FINAL CA – November 2017

ADVANCED MANAGEMENT ACCOUNTING

Test Code –
Branch (MULTIPLE) (Date : 04.06.2017)

(50 Marks)

Note : All questions are compulsory.

Question 1(5 Marks)

a. Under the Hungarian Assignment Method, the prerequisite to assign any job is that each row and column must have a zero value in its corresponding cells. If any row or column does not have any zero value then to obtain zero value, each cell values in the row or column is subtracted by the corresponding minimum cell value of respective rows or columns by performing row or column operation. This means *if any row or column have two or more cells having <u>same minimum value</u> then these row or column will have more than one zero.* However, having two zeros does not necessarily imply two equal values in the original assignment matrix just before row and column operations. *<u>Two zeroes in a same row can also be possible by two</u> <u>different operations</u> i.e. one zero from row operation and one zero from column operation*. **(2 ½ marks)**

b. The order of matrix in the assignment problem is 4 × 4. The total assignment (allocations) will be four. In the assignment problem when any allocation is made in any cell then the corresponding row and column become unavailable for further allocation. Hence, these corresponding row and column are crossed mark to show unavailability. In the given assignment matrix two allocations have been made in A24 (2nd row and 4th column) and A32 (3rd row and 2nd column). This implies that <u>2nd and 3rd row</u> and <u>2nd and 4th column</u> are unavailable for further allocation. Therefore, the other allocations are at either at **A11 and A43** or at **A13 and A41**. **(2 ½ marks)**

Question 2(8 Marks)

The cumulative average time *per batch* for the first 25 batches (3 marks)

The usual learning curve model is

$$y = ax^b$$

Where

y = Average time per batch (hours) for x batches

a = Time required for first batch (hours)

x = Cumulative number of batches produced

b = Learning coefficient

The Cumulative Average Time *per batch* for the first 25 batches

$$y = 1{,}000 \times (25)^{-0.322}$$
$$\log y = \log 1{,}000 - 0.322 \times \log 25$$
$$\log y = \log 1{,}000 - 0.322 \times \log (5 \times 5)$$
$$\log y = \log 1{,}000 - 0.322 \times [2 \times \log 5]$$
$$\log y = 3 - 0.322 \times [2 \times 0.69897]$$
$$\log y = 2.549863$$
$$y = \text{antilog of } 2.549863$$
$$y = 354.70 \text{ hours}$$

(ii) The time taken for the 25th batch(2 marks)

Total Time for first 25 batches	= 354.70 hours × 25 batches
	= 8,867.50 hours
Total Time for first 24 batches	= 359.40 hours × 24 batches = 8,625.60 hours
Time taken for 25th batch	= 8,867.50 hours − 8,625.60 hours
	= 241.90 hours

(iii) Average 'Selling Price' of the final 500 units(3 marks)

Particulars		Amount (`)
Direct Labour [(8,867.50 hrs. + 241.90 hrs. × 25 batches) × ` 6]		89,490
Add: Other Variable Costs (5,000 units × ` 19)		95,000
Add: Fixed Costs		40,000
Total Life Cycle Cost		2,24,490
Add: Desired Profit		80,000
Expected Sales Value		3,04,490
Less: Sales Value (4,500 units × ` 64)		2,88,000
Sales Value (Decline Stage)	...(A)	16,490
Sales Units (Decline Stage)	...(B)	500
Average Sales Price *per unit*	...(A)/(B)	32.98

Question 3(5 Marks)

Basis	Skimming Price	Penetration Pricing
Meaning	Pricing Policy of highly pricing a product at the entry level into the market and reducing it later.	Pricing Policy of entering the market with a low price, then establishing the product and then increasing the price.
Use	This method is preferred in the beginning because in the initial periods when the demand for the product is not known the price covers the initial cost of production.	This is used by companies with established markets, when products are in any stage of their life cycle, to avoid competition. This is also known as "stay-out pricing".
Target Market	It is used when market is price insensitive, demand inelastic or to recover high promotional costs	It is a policy of using a low price as the principal instrument for penetrating mass markets early.
Example	Electronic goods, mobile phone, TVs, etc.	Entry of a new model small segment car into the market.

Question 4(8 Marks)

Let the P_1, P_2 and P_3 be the three products to be manufactured. Then the data are as follows:

Products	Product ingredients			
	A	B	C	Inert Ingredients
P_1	5 %	10%	5%	80%
P_2	5%	5%	10%	80%
P_3	20%	5%	10%	65%
Cost per kg (`)	64	16	40	16

Cost of Product P_1

= 5% × `64 + 10% × `16 + 5% × `40 + 80% × `16 = `19.60 per kg

Cost of Product P2

= 5% × `64 + 5% × `16 + 10% × `40 + 80% × `16

= `20.80 per kg.

Cost of Product P3

= 20% × `64 + 5% × `16 + 10% × `40 + 65% × `16

= `28.00 per kg.

Let x_1, x_2, and x_3 be the quantity (in kg) of P_1, P_2, and P3 respectively to be manufactured. The LP problem can be formulated:

Objective function: **(2 marks)**

Maximize Z = (Selling Price − Cost Price) × Quantity of Product

= (`32.60 − `19.60) x_1 + (`34.80 − `20.80) x_2 + (`36.00 − 28) x_3

= $13x_1 + 14x_2 + 8x_3$

Subject to Constraints: (6 marks)

$1/20x_1 + 1/20x_2 + 1/5x_3 \le 100$

Or $x_1 + x_2 + 4x_3 \le 2{,}000$

$1/10x_1 + 1/20x_2 + 1/20x_3 \le 180$

Or $2x_1 + x_2 + x_3 \le 3{,}600$

$1/20\, x_1 + 1/10\, x_2 + 1/10\, x_3 \le 120$

Or $x_1 + 2x_2 + 2x_3 \le 2{,}400$

$x_1 \le 30$

and $x_1, x_2, x_3 \ge 0$

Question 5 (9 Marks)

Impact on Profit of Continuance of Production by Renewing the Lease (3 marks)

(`in lakhs)

	Factories			
	A	**B**	**C**	**Total**
Sales ...(A)	600	2,400	1,200	4,200
Less: Variable Cost				
Raw Material	150	700	290	1,140
Direct Labour	150	560	280	990
Factory Overheads (Variable)	40	220	110	370
Selling Overheads (Variable)	46	140	80	266
Total Variable Costs ...(B)	386	1,620	760	2,766
Contribution ...(C) = (A) – (B)	214	780	440	1,434
Less: Fixed Cost				
Factory Overheads (Fixed)	80	240	120	440
Selling Overheads (Fixed)	30	100	60	190
Administration Overheads	40	180	80	300
Head Office Expenses	24	100	60	184
Additional Lease Rent	24	--	--	24
Total Fixed Costs (D)	198	620	320	1,138
Profit (C)–(D)	16	160	120	296

The above statement shows that though profit is reduced from existing `320 lakhs to `296 lakhs, still factory 'A' generates a contribution towards head office expenses

(ii) Comparative Statements of Profitability (4 marks) (`in lakhs)

	When Production of Factory A is Transferred to Factory B			When Production of Factory A is Transferred to Factory C		
	B	**C**	**Total**	**B**	**C**	**Total**
Sales	3,000	1,200	4,200	2,400	1,800	4,200
Less: Variable Costs	2,065	760	2,825	1,620	1,196	2,816
Contribution	935	440	1,375	780	604	1,384
Less: Fixed Costs	720	320	1,040	620	400	1,020
Profit	215	120	335	160	204	364

Since transfer of production of factory 'A' to factory 'C' yields higher profit, i.e., `364 lakhs, this course is recommended.

Workings

Variable and Fixed Costs When the Production of Factory 'A' is Transferred to Factory 'B'-(1 mark)

(`in lakhs)

	Sales	Variable Costs	Fixed Costs
'B'	2,400	1,620	620
'A'	600	405 $\frac{\text{` } 1,620}{2,400} \times 600$	---
Additional Costs	---	40.00 (80,000* ×`50)	100
Total	3,000	2,065	720

(*) 80,000 units (`600 lakhs ÷ `750)

Variable and Fixed Costs when the Production of Factory 'A' is transferred to Factory 'C'-(1 mark)

(`in lakhs)

	Sales	Variable Costs	Fixed Costs
'C'	1,200	760	320
'A'	600	380 $\frac{\text{`}760}{1,200} \times 600$	---
Additional Costs	---	56 (80,000 ×`70)	80
Total	1,800	1,196	400

Question 6 (7 Marks)

Random No. Coding for Fresh Cake (1 mark)

No. of Cakes	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

Random No. Coding for One Day Old Cake (1 mark)

No. of Cakes	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 – 99

Let us simulate the sale of fresh and one day old cakes for the next ten days using the given random numbers / information.

Simulation Sheet (3 marks)

Day	R. No. of Fresh Cake	Fresh Stock	Demand	Sales Pcs.	Cl. Stock	Order Initiated	One Day Old Stock	R.N. of Old Cake	Sale of Old Cake Pcs.	Loss Pcs.
1	37	105	106	105	0	110	0	17	--	--
2	73	110	108	108	2	105	0	28	--	--
3	14	105	103	103	2	105	2	69	0	2
4	17	105	104	104	1	105	2	38	0	2
5	24	105	105	105	0	110	1	50	0	1
6	35	110	106	106	4	105	0	57	--	--
7	29	105	105	105	0	110	4	82	1	3

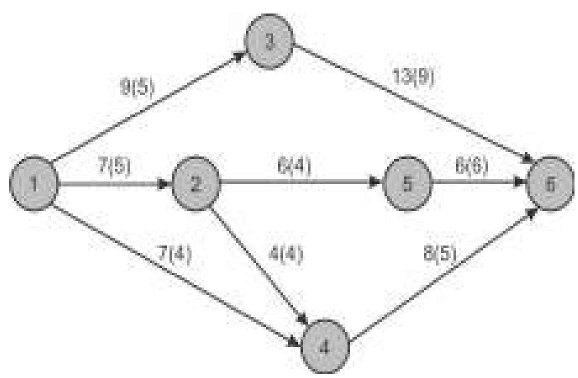
8	37	110	106	106	4	105	0	44	--	--
9	33	105	105	105	0	110	4	89	1	3
10	68	110	107	107	3	105	0	60	--	--
				1,054					2	11

Calculation of Vendor's Profit (2 marks)

	Amount (`)
Sales of Fresh Cakes (1,054 Pcs. × `7)	7,378.00
Sale of One Day Old Cake (2 Pcs. × `2)	4.00
Total Sales Revenue	7,382.00
*Less:*Cost of Cakes Sold[`4.50 × (1,054 + 2) Pcs.]	4,752.00
Less: Cost of Spoilt Cakes [`4.50 × (11 + 3*) Pcs.]	63.00
Profit	2,567.00

Question 7 (8 Marks)

The **Network** for the given problem **(2 marks)**



Different Paths, Normal Duration and Minimum Duration:

Path	Normal Duration (Days)	Minimum Duration (Days)
1–3–6	22 (9 + 13)	14 (5 + 9)
1–2–5–6	19 (7 + 6 + 6)	15 (5 + 4 + 6)
1–2–4–6	19 (7 + 4 + 8)	14 (5 + 4 + 5)
1–4–6	15 (7 + 8)	9 (4 + 5)

Critical Path is **1–3–6**

Total Cost of the Project for the Normal Duration: (1 mark)

= Normal Cost + Overhead Cost + Penalty Cost = `6,000 + `150 × 22 Days + `80 × 3 Days

= `9,540

Crashing First Step: (2 mark)

Let us now crash activities on the Critical Path.

Activity	∆T	∆C/∆T	Remark
1–3	4	100	Least Cost Slope
3–6	4	210	

As activity 1–3 has least cost slope, **crash activity 1–3 by 3 days at a crash cost of `100 per day.**

Total Cost of the Project for the 19 Days:

= Normal Cost + Overhead Cost + Crashing Cost

= `6,000 + `150 × 19 Days + `100 × 3 Days

= `9,150

The Various Paths in the Network with Revised Duration are:

1–3–6 with Project Duration = 19 Days (Critical Path.1)

1–2–5–6 with Project Duration = 19 Days (Critical Path.2)

1–2–4–6 with Project Duration = 19 Days (Critical Path.3)

1–4–6 with Project Duration = 15 Days

Crashing Second Step: (2 marks)

Let us now crash activities on the Critical Paths.

Critical Path	Activity	∆T	∆C/∆T	Remark
1	1–3	1	100	Least Cost Slope
	3–6	4	210	
2	1–2	2	90	
	2–5	2	50	Least Cost Slope
	5–6	-	-	-
3	1–2	2	90	
	2–4	-	-	-
	4–6	3	60	Least Cost Slope

Possible Crashing Alternatives are:

(1 mark)

Critical Path- Activities	1–3, 2–5 & 4–6	1–3 & 1–2*
Cost Slopes (∆C/∆T)	`210 (`100 + `50 + `60)	`190 (`100 + `90)
Remark	Independent Activities	Independent Activity + Common Activity*

As crashing cost per day for every alternative is greater than `150 i.e. Overhead Cost per day. Therefore, any reduction in the duration of project will increase the cost of project completion.

Hence, the **Lowest Cost of Completion** is **`9,150** with the **Completion Time** of **19 Days**.

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