Guideline Answers to Nov 2014 Exam Questions CA Final ADVANCED MANAGEMENT ACCOUNTING

Question 1 is compulsory **(4 × 5 = 20 Marks)**
Answer **any five** questions from the **remaining six** questions **(16 × 5 = 80 Marks).** [Answer any 4 out of 5 in Q.7]

Question 1(a): Marginal Costing – Basics **5 Marks**

A Shoe Manufacturer has a Net Profit of ₹ 25 per pair on a Selling Price of ₹ 143. He is producing 6,000 pairs per annum which is 60% of the potential capacity. The cost per unit is as under:

Direct Materials	**35.00**
Direct Wages	**12.50**
Works Overheads (50% fixed)	**62.50**
Administrative Overheads (75% fixed)	**6.00**

During the current year, the Manufacturer also estimates demand of 6,000 pairs but anticipates that the Fixed Charges to go up by 10% while the rate of Direct Labour and Direct Materials will increase by 8% and 6% respectively. But he has no option of increasing the Selling Price. Under this situation he obtains an offer to utilize further 20% of capacity. What Minimum Price will you recommend to ensure an overall profit of ₹ 1,67,300?

Solution: **See Principles in Chapter 2 Padhuka's – A Ready Referencer on Advanced Management Accounting**

1. Present Cost Analysis

Particulars	Cost per Pair (₹)	Variable Cost per Pair (₹)	Fixed Cost per Pair (₹)
Direct Materials	35.00	100% = 35.00	–
Direct Wages	12.50	100% = 12.50	–
Works OH	62.50	50% = 31.25	50% = 31.25
AOH	6.00	25% = 1.50	75% = 4.50
SOH **(bal.fig)**	2.00	(assumed fully Variable) 100% = 2.00	–
Total Cost (bal.fig)	**118.00**		**35.75**
Add: Profit	Given = 25.00		
Sale Price	**Given = 143.00**		

Present Total Fixed Cost = 6000 Pairs × ₹ 35.75 per pair = **₹ 2,14,500.** (**Note:** 2 alternative assumptions exist.)

2. Proposed Costs

Particulars		₹ per pair
Variable Costs:	Direct Materials	35 + 6% = 37.10
	Direct Wages	12.50 + 8% = 13.50
	Works OH	Same = 31.25
	Admin OH	Same = 1.50
	SOH	Same = 2.00
Total Variable Cost per pair		**85.35**

Revised Contribution per pair = Selling Price – Variable Cost = 143 (–) 85.35 = **₹ 57.65.**

Total Fixed Cost = ₹ 2,14,500 + 10% = ₹ 2,35,950.

3. Selling Price of the Offer for required profit of ₹ 1,67,300

Computation	Result
(a) Required Contribution = Fixed Cost + Required Profit = ₹ 2,35,950 + ₹ 1,67,300	= **₹ 4,03,250**
(b) Contribution from Existing Customers = 6000 pairs × ₹ 57.65	= ₹ 3,54,900
(c) Contribution required from New Order = (a–b)	= ₹ 57,350
(d) New Order Quantity = $\frac{6,000}{60\%} \times 20\%$	= 2,000 Pairs

Computation	Result
(e) Contribution per pair from New Order = $\frac{57,350}{2,000}$	= ₹ 28.675
(f) Required Minimum Sale Price = VC + Contribution = ₹ 28.675 + ₹ 85.35	= ₹ 114.025

Note: Possible Alternative Approaches:

1. Present Fixed Cost can also be taken at 100% Capacity = $\frac{6000}{60\%}$ pairs × ₹ 35.75 = ₹ 3,57,500.
2. SOH may be assumed as fully fixed.

Question 1(b): Balanced Score Card **5 Marks**

ABC Ltd has supermarkets located in most towns and cities. Over the last few year, profits have fallen. ABC Ltd has recognized that customer care has been paid insufficient attention. ABC Ltd has now realized the importance of the customer experience at its supermarkets. ABC Ltd has introduced a loyalty card scheme that rewards customer with discount vouchers based on their spend and buying patterns at supermarkets in an attempt to earn the loyalty of its customers. The management of ABC Ltd is considering the introduction of a Balanced Scorecard approach to manage the performance of its scores.

Required: Recommend an Objective and a suitable Performance Measure for each of 3 Non–Financial Perspectives of a Balanced Scorecard that ABC Ltd could use to support its new strategy of improving the customer experience. You should state 3 Perspectives, an Objective and a Performance Measure for each one of the 3 Perspectives.

Solution: Refer Page 14.13, Q.11 of Padhuka's – A Ready Referencer on Advanced Management Accounting

Perspective	Goals	Performance Measure
Customer Perspective	• Quality • Support	• Response time for Acceptance of Discount Vouchers at various Super Markets, • No. of "Card Decline" Responses.
Internal Business Perspective	Sales Penetration	Number of New Customers in a period.
Innovation and Learning Perspective	Technology & Cost Leadership	• Card Usage Performance, compared to competitors. • Reduction in Average Cost per Card.

Question 1(c): Network Analysis **5 Marks**

State the type of errors in logical sequencing that may arise while drawing a Network diagram.

Solution: See Page 19.4, Q.10 of Padhuka's – A Ready Referencer on Advanced Management Accounting

(a) Looping, (b) Dangling, (c) Duplication, (d) Reverse flow of time, etc.

Question 1(d): Pricing – ROCE, Required Profit, etc. **5 MARKS**

An IT Company produces a CD, particulars of which are detailed below:

Annual Production (units)	**40,000**
Cost per annum (₹)	
(i) Material	**1,00,000**
(ii) Other Variable Cost	**1,20,000**
(iii) Fixed Cost	**80,000**
Apportioned Investment	**3,00,000**

Determine the Unit Selling Price under 2 strategies mentioned below. Assume Company's Tax Rate as 30%

(a) 20% Return on Investment

(b) 6% Profit on List Price, when Trade Discount is 40%.

Solution:

Similar to Page 3.20, Q.9 of Padhuka's – A Ready Referencer on Advanced Management Accounting [M 06]

1. Computation of Selling Price to fetch 20% ROI (post tax)

Particulars	₹
(a) Desired Post Tax ROI at 20% on Given Investment of ₹ 3,00,000	60,000.00
(b) Pre Tax Return, i.e. PBT (since Tax = 30%, PAT = ₹ 60,000 = 70%)	$\frac{60,000}{70\%}$ = 85,714.29
(c) Fixed Costs to be recovered	80,000.00
(d) Desired Contribution (b + c)	1,65,714.29
(e) Variable Costs (Materials + Others) = (1,00,000 + 1,20,000)	2,20,000.00
(f) Desired Sales Revenue (d + e)	3,85,714.29
(g) Production and Sales Quantity	40,000 units
(h) Desired Selling Price per unit (f ÷ g)	**₹ 9.64 per unit**

2. Computation of Selling Price to fetch 6% Profit (post tax) on List Price

	Particulars	₹
	Let List Sale value of 40,000 units = P	P
Less:	Trade Discount at 40%	0.4 P
	Actual Sale Value	0.6 P
Less:	Variable Costs (Materials + Others) = (1,00,000 + 1,20,000)	2,20,000
	Contribution	0.6 P – 2,20,000
Less:	Fixed Costs	80,000
	PBT	0.60 P – 3,00,000
Less:	Tax at 30%	0.18 P – 90,000
	PAT	**0.42P – 2,10,000**

Since PAT must be equal to 6% of List Price, the equation is 0.42 P – 2,10,000 = 0.06 P

Solving this equation, we get P = 5,83,333. Hence, Desired List Price = $\frac{5,83,333}{40,000 \text{ units}}$ = **₹ 14.58 p.u.**

So, Net Selling Price = ₹ 14.58 – 40% = **₹ 8 .75 p.u.**

Question 2(a): Learning Curve – Acceptance of Incremental Orders **9 Marks**

A labour incentive product is made and sold by XY Ltd. Its labour force has a earning rate of 80%, applicable only to Direct Labour and not to Variable Overheads. The Cost per unit of the product is as follows:

Particulars	₹
Direct Materials	**20,000**
Direct Labour (@ ₹ 8 per hour)	**16,000**
Variable Overheads	**4,000**
Total Variable Cost	**40,000**

XY Ltd has received an order from P Ltd for 4 units of the product. Another customer, Q Ltd is also interested in purchasing 4 units of the product. XY Ltd has the capacity to fulfill both the orders. Q Ltd presently purchases this product in the market for ₹ 34,400 and is willing to pay this price per unit of XY Ltd's product. But P Ltd lets XY Ltd choose one of the following options:

(i) A price of ₹ 33,000 per unit for the 4 units it proposes to take from XY Ltd.

OR

(ii) Supply P Ltd's idle labour force to XY Ltd for only 4 units of production, with XY Ltd having to pay only ₹ 2 per Labour Hour to P Ltd's workers. P Ltd's workers will be withdrawn after the first 4 units are produced. In this case, XY Ltd need not use its labour for producing P Ltd's requirements. P Ltd assures XY Ltd that its labour force also has a Learning Rate of 80%. In this option, P Ltd offers to buy the product from XY Ltd at only ₹ 28,000 per unit.

P Ltd and Q Ltd shall not know of each other's offer.

If both orders came before any work started, what is the option that XY Ltd may choose? Present suitable calculations in favour of your arguments.

Solution:

Similar to Page No.20.5, Q.No.5 of Padhuka's – A Ready Referencer on Advanced Management Accounting [M 09]

1. Computation of Time required at various output levels

Total Units	**1**	**2**	**4**	**8**
Avg Hrs per unit	$\frac{₹16,000}{₹8 \text{ ph}}$ = 2,000 hours	2,000 × 80% = 1,600 hours	1,600 × 80% = 1,280 hours	1,280 × 80% = 1,024 hours

Note: Other Variable Costs per unit = Materials ₹ 20,000 + Variable OH ₹ 4,000 = ₹ 24,000 p.u.

2. Evaluation of Options available to the Company by accepting both P and Q Orders

	Option A: Use of own labour for all 8 units		**Option B: Use of own labour for 4 units (Q Order) and P Ltd Labour for 4 units**	
Particulars	**Q (4 units)**	**P (4 units)**	**Q (4 units)**	**P (4 units)**
(a) Selling Price per unit	₹ 34,400	₹ 33,000	₹ 34,400	₹ 28,000
(b) Var. Costs excluding Labour	₹ 24,000	₹ 24,000	₹ 24,000	₹ 24,000
(c) Labour Costs per unit	1,024 hours × ₹ 8 = ₹ 8,192	1,024 hours × ₹ 8 = ₹ 8,192	1,280 hours × ₹ 8 ph = ₹ 10,240	1,280 hours × ₹ 2 ph = ₹ 2,560
(d) Contribution pu (a – b – c)	₹ 2,208	₹ 808	₹ 160	₹ 1,440
(e) Total Contribution	**₹ 8,832**	**₹ 3,232**	**₹ 640**	**₹ 5,760**
	₹ 12,064		**₹ 6,400**	

Conclusion: Option A is preferable, due to higher contribution.

Question 2(b): Simulation – Stock Spoilage **7 Marks**

A Cake Vendor buys pieces of cake every morning at ₹ 4.50 each by placing his order one day in advance and sells them at ₹ 7.00 each. Unsold Cake can be sold next day at ₹ 2.00 per piece and there after it should be treated as no value. The pattern for demand of cake is given below:

Fresh Cake:

Daily Sale	**100**	**101**	**102**	**103**	**104**	**105**	**106**	**107**	**108**	**109**	**110**
Probability	**.01**	**.03**	**.04**	**.07**	**.09**	**.11**	**.15**	**.21**	**.18**	**.09**	**.02**

One day old Cake:

Daily Sale	**0**	**1**	**2**	**3**
Probability	**.70**	**.20**	**.08**	**.02**

Use the following set of Random Numbers:

Fresh Cake	**37**	**73**	**14**	**17**	**24**	**35**	**29**	**37**	**33**	**68**
One day old Cake	**17**	**28**	**69**	**38**	**50**	**57**	**82**	**44**	**89**	**60**

The Vendor adopts the following rule. If there is no stock of cake with him at the end of previous day, he orders for 110 pieces otherwise he orders 100 or 105 pieces whichever is nearest actual fresh cake sale in the previous day. Starting with zero stock and a pending order of 105 pieces, stimulate for 10 days and calculate vendor's profit.

Solution:

Similar to Pg No.21.13, Q.No.12 of Padhuka's – A Ready Referencer on Advanced Management Accounting [N 13]

1. Random Number Table for Fresh Cake

Daily Sale (Demand)	**Probability**	**Cumulative Probability**	**Random Numbers**
100	0.01	0.01	00 – 00
101	0.03	0.04	01 – 03
102	0.04	0.08	04 – 07
103	0.07	0.15	08 – 14
104	0.09	0.24	15 – 23
105	0.11	0.35	24 – 34
106	0.15	0.50	35 – 49
107	0.21	0.71	50 – 70
108	0.18	0.89	71 – 88
109	0.09	0.98	89 – 97
110	0.02	1.00	98 – 99

2. Random Number Table for One Day Old Cake

Daily Sale (Demand)	Probability	Cumulative Probability	Random Numbers
0	0.70	0.70	00 – 69
1	0.20	0.90	70 – 89
2	0.08	0.98	90 – 97
3	0.02	1.00	98 – 100

3. Simulation Table

Day	Fresh Cake		Old Cakes		Opg. Stock	Purch	Sale of Fresh Cakes = Demand	Sale of Old Cakes = Demand	Cl. Stock	Loss
	R.No.	DD	R.No.	DD						
1	37	106	17	0	0	105	105	0	0	0
2	73	108	28	0	0	110	108	0	2	0
3	14	103	69	0	2	105	103	0	2	2
4	17	104	38	0	2	105	104	0	1	2
5	24	105	50	0	1	105	105	0	0	1
6	35	106	57	0	0	110	106	0	4	0
7	29	105	82	1	4	105	105	1	0	3
8	37	106	44	0	0	110	106	0	4	0
9	33	105	89	1	4	105	105	1	0	3
10	68	107	60	0	0	110	107	0	3	0
						1070	**1054**	**2**		**11**

Note: Fresh Cake Sale Quantity is the least of – (i) Fresh Cake Demand, or (ii) Purchases of that day.
Closing Stock is the difference between Fresh Purchase and Sale of Fresh Cakes of the day.
Loss is the number of Unsold Cakes of the previous day.

4. Computation of Profit

	Sale of Fresh Cakes	= 1054 Cakes × ₹ 7 =₹ 7,378
	Sale of Old Cakes	= 2 Cakes × ₹ 2 = ₹ 4
	Total Sales	**₹7,382**
(–)	Cost of Cakes Sold	= (1054+2) Cakes × ₹ 4.50 = (₹ 4,752)
(–)	Cost of Spoilt Cakes	= 11 Cakes × ₹ 2 = (₹ 22)
	Profit	**₹ 2,608**

Note: Closing Stock of 3 Cakes assumed as carried over. Alternatively, if it is assumed that 3 Cakes of Closing Stock is not saleable, Profit = ₹ 2,608 – (3 × ₹ 4.50) = **₹ 2,594.50**

Question 3(a): Linear Programming – Graphical Method **8 Marks**

A Market Advertising Firm desires to reach two type of audiences – customer of annual income of more than ₹ 50,000 (Target Audience A) and customers with annual income of less than ₹ 50,000 (Target Audience B).

The total Advertising Budget is ₹ 2,000 Crores. One programme of TV Advertising costs ₹ 500 Crores and one programme on Radio Advertising costs ₹ 200 Crores. Contract conditions ordinarily require that there should be atleast 3 programmes for TV and the number of programmes on radio must not exceed 5. Survey indicates that a single TV programme reaches 7,50,000 customers in Target Audience A and 1,50,000 in Target Audience B. One Radio Programme reaches 40,000 customers in Target Audience A and 2,60,000 customers in Target Audience B.

Formulate this as a LPP and determine the media mix to maximize the total reach using graphic method.

Solution: **See Qns from Page 18.36 onwards of Padhuka's – A Ready Referencer on Advanced Mgmt Accounting**

Let X and Y be the no. of advertisements in TV and Radio. The LPP is as under:

Maximise $Z = 9,00,000X + 3,00,000Y$ (Maximisation of Reach)

[Total Reach of TV = 7,50,000 + 1,50,000 = 9,00,000, Total Reach of Radio = 2,60,000 + 40,000]

Subject to: $500X + 200Y \leq 2,000$ (Total Advertising Budget)

$X \geq 3$ (Atleast 3 Programmes for TV)

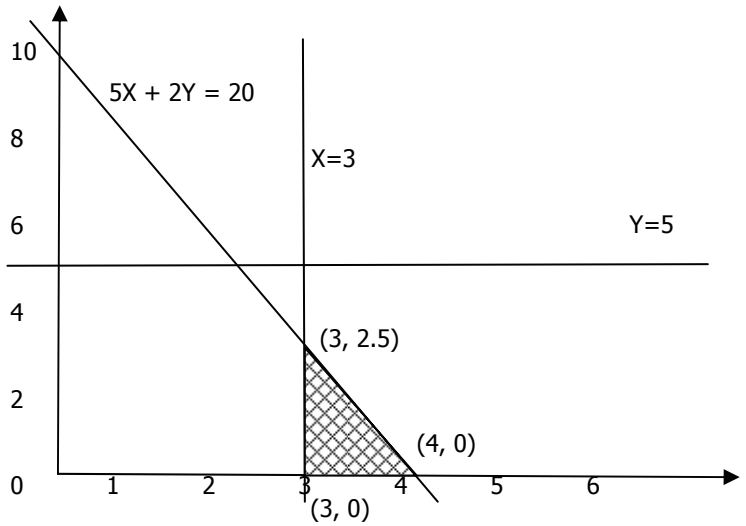
$Y \leq 5$ (No. of Programmes on Radio not to exceed 5)

$X, Y \geq 0$ (Non–Negativity Assumption)

Since two points are required / sufficient to depict a straight line, each of the above inequations are depicted graphically by determining atleast two co–ordinates / points in the graph. The co–ordinates are determined by setting one variable = 0 and determining the other variable, as under –

	Constraint	When X = 0	When Y = 0	Co–ordinates
1.	500X + 200Y = 2000	Y = 10	X = 4	(0, 10), (4, 0)
2.	X = 3			Parallel to Y Axis
3.	Y = 5			Parallel to X Axis
4.	X, Y = 0			Horizontal and Vertical Axes

The above co–ordinates are depicted and the feasible region is identified on the graph as under:



Value of Z at different corners of feasible region

Point	Value of Z = 9,00,000 X + 3,00,000 Y
(3, 2.5)	34,50,000
(3, 0)	27,00,000
(4, 0)	**36,00,000 (maximum)**

Maximum Z = 36,00,000.

Answer: The Firm should give 4 Programmes on TV to maximize its reach to Target Audience A and B.

Question 3(b): Marginal Costing – Multiple Key Factor – Product Mix Decision **8 Marks**

On the basis of the following information determine the product–mix to give the highest profit, if atleast two products are produced:

Product	X	Y	Z
Raw Material per unit (kg)	20	12	30
Machine Hours per unit (hours)	3	5	4
Selling Price per unit (₹)	500	400	800
Maximum limit of production (units)	1500	1500	750

Only 9,200 hours are available for production at a cost of ₹ 20 per hour and maximum 50,000 kgs of material @ ₹ 20 per kg, can be obtained. (Only product mix quantities are to be shown, calculation of Total Profit at that product mix not required to be shown.)

Solution: **See Qns from Page 2.121 onwards of Padhuka's – A Ready Referencer on Advanced Mgmt Accounting**

1.Ranking Priority on Key Factor Resources

Product	X	Y	Z	Total
(a) Selling Price per unit (₹)	500	400	800	
(b) Material Cost per unit (₹)	20 × 20= 400	12 × 20= 240	30× 20= 600	
(c) Machine OH Cost per unit (₹)	3 × 20= 60	5× 20= 100	4× 20= 80	
(d) Contribution per unit (₹) (a – b – c)	**40**	**60**	**120**	
(e) Ranking on Contribution per unit	**III**	**II**	**I**	
(f) Contribution per kg of Raw Material (₹)	40 ÷ 20= 2	60 ÷ 12= 5	120 ÷ 30= 4	
(g) Ranking on Contribution per kg of RM	**III**	**I**	**II**	
(h) Contribution per Machine Hour (₹)	40÷3= 13.33	60 ÷ 5= 12	120 ÷ 4 = 30	
(i) Ranking on Contribution per Machine Hour	**II**	**III**	**I**	

Product	X	Y	Z	Total
(j) Maximum Production Quantity (units)	1,500	1,500	750	
(k) Max. Raw Material Usage (kg)	1,500×20=30,000	1,500×12=18,000	750 × 30= 22,500	**70,500**
(l) Max. Machine Hours Required (hours)	1,500 × 3= 4,500	1,500 × 5= 7,500	750 × 4= 3,000	**15,000**

2. Resource Allocation and Production Decision

Product	Raw Material	Machine Hours
(a) Throughput Accounting Ratio = $\frac{\text{Requirement}}{\text{Availability}}$	$\frac{70,500}{50,000}$ = **141%**	$\frac{15,000}{9,200}$ = **163%**
(b) Ranking based on Throughput Accounting Ratio	**II**	**I**
(c) Available Resource Quantity	50,000 kg	9,200 hours
(d) Resource Used for Z (I Rank on M/c Hrs, highest TA Ratio)	750 × 30= 22,500 kg	750 × 4= 3,000 hours
(e) Balance Resource Available for X and Y	27,500 kg	6,200 hours
(f) Resource Reqd for X (II Rank on M/c Hrs, highest TA Ratio)	1,500×20=30,000 kg	1,500 × 3= 4,500 hours
(g) Resource Allocation for X (least of e and f) based on RM	**27,500 kg**	**4,500 hours**
(h) Possible Production of X	27,500÷20= 1,375 units	4,500÷3= 1,500 units

Answer: Effective Production of X = least of (h) = 1,375 units. Hence, Product Mix is X: 1,375 units, Z:750 units.

Question 4(a): Transfer Pricing **10 Marks**

X Division and Y Division are two divisions in the XY Group of Companies. X Division manufactures one type of component which it sells to external customers and also to Y Division.

Details of X Division are as follows:

Market Price per component	**₹ 300**
Variable Cost per component	**₹ 157**
Fixed Costs	**₹ 20,62,000 per period**
Demand from Y Division	**20,000 components per period**
Capacity	**35,000 components per period**

X Division assembles one type of product which it sells to external customer. Each unit of that product requires two of the components that are manufactured by X Division.

Details of Y Division are as follows:

Selling Price per unit		**₹ 1,200**
Variable Cost per unit:	**Two Components from X**	**2 @ Transfer Price**
	Other Variable Costs per unit	**₹ 375**
Fixed Costs		**₹ 13,50,000 per period**
Demand		**10,000 units per period**
Capacity		**10,000 units per period**

Group Transfer Pricing Policy:

- **Transfers must be at Opportunity Cost.**
- **Y must buy the components from X.**
- **X must satisfy demand from Y before making external sales.**

Required:

(1) Calculate the Profit for each division if the External Demand per period for the components that are made by X Division is:
(i) 15,000 Components, (ii) 19,000 Components, and (iii) 35,000 Components

(2) Calculate the financial impact on the Group if Y Division ignored the transfer pricing policy and purchased all for the 20,000 components that it needs from an External Supplier for ₹ 255 each. Your answer must consider the impact at each of the three levels of demand (15,000, 19,000 and 35,000 Components) from External Customers for the component manufactured by X Division.

Solution:

Similar to M 14 Qn in Padhuka's – A Ready Referencer on Advanced Management Accounting [M 14]

1. Computation of Weighted Average Transfer Price

Particulars	Situation A	Situation B	Situation C
1. Total Capacity	35,000	35,000	35,000
2. External Demand (given)	15,000	19,000	35,000
3. Demand from Division Y	20,000	20,000	20,000
4. Total Requirement (2 + 3)	35,000	39,000	55,000
5. **Shortfall** in meeting external demand **[4 – 1]**	**Nil**	**4,000**	**20,000**
6. Opportunity Cost = Contribution Lost (₹ 300 – ₹ 157)	–	4,000 × ₹ 143 = ₹ 5,72,000	20,000 × ₹ 143 = ₹ 28,60,000
7. Average Opportunity Cost pu of Internal Transfer (6 ÷ 3)	**₹ Nil**	**₹ 28.60**	**₹ 143**
8. Average Transfer Price pu of Internal Transfer = Variable Cost ₹ 157 p.u. + Opportunity Cost (from 7)	157 + Nil = **₹ 157.00**	157 + 28.60 = **₹ 185.60**	157 + 143 = **₹ 300.00**

2(a) Profit Statement for Division X (based on above TP) **(amounts in ₹)**

Particulars	Situation A	Situation B	Situation C
Contribution from Outside Sales at ₹ 143 pu	15,000 × ₹ 143 = ₹ 21,45,000	15,000 × ₹ 143 = ₹ 21,45,000	15,000 × ₹ 143 = ₹ 21,45,000
Contribution from Internal Transfer	20,000 × ₹ Nil = ₹ Nil	20,000 × ₹ 28.60 = ₹ 5,72,000	20,000 × ₹ 143 = ₹ 28,60,000
Total Contribution	**₹ 21,45,000**	**₹ 27,17,000**	**₹ 50,05,000**
Less: Fixed Cost (given)	(20,62,000)	(20,62,000)	(20,62,000)
Profit	**₹ 83,000**	**₹ 6,55,000**	**₹ 29,43,000**

Note: In all cases, Internal Transfer will be 20,000 units since Internal Transfer will be met first as per Company policy. Contribution from External Sales will be equal to the Opportunity Cost included in the Transfer Price as per **WN 1.** External Sales will be 15,000 units in all cases, since Internal Demand is satisfied first.

2(b) Profit Statement for Division Y (based on above TP) **(amounts in ₹)**

Particulars (for 10,000 units)	Situation A	Situation B	Situation C
1. Selling Price per unit	1,200	1,200	1,200
2. Own Variable Cost pu of Division Y	375	375	375
3. Transfer In Cost = 2 units × TP as above	2 × 157 = 314	2 × 185.60 = 371.20	2 × 300 = 600
4. Contribution per unit = 1 – 2 – 3	511	453.80	225
5. Total Contribution [10,000 units × (4)]	51,10,000	45,38,000	22,50,000
6. Fixed Cost (given)	(13,50,000)	(13,50,000)	(13,50,000)
7. **Profit** (5 – 6)	**37,60,000**	**31,88,000**	**9,00,000**

3(a) Profit Statement for Division X (if Y purchases all requirements from outside) **(amounts in ₹)**

Particulars	Situation A	Situation B	Situation C
Contribution from Outside Sales at ₹ 143 pu	15,000 × ₹ 143 = ₹ 21,45,000	19,000 × ₹ 143 = ₹ 27,17,000	35,000 × ₹ 143 = ₹ 50,05,000
Less: Fixed Cost (given)	(20,62,000)	(20,62,000)	(20,62,000)
Profit	**₹ 83,000**	**₹ 6,55,000**	**₹ 29,43,000**

Note: It can be observed that this will be the same Profit as in 2(a), since Transfers are made at **Opportunity Costs**, and External Sale Contribution is fully recovered by way of Transfer Price in 2(a).

3(b) Profit Statement for Division Y (if Y purchases all requirements from outside) **(amounts in ₹)**

Note: Contribution p.u. = SP 1200 (–) Own VC 375 (–) Bought in Cost 2 × ₹ 255 = 510 = ₹ 315 pu.

Particulars	Situation A	Situation B	Situation C
Total Contribution [10,000 units × 315]	31,50,000	31,50,000	31,50,000
Less: Fixed Cost (given)	(13,50,000)	(13,50,000)	(13,50,000)
Profit	**18,00,000**	**18,00,000**	**18,00,000**

4. Summary of Group Profit and Financial Impact (amounts in ₹)

Particulars	Situation A	Situation B	Situation C
Group Profit if Internal Transfers are made (WN 2a + WN 2b)	83,000 + 37,60,000 = 38,43,000	6,55,000 + 31,88,000 = 38,43,000	29,43,000 + 9,00,000 = 38,43,000
Group Profit if Y purchases from Outside Supplier (WN 3a + WN 3b)	83,000 + 18,00,000 = 18,83,000	6,55,000 + 18,00,000 = 24,55,000	29,43,000 + 18,00,000 = 47,43,000
Difference in Profit	Reduction **₹ 19,60,000**	Reduction **₹ 13,88,000**	Increase **₹ 9,00,000**
Reconciliation / Reasoning for difference in Profit (See **Note** below)	(157 – 255) × 20,000 = Reduction ₹ 19,60,000	(185.6 – 255) × 20,000 = Reduction ₹ 13,88,000	(300 – 255) × 20,000 = Increase ₹ 9,00,000
Whether External Buying worthwhile?	**No**	**No**	**Yes**

Note: Since Transfers are made at Opportunity Costs, i.e. Relevant Costs of Make, the reason for difference in Profit = [Difference between Transfer Price (in 3 situations) and External Buying Price ₹ 255] × 20,000 units Buy–In Quantity.

Question 4(b): Network Analysis **6 Marks**

The activities involved in a project are detailed below: Duration (Weeks)

Job	Optimistic	Most likely	Pessimistic
1–2	**3**	**6**	**15**
2–3	**6**	**12**	**30**
3–5	**5**	**11**	**17**
7–8	**4**	**19**	**28**
5–8	**1**	**4**	**7**
6–7	**3**	**9**	**27**
4–5	**3**	**6**	**15**
1–6	**2**	**5**	**14**
2–4	**2**	**5**	**8**

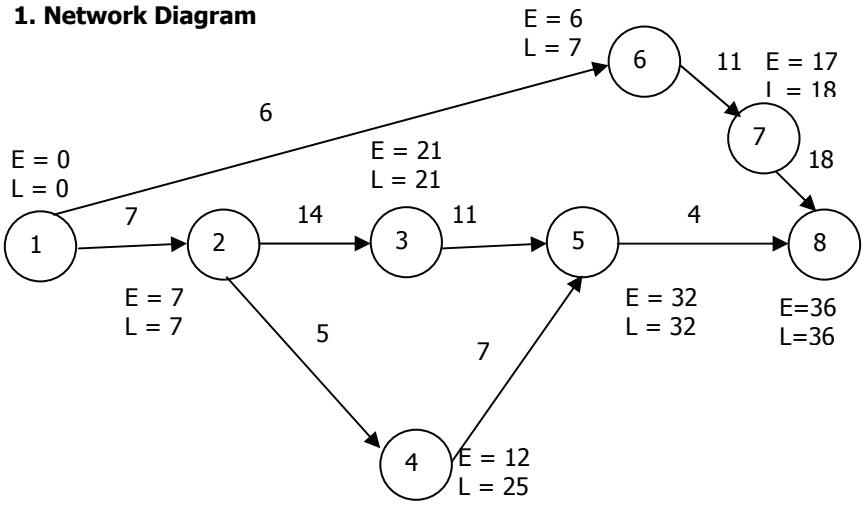
(a) Draw a Network Diagram.

(b) Find the Critical Path after estimating the earliest and latest event times for all nodes, expected project length, Variance of Critical Path, Standard Deviation of Critical Path.

(c) What will be the effect on current critical path if the most likely time of activity 3–5 gets revised to 14 instead of 11 weeks given above?

Solution: **See Illus. in Chapter 19 of Padhuka's – A Ready Referencer on Advanced Management Accounting**

1. Network Diagram



Path	Durations
1–6–7–8	6+11+18 = 35
1–2–3–5–8	7+14+11+4 = **36** (Max.)
1–2–4–5–8	7+5+7+4 = 23

Answer:
Critical Path is **1 – 2 – 3 – 5 – 8,** and Project Duration (Expected Project Length) is **36 weeks.**

Note: Duration of various activities are based on the Expected Time, computed as per the **Network Table.**

2. Network Table, for computing Expected Time and Variance

Activity	Time Estimates (Weeks)			Expected Time	Variance
(after re–arranging)	**Optimistic (t_o)**	**Most Likely (t_m)**	**Pessimistic (t_p)**	$t_e = \frac{t_o + 4t_m + t_p}{6}$	$s_t^2 = \left(\frac{t_p - t_o}{6}\right)^2$
1 – 2	3	6	15	7	4
1 – 6	6	12	30	14	16
2 – 3	5	11	17	11	4
2 – 4	4	19	28	18	16
3 – 5	1	4	7	4	1
4 – 5	3	9	27	11	16
5 – 8	3	6	15	7	4
6 – 7	2	5	14	6	4
7 – 8	2	5	8	5	1

Variance of the Critical Path = 1–2–3–5–8 = 4+16+4+1 = 25, hence Standard Deviation of Critical Path = $\sqrt{25}$ = 5

Effect on Current CP if the Most Likely Time of Activity 3–5 is revised to 14 instead of 11 weeks as given: Expected Duration of Activity 3–5 will be $t_e = \frac{t_o + 4t_m + t_p}{6} = \frac{5 + 4 \times 14 + 17}{6}$ **= 13 Weeks**. (instead of 11 weeks computed earlier).

As Activity 3–5 lies on the Critical Path, the Project Duration will increase by 2 weeks (13–11), and the Total Project Duration will become **38 weeks** (36+2).

Question 5(a): Standard Costing – Materials – Reverse Working **7 Marks**

Compute the missing data, indicated by question marks, from the following:

Particulars	Product A	Product B
Standard Price per unit (₹)	**24**	**30**
Actual Price per unit (₹)	**30**	**40**
Standard Input (kg)	**50**	**??**
Actual Input (kg)	**??**	**70**
Material Price Variance	**??**	**??**
Material Usage Variance (₹)	**??**	**600 (A)**
Material Cost Variance	**??**	**??**

Material Mix Variance for both product together was ₹ 90 Adverse.

Solution: Similar to Page 1.69, Q.38 of Padhuka's – A Ready Referencer on Advanced Management Accounting

1. Let SQ for Product B = Q units.
   Material Usage Variance for B = (SQ × SP) – (AQ × SP) = (Q × 30) – (70 × 30) = ₹ 600A.
   On solving, 30Q = 1500. Hence, **Q = 50**. Therefore, SQ for Product B = **50 Kg**.
2. SQ for Product A = 50 Kg. SQ for Product B = 50 Kg (as computed above). Hence, Std Mix is 1:1.
3. Let AQ of Product A be K Kg. Total AQ = (K + 70) units. Since Standard mix is 1:1, RAQ of A and B are each $\frac{(K + 70)}{2}$ and $\frac{(K + 70)}{2}$ respectively.
   It is given that Material Mix Variance = (RAQ × SP) – (AQ × SP) = ₹ 90A
   On substituting, we have, $[\frac{(K + 70)}{2} \times 24 + \frac{(K + 70)}{2} \times 30] - [(K \times 24) + (70 \times 30)] = -90$
   Upon simplifying, we have, 12K + 840 + 15K + 1050 – 24K – 2100 = –90.
   On solving the above, 3K = 120 or K = 40 units. Hence, **AQ for A = 40 Kg.**
4. Total AQ = 40 + 70 = 110 units. Rewriting 110 units in the ratio 1:1, RAQ for A and B is 55 units each.

5. Variance Computation Chart (**Note:** Quantities in Kg, Prices and Cost in ₹)

Particulars	SQ × SP	RAQ × SP	AQ × SP	AQ × AP
	(1)	(2)	(3)	(4)
Product A	(given) 50 × 24 = 1200	(WN 4) 55 × 24 = 1320	(WN 3) 40 × 24 = 960	(WN 3) 40 × 30 = 1200
Product B	(WN 1) 50 × 30 = 1500	(WN 4) 55 × 30 = 1650	(given) 70 × 30 = 2100	(given)70 × 40 = 2800
Total	**₹ 2,700**	**₹ 2,970**	**₹ 3,060**	**₹ 4,000**

Material **Yield** Variance = ₹ 2,700 – ₹ 2,970 = ₹ 270 A + Material **Mix** Variance = ₹ 2,970 – ₹ 3,060 = ₹ 90 A + Material **Price** Variance = ₹ 3,060 – ₹ 4,000 = ₹ 940 A

Material **Usage** Variance = ₹ 2,700 – ₹ 3,060 = ₹ 360 A + Material **Price** Variance b/fd as above = ₹ 940 A

Total Material **Cost** Variance = ₹ 2,700 – ₹ 4,000 = ₹ 1,300 A

Note: All Prices SP & AP are given in the question. SQ for A and AQ for B is also available in the question.

Material–wise Breakup of Variances:

Particulars	Product A	Product B	Total
(a) Yield Variance = Col.(1) – Col. (2)	₹ 120 A	₹ 150 A	₹ 270 A
(b) Mix Variance = Col.(2) – Col. (3)	₹ 360 F	₹ 450 A	₹ 90 A
(c) Usage Variance (a+b) = Col.(1) – Col. (3)	₹ 240 F	₹ 600 A	₹ 360 A
(d) Price Variance = Col.(3) – Col. (4)	₹ 240 A	₹ 700 A	₹ 940 A
(e) Total Material Cost Variance (c+d)= Col.(1) – Col. (4)	Nil	₹ 1,300 A	₹ 1,300 A

Question 5(b): Marginal Costing – Factory Closure and Transfer to another Factory **9 Marks**

A Manufacturing Company has three factories namely 'Factory A', 'Factory B', 'Factory C'. All three factories produce the same product which are sold at ₹ 750 per unit. The factory–wise estimates of operation results for 2014 are as follows: (₹ Lakhs)

Particulars		Factory A	Factory B	Factory C	Total
Sales		**600**	**2,400**	**1,200**	**4,200**
Costs:	**Raw Materials**	**150**	**700**	**290**	**1,140**
	Direct Labour	**150**	**560**	**280**	**990**
	Factory Overheads–Variable	**40**	**220**	**110**	**370**
	Factory Overheads–Fixed	**80**	**240**	**120**	**440**
	Selling Overheads–Variable	**46**	**140**	**80**	**266**
	Selling Overheads–Fixed	**30**	**100**	**60**	**190**
	Administrative Overheads	**40**	**180**	**80**	**300**
	Head Office Expenses	**24**	**100**	**60**	**184**
PROFIT		**40**	**160**	**120**	**320**

When the above estimates were under finalization, the Company's Legal Department advised that the lease of 'Factory A' was due to expire on 31st December 2013, and that it could be renewed by enhancing the Lease Rent by ₹ 24 Lakhs per annum.

Since this enhancement will have impact on the profitability of the Company, the Management is constrained to examine following proposals:

(i) Renew the lease and bear the impact.

(ii) Close down Factory 'A', sell off the Plant, Machinery and Stock, and liquidate all Liabilities including the Staff and Workers', pay Retrenchment Compensation from Sale Proceeds which are sufficient for the purpose.

In order however to maintain the customer relations, the total planned output of the Factory 'A' will be transferred EITHER Factory 'B' OR Factory 'C'. Plant Capacity is available at both the Factories to take over the manufacture. The additional cost involved in the manufacture of the extra output so transferred in Factory 'B' and 'C' are estimated as under:

	Factory B	Factory C
(a) Additional Fixed Overheads due to increase in capacity utilization (per annum)	**₹ 100 Lakhs**	**₹ 80 Lakhs**
(b) Additional Freight, Selling and Other Overheads to produce and distribute the output to the present customers of Factory 'A'	**₹ 50 per unit**	**₹ 70 per unit**

Prepare comparative statements of profitability in the aforesaid alternative courses of action and give your recommendations.

Solution: Similar to Page 2.45, Q.3.8 of Padhuka's – A Ready Referencer on Advanced Mgmt Accounting [RTP]

1. Cost and Contribution Analysis as per given Estimates (₹ Lakhs)

Particulars		Factory A	Factory B	Factory C	Total
(a) Sales		600	2,400	1,200	4,200
(b) Variable Costs:	Raw Materials	150	700	290	1,140
	Direct Labour	150	560	280	990
	Factory OH–Variable	40	220	110	370
	Selling OH–Variable	46	140	80	266
	Sub–Total Variable Costs	386	1,620	760	2,766
(c) Gross Contribution (a – b)		**214**	**780**	**440**	**1,434**
(d) PV Ratio (c ÷ a) of each Factory		**35.67%**	**32.5%**	**36.67%**	
(e) Specific Fixed Costs:	Factory OH–Fixed	80	240	120	440
	Selling OH–Fixed	30	100	60	190
	Administrative OH	40	180	80	300
	Sub–Total Specific Fixed Costs	**150**	**520**	**260**	**930**
(f) Net Contribution before HO Charges (c – e)		**64**	**260**	**180**	**504**

Note: HO Expenses are considered apportioned and hence not relevant for decision–making.

2. Evaluation of Options

Option 1: Renew the Lease: Revised Net Contribution = 504 (as above) **less** Extra Rent 24 = **₹ 480 Lakhs.**

Option 2 & 3: Transfer of Output to Factory B and C, evaluated as under –

Note: Quantity produced in Factory "A" = $\frac{600 \text{ Lakhs}}{750 \text{ p.u.}}$ **= 0.8 Lakh units.**

Particulars	Option 2: Transfer to "B"		Option 3: Transfer to "C"	
	B	C	B	C
(a) Contribution before Addnl VC	(2,400+600) × PVR 32.5% = 975	440	780	(1,200+600) × PVR 36.67% = 660
(b) Additional Variable Costs (**Note**)	0.8 × ₹ 50= 40	–	–	0.8 × ₹ 70= 56
(c) Revised Contribution (a – b)	**935**	**440**	**780**	**604**
(d) Fixed Costs: Given + Additional	520+100=620	260	520	260+80=340
(e) Net Cn before HO Charges (c – d)	**315**	**180**	**260**	**264**
	495		**524**	

Decision: Net Cn (before HO Charges) is highest in **Option 3**. Hence, the Company may transfer output to Factory **C**.

Question 6(a): Activity Based Costing **10 Marks**

A Company manufactures several products of varying designs and models. It uses a single Overhead Recovery Rate based on Direct Labour Hours. The Overheads incurred by the Company in the first half of the year are as under:

Particulars	₹
Machine Operation Expenses	**20,25,000**
Machine Maintenance Expenses	**3,75,000**
Salaries of Technical Staff	**12,75,000**
Wages and Salaries to Stores Staff	**5,25,000**

During this period, the Company introduced Activity Based Costing System. The following significant activities were identified:

(a) Receiving Materials and Components

(b) Set up of Machines for Production Runs

(c) Quality Inspection

It is also determined that:

(i) The Machine Operation and Machine Maintenance Expenses should be apportioned between Stores and Production Activity in 1:4 ratio.

(ii) Technical Staff Salaries should be apportioned between Machine Maintenance, Set–Up & Quality Inspection in 3:4:3 ratio.

The consumption of activities during the period under review are as under:

(i)	Direct Labour Hours worked	80,000
(ii)	Production set–ups	4,080
(iii)	Material and Components Consignments received from Suppliers	3920
(iv)	Number of Quality Inspections carried out	2560

The Direct Wage Rate ₹ 12 per hour.

The data relating to two products manufactured by the Company during the period are as under:

Particulars		P	Q
(i)	Direct Materials Costs	₹ 12,000	₹ 8,000
(ii)	Direct Labour Hours	960 Hrs.	100 Hrs.
(iii)	Direct Materials Consignments received	48 nos.	52 nos.
(iv)	Production Runs	36 nos.	24 nos.
(v)	Number Of Quality Inspections done	30 nos.	10 nos.
(vi)	Quantity Produced (Unit in nos.)	15,000	5,000

A potential customer has approached the Company for the supply of 24,000 units of a Component 'R' to be delivered in lots of 3,000 units per quarter. The job will involve an initial Design Cost of ₹ 60,000 and the manufacture will involve the following per quarter.

(i)	Direct Materials costs	₹ 12,000
(ii)	Direct Labour Hours	300 Hrs.
(iii)	Production Runs	6 nos.
(iv)	Inspections	24 nos.
(v)	Number of Consignments of Direct Materials to be received	20 nos.

You are required to –

1. **Calculate the Costs of Products P and Q based on the existing system of Single Overhead Recovery rate.**
2. **Determine the Cost of Product P & Q using Activity Based Costing System.**
3. **Compute the Sales Value per quarter of Component 'R' using Ativity Based Costing System. (considering a mark–up of 25% on Cost).**

Solution:

Similar to Page 8.16, Q.4 &9 Padhuka's – A Ready Referencer on Advanced Mgmt A/cing [M 03, M 05, M 11]

1. Computation of OH Recovery Rate

$$\text{OH Recovery Rate} = \frac{20,25,000+3,75,000+12,75,000+5,25,000}{80,000} = ₹\ 52.50 \text{ per DLH.}$$

2. Computation of ABC Rates

Activity	Receiving Material and Components	Set up	Quality Inspection
1. Wages & Salaries of Stores Staff	Direct = 5,25,000	–	–
2. Wages & Salaries of Tech.Staff	–	$\frac{4}{10}\times 12,75,000 = 5,10,000$	$\frac{3}{10}\times 12,75,000 = 3,82,500$
3. M/c Operation 20,25,000 + M/c Maint. 3,75,000 + $\frac{3}{10}$ from Tech. Staff 3,82,500=27,82,500 in **1:4**	5,56,500	22,26,000	–
Activity Cost Pool	**₹ 10,81,500**	**₹ 27,36,000**	**₹ 3,82,500**
Cost Driver and Quantity	3,920 Consignments	4,080 Set ups	2,560 Inspection
ABC Rate	₹ 275.89 per Consignment	₹ 670.59 per set up	₹ 149.41 per Inspection

3. Statement of Product Cost

Particulars	P (₹)	Q (₹)
1. Direct Cost		
(a) Materials	12,000	8,000
(b) Labour	960 hrs × 6 = 5,760	100 hrs × 6 = 600
Sub total Direct Cost	17,760	8,600
2. Indirect Cost under Traditional System	960 hrs × 52.50 = 50,400	100 hrs × 52.50 = 5,250
3. Total Cost under Traditional System (1+2)	**68,160**	**13,850**
4. Average Cost p.u under Traditional System	68,160 ÷ 15,000 = 4.544	13,850 ÷ 5000 = 2.77
5. Indirect Cost under ABC System		
(a) Receiving Materials	48 × 275.89 = 13,243	52 × 275.89 = 14,346
(b) Set up	36 × 670.59 = 24,141	24 × 670.59 = 16,094
(c) Quality Inspection	30 × 149.41 = 4,482	10 × 149.41 = 1,494
Total OH under ABC System	41,866	31,934
6. Total Cost under ABC System (1 + 5)	**59,626**	**40,534**
7. Average Cost p.u under ABC	59,626 ÷ 15,000 = 3.98	40,534 ÷ 5,000 = 8.11

4. Cost Sheet for New Component R

Particulars	₹
1. Direct Cost	
(a) Direct Materials	12,000.00
(b) Labour (300 hrs × 6)	1,800.00
(c) Design (Specifically incurred) = $\frac{60,000}{8 \text{ Quarters}}$	7,500.00
Sub Total Direct Cost	21,300.00
2. Indirect Cost	
(a) Receiving Material = (20 × 275.89)	5,517.80
(b) Set up (6 × 670.59)	4,023.54
(c) Quality Inspection (24 × 149.41)	3,585.84
Sub Total OH	13,127.18
Total Cost	**34,427.18**
Add: Markup = 25% on Cost	8,606.80
Selling Price	**43,033.98**

Question 6(b): Flexible Budgeting **6 Marks**

The following are the details regarding budgeted and actual production costs for the year 2013 of an industrial concern. You are required to prepare a Production Cost Budget for the year 2014.

	Budget		Actual	
Output (units)	**39,900**		**40,600**	
	Units	**₹**	**Units**	**₹**
Materials Consumed	**42,000**	**42,000**	**43,000**	**53,750**
Wages at 1 hour per unit at ₹ 1 per unit Budget	**–**	**39,900**	**–**	**44,660**
Variable Overhead at ₹ 1 per unit Budget	**–**	**19,950**	**–**	**20,600**
Fixed Overheads	**–**	**30,000**	**–**	**35,000**
Total		**1,31,850**		**1,54,010**

During the budget period:

(1) Production is expected to reach 50,000 units.

(2) Material Price are expected to increase further by the same percentage as they had increased over the budget period.

(3) Labour Rates are expected to increase by ₹ 0.20 per hour above the actual rates shown above; efficiency is expected to decline by 10%; upto 31st December 2013, there has been no decline in efficiency.

(4) Variable Overhead of previous year to be maintained.

(5) Fixed Overheads are expected to rise by 10% per annum.

(6) Wastage of Materials to be maintained at 2013 Budget level.

Solution:

Similar to Pg No.7.21, Q.No.11 of Padhuka's – A Ready Referencer on Advanced Management Accounting [N 08]

Production Cost Budget

Particulars	Computation	₹
Material Cost **(WN 1)**	Quantity × Price = 52,632 units × ₹ 1.56 p.u.	82,105.92
Labour Cost (**WN 2**)	Hours × Rate = 55,556 hours × ₹ 1.30 per hour	72,222.80
Variable OH	Same as previous year = $\frac{20,600}{40,600 \text{ units}} \times 50,000$ units	25,369.46
Fixed OH	₹ 35,000 + 10% thereon (based on Actuals)	38,500.00
	Total	**2,18,198.18**

WN 1: Material Costs for 2014

(a) **Quantity:** For 39,900 units of output, RM Consumed is 42,000 units.

So, for 50,000 units of Output, RM Consumed = $\frac{42,000}{39,900 \text{ units}} \times 50,000$ units = **52,632 units of RM**.

(b) **Price:** 2013 RM Price = $\frac{₹ 42,000}{42,000 \text{ units}}$ = ₹ 1, Actual Price = $\frac{₹ 53,750}{43,000 \text{ units}}$ = ₹ 1.25. So, Price Increase = 25%.

Hence, Revised Price of 2014 = 1.25 + 25% increase = **₹ 1.56 p.u.**

WN 2: Labour Costs for 2014

Particulars	Computation	Result
(a) Budgeted Hours for 2013	₹ 39,900 divided by ₹ 1 per hour	39,900 hours
(b) Actual Time of 2013 = Std Time Allowed for 40,600 units (Since no decline in efficiency in 2013)	$\frac{39,900}{39,900 \text{ units}} \times 40,600$ units	40,600 hours
(c) Actual Rate of 2013	= $\frac{₹ 44,660}{40,600 \text{ hours}}$	₹ 1.10 per hour
(d) Revised Wage Rate per hour of 2014	2013 Actuals + ₹ 0.20 per hour	₹ 1.30 per hour
(e) Revised Time for 2014	$\frac{1 \text{ hour per unit}}{90\% \text{ Efficiency}} \times 50,000$ units	55,556 hours.

Question 7: Answer any four out of the following five questions – Theory – Various Topics **4 X 4 = 16 Marks**

Question	Answer Reference
(a) In a Transportation Problem for Cost Minimization, there are 4 Rows indicating quantities demanded and these totals upto 1800 units. There are 4 Columns giving quantities supplied and these totals upto 2,100 units. What is the condition for a solution to be degenerate?	**Page 17.4, Q 10, M 12 Qn**
(b) Explain the concept of Relevancy of cost by citing three examples each of Relevant Costs and Non–Relevant Costs.	**Page 4.3, Q 7, M 04, N 08 Qn**
(c) How does the JIT approach help in improving an organization's Profitability?	**Page 13.3, Q 6**
(d) Briefly explain the phases in the Life Cycle of a product.	**Page 10.1, Q 3, N 11 Qn**
(e) How Customer Costing Is applied in Service Sector? Explain with example from any Service Sector Area.	**Page 6.3, Q 7, M 06 Qn**

STUDENTS' NOTES