: Commission	-	-		-	-
	112.32	118.80	132.00	132.00	495.12
Direct Material	19.01	22.32	28.16	15.84	85.33
Direct Wages	17.28	17.28	28.80	17.28	80.64

Variable Overhead	34.56	34.56	57.60	34.56	161.28
	70.85	74.16	114.56	67.68	327.25
Contribution	41.47	44.64	17.44	64.32	167.87
Fixed Overhead					142.40
Profit/(Loss)					25.47

Labour Hrs Required	360,000	360,000	600,000	360,000	1,680,000
Contribution per Labour Hour (₹)	11.52	12.40	2.91	17.87	

**By following the strategy of Marketing Team, Contribution per Labour Hour has reduced in case of Product C & D. Therefore strategy of Marketing Team should be followed in Case of Product A&B only.*

9. Statement showing value of total work undertaken by PK Ltd. at customer's price.

	(₹'000)
Material cost (for appliances covered under agreement) [Refer to workings]	276
Material cost (for appliances not covered under agreement) [Refer to workings]	92
Labour cost (for appliances covered under agreement) [Refer to workings]	625
Labour cost (for appliances not covered under agreement) [Refer to workings]	180
Total receipts	1,173
Break up of receipts:	
Big appliances	65%
Small appliances	35%
	762
	411

Profitability Statement

	(₹ '000)		
	Option 1	Option 2	Option 3
Income:			
Big appliances	70.20	762.00	762
	(65%×₹108)		
Small appliances	411.00	37.80	411
		(35%× ₹108)	
Total receipts: (A)	481.20	799.80	1,173
Costs:			
Material	93.33	173.33	266.66

[Refer to workings]			
Heat, rent, light etc.,	55.00	25.00	70.00
Management costs	50.00	42.00	80.00
Service staff costs	110.00	210.00	355.00
Transport costs	18.00	120.00	110.00
Total costs: (B)	326.33	570.33	881.66
Profit: [(A-B)]	154.87	229.47	291.34

Recommendation: Option 3 is most profitable one.

Working Notes:

1. Material and labour cost (for appliances under after sales agreement):	
(i) Cost of Material per unit charged to customer's by PK Ltd (120% of ₹115)	138,00
Cost of material charged to customer's by PK Ltd. (₹30,000/₹15×₹138)	2,76,000
(ii) Cost of labour charged to customers by PK Ltd. (₹50,000 / ₹8 x 100)	6,25,000
2. Material and labour cost (for appliances not covered under sales agreement):	
(i) Cost of material charged to customer's by PK Ltd. (₹10,000 / ₹15 x ₹138)	92,000
(ii) Cost of labour charged to customers by PK Ltd. (₹18,000 / ₹10 x 100)	1,80,000
3. Material Cost to PT Ltd: (276,000+92,000) / 138 x 100	2,66,667
Option 1	
To set up a local service Centre to provide service for small appliances (35% Share)	
Material Cost 2,66,667 x 35%	93,333
Option 2	
To set up a local service Centre to provide service for big appliances (65% Share)	
Material Cost 2,66,667 x 65%	1,73,333

Option 3	
To set up a local service Centre to provide service to all appliances (100% Share)	
Material Cost 2,66,667 x 100%	2,66,667

- 10 (a) Computation of the amount Mr. 'M' should be billed for his car repairs. Parts charges:

	₹	₹
Repairs parts used:	250	
Overhead charges (20% of ₹250)	<u>50</u>	
Total parts charges		300
Labour charges:		
5 hours @ ₹80 per hour	400	
Overhead charges (80% of ₹400)	<u>320</u>	
Total labour charges		720
Total billing amount		1,020

- (b) Determination of initial selling price

Let the selling price be ₹X

Sales Value : ₹4,000 X

Annual cash costs are :	₹
Variable cost: 4,000 units × ₹125	5,00,000
Advertisement and other expenses	75,000
Additional fixed costs	37,500
Total cash cost	6,12,500

Depreciation per annum = ₹12,50,000 / 4 ₹3,12,500

Profit for taxation : ₹4,000 × ₹X – (₹6,12,500 + ₹3,12,500)

= ₹4,000 X – ₹9,25,000

Tax at 30% on profit :

$$30\% \text{ of } \{₹4,000 X - ₹9,25,000\} = ₹1,200 X - ₹2,77,500$$

Total annual cash outflow :

$$₹6,12,500 + (₹1,200 X - ₹2,77,500) = ₹1,200 X + ₹3,35,000$$

Net annual cash inflow :

$$₹4,000 X - (₹1,200 X + ₹3,35,000)$$

$$₹2,800 X - ₹3,35,000$$

Now, present value of initial cash outflow = Present value of cash inflow

$$\text{or } ₹12,50,000 = (₹2,800 X - ₹3,35,000) \times 2.854$$

$$\text{or } X = ₹276.06$$

Hence selling price should be ₹276.06 per unit.

11. Advantages of Uniform Costing: The advantages accruing from the use of uniform costing system are as follows:-

1. The management of each firm will be saved from the exercise of developing and introducing a costing system of its own.
2. A costing system devised by mutual consultation and after considering the difficulties and circumstances prevailing in different firms is readily adopted and successfully implemented.
3. It facilitates comparison of cost figures of various firms to enable the firms to identify their weak and strong points besides controlling costs.
4. Optimum achievement of efficiency is attempted by all the firms by utilising the experience of other concerns in the industry.
5. Standing in the industry of each firm will be known by making a comparison of its cost data with others.
6. Services of cost consultants or experts may be available jointly to each firm in the industry by sharing their experiences and expenses.
7. Research and development benefits of bigger firms may be made available to smaller firms.
8. It helps in the reduction of labour turnover, as a uniform wage system is the pre-condition of a uniform costing system.
9. It helps Trade Associations in negotiating with the Government for any assistance or concession in the matters of taxation, exports, subsidies, duties and prices determination etc.

10. Unhealthy competition is avoided among the firms in the same industry in framing pricing policies and submitting tenders.
11. Prices fixed on the basis of uniform costing are representative of the whole industry and thus are reliable.
12. Uniform costing provides a basis for the comparative assessment of the performance of two firms in the same industry but in different sectors.
13. It helps the Government in regulating the prices of essential commodities such as bread, sugar, cement, steel etc.

Limitations of Uniform Costing:

1. Sometimes it is not possible to adopt uniform standards, methods and procedures of costing in different firms due to differing circumstances in which they operate. Hence, the adoption of uniform costing becomes difficult in such firms.
2. Disclosure of cost information and other data is an essential requirement of a uniform costing system. Many firms do not wish to share such information with their competitors in the same industry.
3. Small firms in an industry believe that uniform costing system is only meant for big and medium size firms, because they cannot afford it.
4. It induces monopolistic trend in the business, due to which prices may be increased artificially and supplies withheld.

12. Working Note:

Ranking of products when availability of time is the key factory

Product	P	Q	R	S
Market Price per unit (₹)	350	345	280	230
Less: Variable cost of Production per Unit (₹)	330	310	180	185
Contribution per unit (₹)	20	35	100	45
Contribution per hour (₹)	6.66 (₹20/3 hrs)	8.75 (₹35/4 hrs)	50 (₹100/2 hrs)	15 (₹45/3 hrs)
Ranking	IV	III	I	II

- (i) Statement of production mix (when total available hours in division A are 24,000)

Product (Refer to W.N.)	Maximum demand (units)	Hours per unit	Units produced	Hours used	Balance hours
(a)	(b)	(c)	(d)	(e)=(b)×(c)	(f)
R	2,800	2	2,800	5,600	18,400 (24,000-5,600)
S	1,800	3	1,800	5,400	13,000 (18,400-5,400)
Q	3,500	4	3,250	13,000	0 (13,000-13,000)
P	3,000	3	0	0	-

Note: Time required to meet the demand of 2,000 units of product S for division B is 6,000 hours. This requirement of time viz., 6,000 hours for providing 2,000 units of product S for division B can be met by sacrificing the production of 1,500 units of product Q (1,500 units × 4 hours) .

Statement of Transfer Price for each unit for 2,000 units of S

Transfer Price	2,000 units of product S (₹)	Per unit of Product S (₹)
Variable cost	3,70,000	185.00
Opportunity cost of the contribution foregone by not producing 1,500 units of Q (1500 units × ₹35)	52,500	26.25
Transfer price	4,22,500	211.25

- (ii) Statement of product mix (when total available hours in division A are 32,000)

Product (Refer to W.N.)	Maximum demand (units)	Hours per unit	Units produced	Hours used	Balance hours
(a)	(b)	(c)	(d)	(e)=(b)×(c)	(f)
R	2,800	2	2,800	5,600	26,400 (32,000-5,600)
S	1,800	3	1,800	5,400	21,000 (26,400-5,400)
Q	3,500	4	3,500	14,000	7,000 (21,000-14,000)
P	3,000	3	2,333	7,000	0 (7,000-7,000)

Note: The required time for producing 2,000 units of product S for division B is 6,000 hours. This requirement can be met by sacrificing the output of 2,000 units of product P.

Statement of Transfer Price for each unit for 2,000 units of S

Transfer Price	2,000 units of product S (₹)	Per unit of Product S (₹)
Variable cost	3,70,000	185.00
Opportunity cost of the contribution foregone by not producing 2,000 units of P (2,000 units × ₹20)	40,000	20.00
Transfer price	4,10,000	205.00

13. The given problem is a balanced minimization transportation problem. The objective of the company is to minimize the cost. Let us find the initial feasible solution using Vogel's Approximation method (VAM)

Plants	A	B	C	D	Capacity	Difference
X	6	8	6	5 600	600/0	1 1 1 1
Y	4 300	4 400	8	4 100	800/400/100/0	0 0 0 0
Z	3 300	7	2 300	8	600/300/0	1 4 - -
Req	600/300/0	400/0	300/0	700/600/0		
Diff:	1 1 2 2	3 3 4 -	4 - - -	1 1 1 1		

Since the number of allocations = 6 i.e. $(m+n-1)$, let us test the above solution for optimality.

(u_i+v_j) matrix for allocated cells

			5	u_i
4	4		4	1
3		2		0
	4	4	3	-1
v_j				

$(u_i + v_j)$ matrix for un allocated cells

	5	5	4	-	1
	-	-	3	-	0
	-	3	-	3	-1
v_j	4	4	3	4	

$$\Delta_{ij} = C_{ij} - (u_i + v_j)$$

1	3	2	-
-	-	5	-
-	4	-	5

Since, all allocations are non negative, the allocation is optimal.

The optimal allocation are given below

Plants	Outlet	Units (A)	Cost (₹)(B)	Total Cost (₹) C=(A) x(B)
X	D	600	5	3,000
Y	A	300	4	1,200
Y	B	400	4	1,600
Y	D	100	4	400
Z	A	300	3	900
Z	C	300	2	600
Total				7,700

14. This is an unbalanced minimization assignment problem. First of all balance the given problem by adding a dummy seminar:

	Ind. AS	GST	Negative list	DTC	Dummy
Monday	40	30	50	20	0
Tuesday	30	20	30	30	0
Wednesday	50	10	20	20	0
Thursday	20	30	10	30	0
Friday	10	20	10	30	0

Subtracting the minimum element of each column from all elements of that column, we get the following matrix:

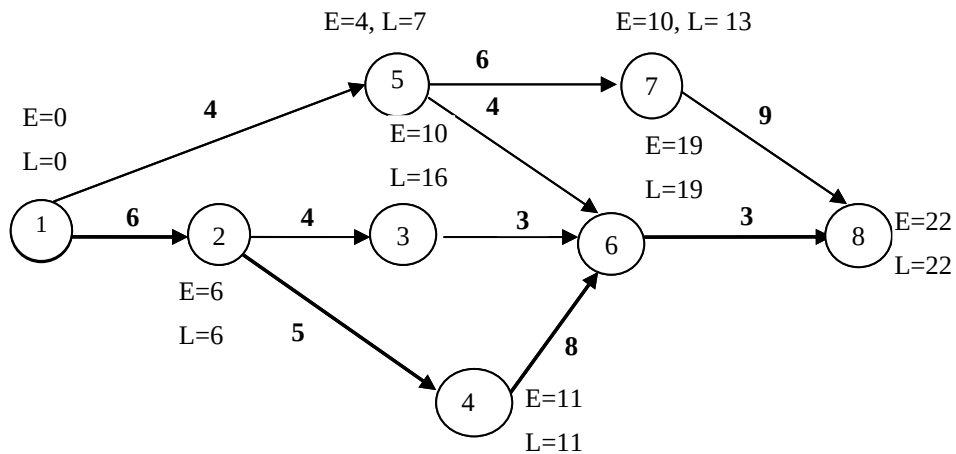
	Ind. AS	GST	Negative list	DTC	Dummy
Monday	30	20	40	0	0
Tuesday	20	10	20	10	0
Wednesday	40	0	10	0	0
Thursday	10	20	0	10	0
Friday	0	10	0	10	0

The minimum number of lines to cover all zeros are 5 which is equal to the order of the square matrix (i.e. 5), the above matrix will give the optimal solution which is given below

Day	Topic	No. of Members Missing
Monday	DTC	20
Tuesday	No Seminar	0
Wednesday	GST	10
Thursday	Negative list on Service tax	10
Friday	Ind. AS	10
Total		50

Thus, the total number of members who will missing at least one seminar = 50

15. The required network is drawn below:



- From the above network, it can be noted that the critical path is 1 – 2 – 4 – 6 – 8.
- Expected cost of construction of the building is = $(10 + 4 + 6 + 8 + 3 + 13 + 18 + 8 + 15 + 3)$ millions of ₹88 million
- Expected time required to build the plant = $6 + 5 + 8 + 3 = 22$ months.

- (iv) It is given that the time required for one activity is independent of the time and cost of any other activity and variations are expected to follow normal distribution, the S.D. Hence, the variance of the expected time is determined by summing the variance of critical activities and is = $1 + 2 + 5 + 1 = 9$.

Standard Deviation of the expected time = $\sqrt{9} = 3$ months.

16. The yearly return can be determined by the formula:

$$\text{Return (\%)} = \frac{\text{Profit} \times \text{units demanded}}{\text{Investment}} \times 100$$

First of all, random numbers 00 – 99 are allocated in proportion to the probabilities associated with each of three variables as given under.

Annual Demand

Units in '000	Probability	Cum. Probability	Random numbers assigned
45	0.05	0.05	00-04
35	0.10	0.15	05-14
30	0.15	0.30	15-29
25	0.35	0.65	30-64
15	0.20	0.85	65-84
60	0.10	0.95	85-94
75	0.05	1.00	95-99

Profit per unit

Profit/ unit (₹)	Probability	Cum. Probability	Random numbers assigned
5.00	0.10	0.10	00-09
6.00	0.30	0.40	10-39
8.00	0.25	0.65	40-64
7.00	0.25	0.90	65-89
12.00	0.10	1.00	90-99

Investment Required (in thousands of rupees)

Investment ('000)	Probability	Cum. Probability	Random numbers assigned
4,000	0.20	0.20	00-19
3,200	0.45	0.65	20-64
3,500	0.35	1.00	65-99

Let us now simulate the process for 10 trials. The results of the simulation are shown in the tables given below:

Trial	Random no. of demand	Simulated demand ('000) units	Random no. for profit per unit	Simulated profit per unit (₹)	Random number for investment	Simulated investment ('000)	Simulated return (%)
1	30	25	12	6.00	16	4,000	3.75
2	50	25	09	5.00	69	3,500	3.57
3	63	25	94	12.00	26	3,200	9.38
4	27	30	08	5.00	74	3,500	4.29
5	64	25	60	8.00	61	3,200	6.25
6	28	30	28	6.00	72	3,500	5.14
7	31	25	23	6.00	57	3,200	4.69
8	54	25	85	7.00	20	3,200	5.47
9	64	25	68	7.00	18	4,000	4.38
10	32	25	31	6.00	87	3,500	4.29

The above table shows that the highest likely return is 9.38% which is corresponding to the annual demand of 25,000 units resulting a profit of ₹12/- per unit and the required investment will be ₹ 32,00,000.

17.

Computation of minimum selling price

	For 4,000 Units (₹)	For 16,000 Units (₹)
Material	1,40,000	5,60,000
Direct Labour	96,000	2,45,760 (W.N.-1)
Variable Overhead	60,000	1,60,000
Total Variable Cost	2,96,000	9,65,760
Fixed Cost	2,25,000	2,25,000
Total Cost	5,21,000	11,90,760
Total Cost/ Unit	130.25	74.42
Sales ₹150 x 4000	6,00,000	6,00,000 + 12,000 X
Profit	79,000	12,000 X – (11,90,760 -6,00,000)

Minimum Selling price for the order of 12,000 demand from a prospective customer should not be less than ₹49.23 (refer Working note-2)

Working Note-1

Direct Labour Cost at 16,000 units level

Units	Hours
4,000	$4,000 \times 1.5 = 6,000$
8,000	$8,000 \times 1.5 \times 0.8 = 9,600$
16,000	$16,000 \times 1.5 \times (0.8)^2 = 15,360$
15,360 hours $\times 24/1.5 = ₹ 2,45,760$	

Working note-2

Sales at 16,000 units level

Let X be the selling price for an order of 12,000 units

Total sales = ₹6,00,000 + 12,000 X

Cost to be covered by the further sale of 12,000 units

$12,000X \geq 11,90,760 - 6,00,000$

$12,000X \geq 5,90,760$

$X \geq 49.23$

Therefore, minimum selling price should be ₹49.23 i.e. ₹ 5,90,760/12,000 units

18. A performance budget is one which presents the purposes and objectives for which funds are required, the costs of the programmes proposed for achieving those objectives, and quantities data measuring the accomplishments and work performed under each program. Thus performance budgeting is a technique of presenting budgets for costs and revenues in terms of functions. Programmes and activities are correlating the physical and financial aspect of the individual items comprising the budget.

Traditional budgeting vs. Performance budgeting

1. The traditional budgeting gives more emphasis on the financial aspect than the physical aspects or performance. Performance Budgeting aims at establishing a relationship between the inputs and the outputs.
 2. Traditional budgets are generally prepared with the main basis towards the objects or items of expenditure i.e. it highlights the items of expenditure, namely, salaries, stores and materials, rates rents and taxes and so on. In the Performance budgeting the emphasis is more on the functions of the organisation, the programmes to discharge these function and the activities which will be involved in undertaking these programmes.
19. (i) CPM is activity oriented i.e. CPM network is built on the basis of activities. Also results of various calculations are considered in terms of activities of the project. On

the other hand, PERT is event oriented.

- (ii) CPM is a deterministic model i.e. It does not take into account the uncertainties involved in the estimation of time for execution of a job or an activity. It completely ignores the probabilistic element of the problem. PERT, however, is a probabilistic model. It uses three estimates of the activity time; optimistic, pessimistic and most likely; with a view to take into account time uncertainty. Thus, the expected duration of each activity is probabilistic and expected duration indicates that there is fifty per cent probability of getting the job done within that time.
 - (iii) CPM places dual emphasis on time and cost and evaluates the trade-off between project cost and project time. By deploying, additional resources, it allows the critical path project manager to manipulate project duration within certain limits so that project duration can be shortened at an optimal cost. On the other hand, PERT is primarily concerned with time. It helps the manager to schedule and coordinate various activities so that the project can be completed on scheduled time.
 - (iv) CPM is commonly used for those projects which are repetitive in nature and where one has prior experience of handling similar projects. PERT is generally used for those projects where time required to complete various activities are not known as priori. Thus, PERT is widely used for planning and scheduling research and development projects.
20. (a) In a World Class Manufacturing environment, characterised by Just in Time policies, the focus of the management is to produce only as much as is required. This requires purchase of small quantities of raw material, increase in the number of set ups and minimal importance to capacity utilisation. Policies like this result in increased adverse variances related to raw material prices, labour efficiency and production volume. Critics argue that the fear of such adverse variances affects goal congruence and forces managers to behave against their company's policies.
- (b) This is looked upon as one of the major reasons for lack of innovation especially in the global era where competition amongst companies is unprecedented. It is argued that techniques like Target costing are much more motivating when compared to Traditional costing since the former encourage the use of concepts like value engineering and value analysis.