

Gurukripa's Guideline Answers to Nov 2010 Final Exam Qns Advanced Mgmt Accounting (New Syllabus)

Question No.1 is compulsory (4 X 5 = 20 Marks).

Answer any five questions from the remaining six questions (16 X 5 = 80 Marks).

Question 1(a): Testing of Hypothesis

5 Marks

A potato chips manufacturing Company decided that the Mean Net Weight per pack of its products must be 90 grams. A random sample of 16 packets yields a Mean Weight of 80 grams with Standard Deviation of 17.10 grams. Test the Hypothesis that the Mean of the whole universe is less than 90, use level of significances of (a) 0.05 (b) 0.01.

Solution:

In spite of small sample, Z Test is assumed in the solution given here.

Alternatively, t-Test can also be applied at 15 DOF.

Step	Computation
1	Null Hypothesis (H_0): $\mu = 90$, Alternative Hypothesis (H_1): $\mu < 90$
2	Left-Tail Test (To test whether the Mean Net Weight has decreased , i.e. less than 90) at $\alpha = 5\%$ and $\alpha = 1\%$
3	Basic Data is as under: Sample Size (n) = 16, Population Mean (μ) = 90, Sample Mean ($\bar{X}$) = 80, Sample Std Deviation (s) = 17.10
4	Std. Error = $\frac{s}{\sqrt{n}} = \frac{17.10}{\sqrt{16}} = \frac{17.10}{4} = 4.275$
5	Computed Z = $\frac{\bar{X} - \mu}{S.E.} = \frac{80 - 90}{4.275} = 2.3392$
6	Table Z = 1.645 (for $\alpha = 5\%$) and 2.33 (for $\alpha = 1\%$)
7	Since Computed Z > Table Z, H_0 is rejected and H_1 is accepted. So, the sample indicates that the Mean of the whole universe is less than 90 .

Question 1(b): Budgetary Control

5 Marks

What are the steps involved in Zero-base budgeting?

Solution:

Refer Page 14.12, Q.No.28

Question 1(c): Marginal Costing

5 Marks

G Ltd produces and sells 95,000 units of X in a year at its 80% production capacity. The Selling Price of product is Rs.8 per unit. The Variable Cost is 75% of Sale Price per unit. The Fixed Cost is Rs.3,50,000. The Company is continuously incurring losses and Management plans to shut-down the Plant. The Fixed Cost is expected to be reduced to Rs.1,30,000. Additional costs of Plant shut-down are expected at Rs.15,000.

Should the Plant be shut-down? What is the capacity level of production of Shut-Down Point?

Solution:

1.	Contribution per unit = Sale Price less Variable Costs per unit = Rs.8 – 75% of Rs.8 =	Rs.2 p.u.
2.	Avoidable Fixed Costs = Total Fixed Cost Rs.3,50,000 – Minimum Fixed Cost Rs.1,30,000 – Shut-down costs Rs.15,000	= Rs.2,05,000
3.	Shut Down Point = $\frac{\text{Avoidable Fixed Cost}}{\text{Contribution per unit}} = \frac{\text{Rs.2,05,000}}{\text{Rs.2}}$ Since, present output of 95,000 units < Shut Down Point, it is preferable to close down the Plant.	= 1,02,500 units
4.	Total Capacity = $\frac{95,000}{80\%} =$	= 1,18,750 units
5.	Capacity Level at Shut down Point = $\frac{1,02,500}{1,18,750} =$	= 86.32 %

Question 1(d): Performance Measurement – Theory of Constraints

5 Marks

H Ltd manufactures three products. The Material Cost, Selling Price and Bottleneck Resource details per unit are as follows:

Particulars	Product X	Product Y	Product Z
Selling Price (Rs.)	66	75	90
Material and Other Variable Cost (Rs.)	24	30	40e
Bottleneck Resource Time (minutes)	15	15	20

Budgeted Factory Costs for the period are Rs.2,21,600. The Bottleneck Resources time available is 75,120 minutes per period.

Required:

- The Company adopted Throughput Accounting and Products are ranked according to 'Product Return per Minute'. Select the highest rank product.
- Calculate Throughput Accounting Ratio and comment on it.

Solution:

Similar to Illustration 4 of Page 15.20

Particulars	X	Y	Z
1. Sale Price p.u.	Rs.66	Rs.75	Rs.90
2. Material and Other Variable Cost p.u.	Rs.24	Rs.30	Rs.40
3. Contribution p.u. (1 – 2)	Rs.42	Rs.45	Rs.50
4. Bottleneck Resource Time (min)	15	15	20
5. Product Return per minute [(3) ÷ (4)]	2.80	3.00	2.50
6. Rank based on (5) above	II	I	III
7. Factory Cost per minute = Rs.2,21,600 ÷ 75,120	2.95	2.95	2.95
8. Throughput Accounting (TA) Ratio = (5) ÷ (7)	0.95	1.02	0.85
9. Rank based on TA Ratio	II	I	III

Comments: Product Y has the highest throughput Contribution per minute and the highest TA Ratio.

Question 2(a): Marginal Costing – Key Factor

12 Marks

E Ltd manufactures and sells four types of products under the brand names A, B, C and D. On a turnover of Rs.30 Crores in 2009, the Company earned a Profit of 10% before Interest and Depreciation which are fixed. The details of product mix and other information are as follows:

Products	Mix % to Total Sales	P/V Ratio (%)	Raw Material as % on Sales Value
A	30	20	35
B	10	30	40
C	20	40	50
D	40	10	60

Interest and Depreciation amounted to Rs.225 Lakhs and Rs.115.50 Lakhs respectively. Due to increase in Prices in the international market, the Company anticipates that the Cost of Raw Materials which are imported will increase by 10% during 2010. The Company has been able to secure a license for the import of Raw Materials of a value of Rs.1,535 Lakhs at 2010 Prices. In order to counteract the increase in costs of Raw Materials, the Company is contemplating to revise its product mix. The market survey report indicates that the sales potential of each of the products: A, B and C can be increased upto 30% of Total Sales Value of 2009. There was no inventory of Finished Goods or Work In Progress in both the year.

You are required to set an optimal Product Mix for 2010 and find the Profitability.

Solution:

Particulars (Rs. in Lakhs)	A	B	C	D	Total
1. Sales Mix of 2009 (given)	30%	10%	20%	40%	
2. Sales Amount of 2009	900	300	600	1200	3,000
3. PV Ratio (given)	20%	30%	40%	10%	
4. Contribution Amt of 2009 (2 x 3)	180	90	240	120	630
5. Raw Material as a % of Sales (given)	35%	40%	50%	60%	
6. Raw Material Cost Amt of 2009 (2 x 5)	315	120	300	720	1,455
7. EBIT of 2009 (given)	10% of Turnover of Rs.3,000				300
8. Operating Fixed Cost	Contribution – EBIT = 630 – 300				330
9. Interest and Depreciation of 2009	(225.00 + 115.50) (given)				340.50
10. Profit/ (Loss) of 2009	EBIT – (Interest and Depreciation) [7 – 9]				(40.50)

Particulars (Rs. in Lakhs)	A	B	C	D	Total
11. Raw Material as % of Sales for 2010 = 2009 Cost % + 10% thereon	35% + 3.5% = 38.5%	40% + 4% = 44%	50% + 5% = 55%	60% + 6% = 66%	
12. Revised PV Ratio for 2010 = 2009 PVR less additional cost due to RM [3 – (11–5)]	20% – 3.5% = 16.5%	30% – 4% = 26%	40% – 5% = 35%	10% – 6% = 4%	
13. Contribution per Re. of Raw Material in 2010 [(12) ÷ (11)]	16.5 ÷ 38.5 = 0.43	26 ÷ 44 = 0.59	35 ÷ 55 = 0.64	4 ÷ 66 = 0.06	
14. Rank based on 13 above	III	II	I	IV	
15. Maximum Sales amount in 2010 (2009 Sales + 30% in 2010) (See Note)	900 + 30% = 1170	300 + 30% = 390	600 + 30% = 780	Not Specified	
16. Maximum Raw Material required in 2010 (Max Sales x RM%) = (15 x 11)	450.45	171.60	429.00	Not Specified	
17. Raw Material allocated in 2010 based on 14 & 16 (restricted to availability)	450.45	171.60	429.00	(b/f) 483.95	1535.00
18. Sales Value in 2010 (17 ÷ 11)	1170.00	390.00	780.00	733.25	3073.25
19. Contribution of 2010 (18 x 12)	193.05	101.40	273.00	29.33	596.78
20. Operating Fixed Cost for 2010 (Same as last year 2009)					330.00
21. EBITD for 2010 (18 – 19)					266.78
22. Interest and Depreciation for 2010 (Same as last year 2009)					340.50
23. Profit/(Loss) for 2010					(73.72)

Note: It is given that Sales of A, B and C can be increased upto 30% of the Total Sales Value of 2009, i.e. Rs.3000 x 30% = Rs.900 Lakhs. In such a case, the entire Raw Material of 2010 will be allocated only for C, the highest ranked product. Hence, the given statement is assumed as 30% of the respective Product Sale Value in 2009.

Question 2(b): Total Quality Management

4 Marks

List out the remedies available for difficulties experienced during implementation of PRAISE.

Solution:

Refer Page 12.3, Q.No.4

Question 3(a): Standard Costing

10 Marks

A Company is engaged in manufacturing of several products. The following data have been obtained from the record of a machine shop for an average month:

Budgeted		Actual data for August 2010 are –	
No. of working days	24	Overheads Fixed	Rs.78,800
Working hours per day	8	Variable	Rs.70,870
No. of Direct workers	150	Net operator hours worked	20,500
Efficiency	One Standard Hour per Clock Hour	Standard hours produced	22,550
Down time	10%	There was a special holiday in August.	
Overheads Fixed	Rs.75,400		
Variable	Rs.90,720		

Required:

- Calculate Efficiency, Activity, Calendar and Standard Capacity Usage Ratio.
- Calculate all the relevant Fixed Overhead Variances.
- Calculate Variable Overheads Expenditure and Efficiency Variance.

Solution:

1. Basic Computations

Budgeted Hours = $24 \times 8 \times 150 = 28,800$ hours less 10% down time = 25,920 hours.

VOH Standard Rate per Hour = $\frac{BVOH}{BH} = \frac{90,720}{25,920} = \text{Rs.}3.50$ per hour

FOH Standard Rate per Hour = $\frac{BFOH}{BH} = \frac{75,400}{25,920} = \text{Rs.}2.91$ per hour

2. VOH Variances

SH × SR (1)	AVOH (2)	AH × SR (3)	VOH Variances	
(22,550 hrs × Rs.3.50) = 78,925	(Given) = 70,870	20,500 hrs × Rs.3.50 = 71,750 (given)	Cost (1) – (2) = 8,055 F	
			Expenditure (3) – (2) = 880 F	Efficiency (1) – (3) = 7,175 F

3. FOH Variances

(1) AO × SR = SH × SR	(2) AFOH	(3) BFOH	(4) AH × SR	(5) PFOH
22,550 hrs × Rs.2.91 = 65,621	Given 78,800	Given 75,400	20,500 hrs × Rs.2.91 = 59,655	$\frac{75,400}{24} \times 23 = 72,258$

FOH Variances	FOH related ratios
Cost (1) – (2) = 13,179 A	Activity Ratio (1 ÷ 3) = 87.03 %
Expenditure (3) – (2) = 3,400 A	Capacity Ratio (4 ÷ 5) 82.56 %
Volume (1) – (3) = 9,779 A	Efficiency Ratio (1 ÷ 4) 110.00 %
Capacity (4) – (5) = 12,603 A	Calendar Ratio (5 ÷ 3) 95.83 %
Efficiency (1) – (4) = 5,966 F	
Calendar (5) – (3) = 3,142 A	

Question 3(b): Linear Programming – Graphical Approach

6 Marks

A Firm makes two products X and Y, and has a total production capacity of 16 tonnes per day. X and Y are requiring the same production capacity. The Firm has a permanent contract to supply at least 3 tonnes of X and 6 tonnes of Y per day to another company. Each tonne of X require 14 machine hours of production time and each tonne of Y requires 20 machine hours of production time. The daily maximum possible number of machine hours is 280. All the Firm's output can be sold, and the profit made is Rs.20 per tonne of X and Rs.25 per tonne of Y.

Formulate a linear programme to determine the production schedule for maximum profit, by using graphical approach and calculate the optional product mix and profit.

Solution:

Maximize $Z = 20x + 25y$, subject to
 $x \geq 3$ Constraint 1
 $y \geq 6$ Constraint 2
 $14x + 20y \leq 280$ Constraint 3
 $x + y \leq 16$ Constraint 4
 $x, y \geq 0$ (Non-Negativity Assumption)

Equation 3: $14x + 20y = 280$.

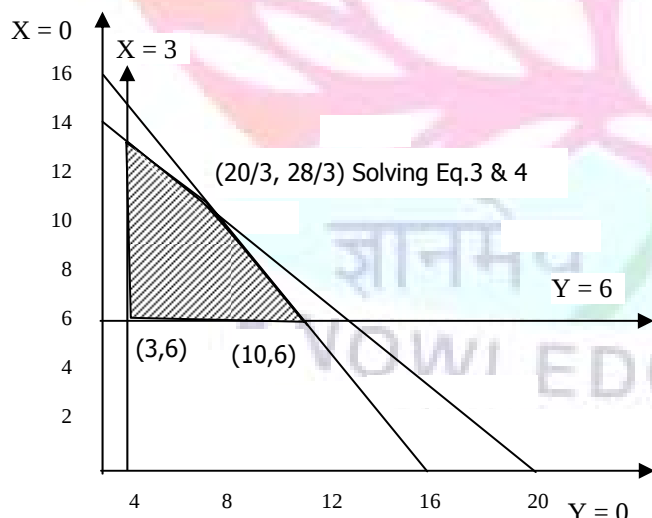
When $x = 0$, $y = 14$,
 Also, $x = 20$, when $y = 0$

So (0, 14) and (20, 0) constitute two points on Equation 3.

Equation 4: $x + y = 16$.

When $x = 0$, $y = 16$,
 Also, $x = 16$, when $y = 0$

So (0, 16) and (16, 0) constitute two points on Equation 4.



For finding out points of intersection of Equations 3 & 4,

By solving Equations 3 & 4

$$14x + 20y = 280$$

$$14x + 20(16 - x) = 280$$

$$14x + 320 - 20x = 280$$

$$-6x = 40, x = 20/3. \text{ Substituting, } y = 28/3$$

For finding out points of intersection of Equations 3 & 4,

By solving Equations 1 & 3 $x = 3$

$$14(3) + 20y = 280, \text{ So, } y = 11.9.$$

Point Value of $Z = 20x + 25y$

(3, 11.9) 357.50

(3, 6) 210.00

(10, 6) 350.00

(20/3, 28/3) 366.67

Decision: The Company should produce 20/3 and 28/3 units of A and B respectively to maximize its profit at Rs.366.67.

Question 4(a): Marginal Costing

4 Marks

The following information is given by Z Ltd: (1) Margin of Safety = Rs.1,87,500 (2) Total Cost = Rs.1,93,750
(3) Margin of Safety = 7,500 units (4) Break-Even Sales = 2,500 units

Calculate Profit, PV Ratio, BEP Sales in (in Rs) and Fixed Cost.

Solution:

1.	Sale Price p.u. = $\frac{\text{MOS Value}}{\text{MOS Qty}} = \frac{1,87,500}{7,500} =$	Rs.25 p.u.
2.	BES (Rs.) = BEQ × Sale Price p.u. = 2,500 units × Rs.25	= Rs.62,500
3.	Total Sales = MOS + BES = Rs.1,87,500 + Rs.62,500 =	= Rs.2,50,000
4.	Profit = Total Sales – Total Cost = Rs.2,50,000 – Rs.1,93,750 =	= Rs.56,250
5.	Since MOS = $\frac{\text{Profit}}{\text{PV Ratio}}$, PV Ratio = $\frac{\text{Profit}}{\text{MOS}} = \frac{56,250}{1,87,500} =$	= 30 %
6.	Since BES = $\frac{\text{FC}}{\text{PVRatio}}$, Fixed Cost = BES × PV Ratio = Rs.62,500 × 30%	= Rs.18,750

Question 4(b), (c) & (e): Performance Measurement, Network Analysis and Simulation – Theory

4 Marks each

4(b)	Explain the major components of Balanced Score Card.	Solution: Page 15.5, Q.No.13
4(c)	List the 5 steps involved in the methodology of Critical Path Analysis	Solution: Page 21.1, Q.No.3
4(e)	What are the steps involved in carrying out Monte Carlo Simulation model?	Solution: Page 20.3, Q.No.7

Question 4(d): Pricing Decisions

4 Marks

Calculate the Selling Price per unit to earn a Return of 12% net on Capital Employed (Net of Tax at 40%). The Cost of Production and Sales of 80,000 units are –

Variable Cost including Material Cost Rs.9,60,000

Fixed Overheads Rs.5,00,000

The fixed portion of Capital Employed is Rs.12 Lakhs and the varying portion is 50% of Sales Turnover.

Solution:

Same as Page 4.20, Illustration 5

M 05 question

Let Selling Price be Rs.X per unit.	Hence Sales Value = 80,000X
Sales	80,000X
Less: Variable Costs (given)	9,60,000
Contribution	80,000X – 9,60,000
Less: Fixed Costs (given)	5,00,000
Profit Before Tax	80,000X – 14,60,000
Less: Tax at 40%	32,000X – 5,84,000
Profit After Tax	48,000X – 8,76,000
Capital Employed = 12,00,000 + 50% of 80,000X =	12,00,000 + 40,000X

Desired PAT = 12% of Capital Employed.	
Hence, 48,000X – 8,76,000 = 12% of (12,00,000 + 40,000X)	
48,000X – 8,76,000 = 1,44,000 + 4,800X	
43,200X = 10,20,000	
Hence X = 10,20,000 ÷ 43,200 = Rs.23.61	
Therefore, Desired Selling Price = Rs.23.61 per unit.	

Question 5(a): Activity Based Cost Management

11 Marks

Fruitolay has decided to increase the size of the store. It wants the information about the probability of the individual product lines: Lemon, Grapes and Papaya. It provides the following data for the 2009 for each product line –

Particulars	Lemon	Grapes	Papaya
Revenues	Rs.79,350.00	Rs.2,10,060.00	Rs.1,20,990.00
Cost of Goods Sold	Rs.60,000.00	Rs.1,50,000.00	Rs.90,000.00
Cost of Bottles Returned	Rs.1,200.00	Rs.0	Rs.0
Number of Purchase Orders	36	84	36
Number of Deliveries Received	30	219	66
Hours of Shelf Stocking Time	54	540	270
Items sold	12600	110400	30600

Fruitolay also provides the following information for the year 2009:

	Activity	Description of Activity	Total Costs	Cost Allocation Basis
1.	Bottle Returns	Returning of Empty Bottles to the Store	1,200.00	Direct tracing to product line
2.	Ordering	Placing of orders of purchases	15,600.00	156 orders
3.	Delivery	Physical delivery & the receipts of merchandise	25,200.00	315 deliveries
4.	Shelf Stocking	Stocking of merchandise on store and ongoing re-stocking	17,280.00	864 hours of time
5.	Customer Support	Assistance provided to customers including bagging and checkout	30,720.00	1,53,600 items sold

Required:

1. Fruitolay currently allocates Store Support Costs (all Costs other than Cost of Goods Sold) to the product lines on the basis of the Cost of Goods Sold of each product line. Calculate the Operating Income and Operating Income as the percentage of revenue of each product line.
2. If Fruitolay allocates Store Support Costs (all Costs other than the Cost of Goods Sold) to the product lines on the basis of ABC System, calculate the Operating Income and Operating Income as the percentage of revenue of each product line.
3. Compare both the systems.

Solution: Similar to Page 9.18, Illustration 5 (figures divided by 10)

M 03 (PE 2 Syllabus) Question

1. Allocation based on Cost of Goods Sold

- Total Support Costs = Rs.1,200 + Rs.15,600 + Rs.25,200 + Rs.17,280 + Rs.30,720 = Rs.90,000
- Total Cost of Goods Sold = Rs.60,000 + Rs.150,000 + Rs.90,000 = Rs.3,00,000
- Hence, Ratio of Support Costs to COGS = Rs.90,000 ÷ Rs.3,00,000 = 30%
- The Product Profit Statement is as under:

Particulars	Lemon	Grapes	Papaya	Total
Revenues	Rs.79,350	Rs.2,10,060	Rs.1,20,990	Rs.4,10,400
Less: Cost of Goods Sold	Rs.60,000	Rs.1,50,000	Rs. 90,000	Rs.3,00,000
Gross Margin	Rs.19,350	Rs. 60,060	Rs. 30,990	Rs.1,10,400
Less: Support Costs at 30%	Rs.18,000	Rs. 45,000	Rs. 27,000	Rs. 90,000
Net Profit	Rs. 1,350	Rs. 1,5,060	Rs. 3,990	Rs. 20,400

Note: Cost of Bottles returned is presumed to have been already adjusted.

2. Allocation based on Activity Based Costing

(a) Computation of Activity Based Cost Driver Rates

Activity	Total Cost	Cost Allocation Base	ABC Rate
Bottles returns	Rs. 1200	Direct tracing to soft-drink line	Directly allocated
Ordering	Rs.15,600	156 Purchase Orders	Rs.100 per purchase order
Delivery	Rs.25,200	315 deliveries	Rs.80 per delivery
Shelf-stocking	Rs.17,280	864 hours of shelf-stocking time	Rs.20 per hour
Customer Support	Rs.30,720	1,53,600 items sold	Rs.0.20 per item sold

(b) Product Profit Statement under ABC System is as under –

Particulars	Lemon	Grapes	Papaya	Total
Revenues	Rs.79,350	Rs.2,10,060	Rs.1,20,990	Rs.4,10,400
Less: Cost of Goods Sold	Rs.60,000	Rs.1,50,000	Rs. 90,000	Rs.3,00,000
Gross Margin	Rs.19,350	Rs. 60,060	Rs. 30,990	Rs.1,10,400
Less: Activity Based Cost				
Bottles Returns (direct)	Rs. 1,200	Nil	Nil	Rs. 1,200
Ordering at Rs.100 per order	Rs. 3,600	Rs. 8,400	Rs. 3,600	Rs. 15,600
Delivery at Rs.80 per delivery	Rs. 2,400	Rs. 17,520	Rs. 5,280	Rs. 25,200
Shelf–stocking at Rs.20 ph	Rs. 1,080	Rs. 10,800	Rs. 5,400	Rs. 17,280
Customer support at 0.20 pu	Rs. 2,520	Rs. 22,080	Rs. 6,120	Rs. 30,720
Total Support Costs	Rs.10,800	Rs. 58,800	Rs. 20,400	Rs. 90,000
Net Profit	Rs. 8,550	Rs. 1,260	Rs. 10,590	Rs. 20,400

Note: Cost of Bottles returned is presumed to have been already adjusted.

Question 5(b): Time Series Analysis

5 Marks

Discuss various Forecasting methods using Time Series.

Solution:

Refer Page 22.5, Q.No.17

Question 6(a): Transportation

8 Marks

A Company has three Plants located at A, B and C. The production of these Plants is absorbed by four distribution centres located at X, Y, W and Z. The Transportation Cost per unit has been shown in small cells in the following table:

Distribution Centres Factories	X	Y	W	Z	Supply (Units)
A	6	9	13	7	6000
B	6	10	11	5	6000
C	4	7	14	8	6000
Demand (units)	4000	4000	4500	5000	18000 17500

Find the optimum solution of the transportation problem by applying Vogel's Approximation Method.

Solution:

Initial Basic Feasible Solution is determined as under:

	X	Y	W	Z	Dummy	Supply	Cost Differences				
							I	II	III	IV	V
A	6	9	13	7	0	6000/5500/0	6	1	3	3	4
B	6	10	11	5	0	6000/1000/0	5	5	4	–	–
C	4	7	14	8	0	6000/3000/0	4	3	3	3	7
Demand	4000/3000/0	4000/1000/0	4500/0	5000/0	500/0	18,000					

Cost Diff:

I	2	2	2	2	0	In the above IBFS, Number of allocated cells is 7. $m + n - 1$ (i.e. Rows + Columns – 1) $= 5 + 3 - 1 = 7$. Hence, there is no degeneracy.
II	2	2	2	2	–	
III	2	2	2	–	–	
IV	2	2	1	–	–	
V	–	2	1	–	–	

OPTIMALITY TEST:

Table 1 = $U_i + V_j$ for allocated cells computed as below:

$U_i \& V_j$	$0 + 6 = 6$	$0 + 9 = 9$	$0 + 13 = 13$	$0 + 5 = 5$	0
0	6	9	13	7	0
$6 - 6 = 0$	6	10	11	5	0
$4 - 6 = -2$	4	7	14	8	0

Table 2 = $U_i + V_j$ for unallocated cells computed as below:

$6 + 0 = 6$			$5 + 0 = 5$	
	$9 + 0 = 9$	$13 + 0 = 13$		0
		$13 - 2 = 11$	$5 - 2 = 3$	-2

Table 3 = Net Evaluation Table (NET) = Table 1 – Table 2 for unallocated cells is computed below:

$6 - 6 = 0$			$7 - 5 = 2$	
	$10 - 9 = 1$	$11 - 13 = -2$		0
		$14 - 11 = 3$	$8 - 3 = 5$	$0 - (-2) = 2$

Since there is a negative element in the NET, allocation is not optimal. The loop is created as below –

0	+ve		-ve	2	
-ve		1	-2 (origin) +ve		0
+ve		-ve	3	5	2

Of the above, the existing allocations to the negative corners of the loop are identified. The least of them is 1000.

ABFS 1: The new $U_i + V_j$ for allocated cells is computed from the above re-allocation (Selected Quantity = 1,000)

$U_i \& V_j$	$0 + 6 = 6$	$0 + 9 = 9$	$0 + 13 = 13$	$0 + 7 = 7$	0
0	6	9	13	7	0
$11 - 13 = -2$	6	10	11	5	0
$7 - 9 = -2$	4	7	14	8	0

Table 2 = $U_i + V_j$ for unallocated cells computed as below:

$6 + 0 = 6$			$7 + 0 = 7$	
$6 - 2 = 4$	$9 - 2 = 7$			$0 - 2 = -2$
		$9 - (-2) = 11$	$7 - 2 = 5$	$0 - 2 = -2$

Table 3 = Net Evaluation Table (NET) = Table 1 – Table 2 for unallocated cells is computed below:

$6 - 6 = 0$			$7 - 7 = 0$	
$6 - 4 = 2$	$10 - 7 = 3$			$0 - (-2) = 2$
		$14 - 11 = 3$	$8 - 5 = 3$	$0 - (-2) = 2$

Since all NET entries ≥ 0 , ABFS-1 is optimal. However, 2 Alternative Solutions exist (since there are 2 zeroes in NET).

Computation of Maximum Profit: (from the profit matrix formulated first and ABFS-1 above)

	X	Y	W	Z	Dummy
A		$9 \times 2000 = 18,000$	$13 \times 3500 = 45,500$		$0 \times 500 = 0$
B			$11 \times 1000 = 11,000$	$5 \times 5000 = 15,000$	
C	$4 \times 4000 = 16,000$	$7 \times 2000 = 14,000$			

Maximum Profit = Total of above = **Rs.1,29,500**

Question 6(b) & (c): JIT, MRP & ERP, Costing of Service Sector – Theory

4 Marks each

6(b)	Mention the data required to operate the Material Requirement Planning system.	Solution: Page 11.9, Q.No.21
6(c)	"Customer profile is important in charging cost." Explain this statement in the light of Customer Costing in Service Sector.	Solution: Page 5.4, Q.No.7

Question 7(a): Decision Making

12 Marks

A Company has two divisions, Division A and Division B. Both divisions of the Company manufacture the same product but located at two different places. The annual output of Division A is 6,000 tons (at 80% capacity) and that of Division B is 7,500 tons (at 60% capacity). The basic Raw Material required for production is available locally at both the places, but at Division A, it is limited to 4,000 tons per annum at the rate of Rs.100 per ton, at Division B, it is limited to 8,000 tons per annum at the rate of Rs.110 per ton. Any additional requirement of Material will have to be purchased at a rate of Rs.125 per ton from other markets at either of division. Variable Costs per ton at each division remain constant. For every 1,000 tons of output, 800 tons Raw Material is required. The details of other costs of the divisions are as follows:

Particulars	Division A	Division B
Other Variable Costs of output (Rs.)	122 per ton	120 per ton
Fixed Cost per annum (Rs.)	3,80,000	6,00,000

Required:

- Calculate Variable Cost per ton for each division's product and decide ranking in order of preference.
- The Company desires to fully utilize the available local supplies of Raw Material to save the Overall Variable Cost of production, keeping the total production of both the divisions putting together is the same as at present level. Calculate the quantity of production (output) that could be transferred between the two divisions and overall saving in Variable Cost.
- After considering the option (ii), how the balance capacity should be utilized, if the Company is working at 100% capacity, and also calculate Selling Price per ton, if Company wants a mark-up 10% on full cost of each division's product.

Solution:

Similar to Page 3.13 Illustration 2

N 01 Question Modified

1. Computation of Variable Cost per Ton

Particulars	Division A	Division B	Total
1. Annual Output	6,000 Tons	7,500 Tons	13,500 Tons
2. Raw Material required	$6,000 \times 80\% = 4,800$ Tons	$7,500 \times 80\% = 6,000$ Tons	10,800 Tons
3. Raw Materials available locally	(Given) 4,000 Tons	(Given) 8,000 Tons	12,000 Tons
4. Cost of RM purchased locally	$4,000 \text{ Tons} \times \text{Rs.}100 = \text{Rs.}4,00,000$	$6,000 \text{ Tons} \times \text{Rs.}110 = \text{Rs.}6,60,000$	Rs.10,60,000
5. Cost of RM Purchased from other markets	$800 \text{ Tons} \times \text{Rs.}125 = \text{Rs.}1,00,000$	Nil	Rs.1,00,000
6. Total Cost of RM purchased (4 + 5)	Rs.5,00,000	Rs.6,60,000	Rs.11,60,000
7. Other Variable Cost	$6,000 \text{ tons} \times \text{Rs.}122 = \text{Rs.}7,32,000$	$7,500 \text{ tons} \times \text{Rs.}120 = \text{Rs.}9,00,000$	Rs.16,32,000
8. Total Variable Cost	Rs.12,32,000	Rs.15,60,000	Rs.27,92,000
9. Cost per ton of output	205.33	208.00	
10. Rank based on priority	I	II	

2. Quantity of production based on Local Purchases

Present Total Output = 6,000 + 7,500 = 13,500 Tons. This should be retained only by local supplies, as under:

Particulars	Division A	Division B	Total
1. Present Output (FG)	6,000 Tons	7,500 Tons	13,500 Tons
2. Capacity Utilisation	80%	60%	
3. Total Capacity of Output (FG)	$6,000 \div 80\% = 7,500$ Tons	$7,500 \div 60\% = 12,500$ Tons	
4. Raw Material available locally	4,000 Tons	8,000 Tons	
5. Possible Production from locally available Raw Material	$4,000 \text{ Tons} \div 80\% = 5,000$ Tons	$8,000 \text{ Tons} \div 80\% = 10,000$ Tons	
6. Revised Output using local purchases only (Total = 13,500 MT)	5,000 Tons (maximum)	8,500 Tons (balancing figure)	

Particulars	Division A	Division B	Total
7. Cost of Material Purchases	4,000 Tons × Rs.100 per Ton = Rs.4,00,000	8,500 tons × 80% × Rs.110 = Rs.7,48,000	Rs.11,48,000
8. Other Variable Costs	5,000 Tons × Rs.122 per Ton = Rs.6,10,000	8,500 MT × Rs.120 = Rs.10,20,000	Rs.16,30,000
9. Total Variable Costs (7 + 8)	Rs.10,10,000	Rs.17,68,000	Rs.27,78,000

Overall Savings in Variable Costs = Rs.27,92,000 – Rs.27,78,000 = Rs.14,000

3. If Company is working at 100% Capacity

	Particulars	Division A	Division B	Total
1.	100% Capacity Finished goods Output	7,500 Tons	12,500 Tons	20000 Tons
2.	Raw Material required at 80% thereon	6,000 Tons	10,000 Tons	
3.	(a) Raw Material locally (max)	4,000 Tons	8,000 Tons	
	(b) Balance RM purchased at other mkts(2 – 3a)	2,000 Tons	2,000 Tons	
4.	Cost of locally purchased Raw Material	4,000 Tons x Rs.100 = Rs.4,00,000	8,000 Tons x Rs.110 = Rs.8,80,000	12,80,000
5.	Cost of Raw Material purchased at other mkts	2,000 Tons x Rs.125 = Rs.2,50,000	2,000 Tons x Rs.125 = Rs.2,50,000	5,00,000
6.	Other Variable. Costs	7,500 Tons x Rs.122 = Rs.9,15,000	12,500 Tons x Rs.120 = Rs.15,00,000	24,15,000
7.	Fixed Costs (given)	Rs.3,80,000	Rs.6,00,000	9,00,000
8.	Total Costs (4+5+6+7)	Rs.19,45,000	Rs.32,30,000	51,75,000
9.	Add: Mark-up at 10% on full Cost	Rs.1,94,500	Rs.3,23,000	5,17,500
10.	Desired Sales Value	Rs.21,39,500	Rs.35,53,000	56,92,500
11.	Average Selling Price per ton (10 ÷ 1)	Rs.285.27	Rs.284.24	284.63

Question 7(b): Learning Curve

4 Marks

Explain the distinctive features of Learning Curve theory in manufacturing environment.

Solution:

Refer Page 19.1, Q.No.3

ज्ञानमेव प्रदीपः
KNOWLEDGE IS LIGHT