FINAL CA – November 2017

ADVANCED MANAGEMENT ACCOUNTING

Test Code – p 7

Branch (MULTIPLE) (Date : 11.06.2017)

(50 Marks)

Note : All questions are compulsory.

Question 1(4 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 correspondingminimum 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 same minimum value 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. *Two zeroes in a same row can also be possible by two different operations i.e. one zero from row operation and one zero from column operation*. **(2 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 (2^{nd} row and 4^{th} column) and A32 (3^{rd} row and 2^{nd} column). This implies that 2^{nd} and 3^{rd} row and 2^{nd} and 4^{th} column are unavailable for further allocation. Therefore, the other allocations are at either at **A11 and A43** or at **A13 and A41**. **(2 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

= $13x_1 + 14 x_2 + 8x_3$

Subject to Constraints: (6 marks)

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

Or $x_1 + x_2 + 4x_3 \leq 2,000$

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

Or $2x_1 + x_2 + x_3 \leq 3,600$

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

Or $x_1 + 2x_2 + 2x_3 \leq 2,400$

$x_1 \leq 30$

and $x_1, x_2, x_3 \geq 0$

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 ` 1,620 / 2, 400 x 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 `760 / 1,200 x600	---
Additional Costs	---	56 (80,000 ×`70)	80
Total	1,800	1,196	400

Question 6 (8 Marks)

The Initial basic solution worked out by the shipping clerk is as follows-

Warehouse	Market				Supply
	I	II	III	IV	
A	5	2 [12]	4 [1]	3 [9]	22
B	4	8	1 [15]	6	15
C	4 [7]	6	7 [1]	5	8
Req.	7	12	17	9	45

The initial solution is tested for optimality. The total number of independent allocations is 6 which is equal to the desired (m +n –1) allocations. We introduce u_i's (i = 1, 2, 3) and v_j's (j = 1, 2, 3, 4). Let us assume $u_1 = 0$, remaining u_i's and v_j's are calculated as below-

($u_i + v_j$) Matrix for Allocated / Unallocated Cells

					u_i
	1	2	4	3	0
	-2	-1	1	0	-3
	4	5	7	6	3
v_j	1	2	4	3	

Now we calculate $\Delta ij = Cij – (ui + vj)$ for non-basic cells which are given in the table below-

Δ_{ij} Matrix

4			
6	9		6
	1		**-1**

Since one of the Δ_{ij} 's is negative, the schedule worked out by the clerk is **not the optimal solution**.

(1 mark)

(ii) Introduce in the cell with negative $_{ij}$ [R_3C_4], an assignment. The reallocation is done as follows-

	12	1 +1	9 -1
		15	
7		1 -1	+1

Revised Allocation Table

	12	2	8
		15	
7			1

Now we test the above improved initial solution for optimality-

(u_i + v_j) Matrix for Allocated / Unallocated Cells

					u_i
	2	2	4	3	0
	-1	-1	1	0	-3
	4	4	6	5	2
v_j	2	2	4	3	

Now we calculate $\Delta ij = Cij - (ui + vj)$ for non-basic cells which are given in the table below-

Δ_{ij} Matrix

3			
5	9		6
	2	1	

Since all $_{ij}$ for non -basic cells are positive, the solution as calculated in the above table is the optimal solution. **(2 Marks)**

The supply of units from each warehouse to markets, along with the transportation cost is given below- **(1 Mark)**

Warehouse	Market	Units	Cost per unit (`)	Total Cost (`)
A	II	12	2	24
A	III	2	4	8
A	IV	8	3	24
B	III	15	1	15
C	I	7	4	28
C	IV	1	5	5
			Minimum Total Shipping Cost	**104**

(iii) If the clerk wants to consider the carrier of route C to II only, instead of 7 units to I and 1 unit to IV, it will involve shifting of 7 units from (A, II) to (A, I) and 1 unit to (A, IV) which results in the following table- **(2 marks)**

Warehouse	Market I	Market II	Market III	Market IV	Supply
A	5 [7]	2 [4]	4 [2]	3 [9]	22
B	4	8	1 [15]	6	15
C	4	6 [8]	7	5	8
Req.	7	12	17	9	45

(iv)

The transportation cost will become- **(1 mark)**

Warehouse	Market	Units	Cost per unit (`)	Total Cost (`)
A	I	7	5	35
A	II	4	2	8
A	III	2	4	8
A	IV	9	3	27
B	III	15	1	15
C	II	8	6	48
		Minimum Total Shipping Cost		**141**

The total shipping cost will be `141. Additional Transportation Cost `37.

The carrier of C to II must reduce the cost by **`4.63** (`37/8) so that the total cost of transportation remains the same and clerk can give him business. **(1 mark)**

Question 7 (4 Marks)

Relevant / Not Relevant (1 mark for each cost)

S. No.	Name of the Cost	Example	Relevant / Not Relevant
(i)	Sunk Cost	Written down value of machine already purchased.	Not Relevant in decision making.
(ii)	Opportunity Cost	Funds invested in business or deposited into bank.	Useful in decision making.
(iii)	Out of Pocket Cost	Commission to salesman on sales, Carriage inward.	Relevant for decision making.
(iv)	Differential Cost	Include all fixed cost and variable cost which are increased /decreased.	Relevant in specific decision making.

Question 8 (4 marks)

Statement Showing "Operating Loss" (2 marks)

	If Plant is Continued	If Plant is Shutdown
	7,60,000	---
Less: Variable Cost	5,70,000	---
Contribution	1,90,000	---
Less: Fixed Cost	3,50,000	1,30,000
Less: Additional Cost	---	15,000
Operating Loss	1,60,000	1,45,000

Decision on Shut Down

A comparison of loss figures (indicated as above) points out that loss is reduced by **`15,000** (` 1,60,000 - ` 1,45,000) if plant is shut down.

→ Accordingly, plant should be Shut Down. **(1 mark)**

Shut Down Point = $\frac{\text{` }3,50,000 - \text{`}1,45,000}{\text{` }8 - \text{`}6}$

= 1,02,500 units

Capacity Level at Shut Down Point (%)(1 mark)

At 100% Level – Production Capacity = 95000 units

118750

= 0.80

Capacity Level at Shut Down Point**(1 mark)** =

1,02,500units

86.32%

1,18,750units

****