FINAL CA – November 2017

ADVANCED MANAGEMENT ACCOUNTING

Test Code –

Branch (MULTIPLE) (Date : 25.06.2017)

(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(6 Marks)

The cumulative average time *per batch* for the first 25 batches (2 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(2 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(4 Marks)(1 mark for each)

	Situation	Appropriate pricing Policy
(i)	'W' is a new product for the company and the market and meant for large scale production and long term survival in the market. Demand is expected to be elastic.	Penetration Pricing
(ii)	'X' is a new product for the company, but not for the market. X's success is crucial for the company's survival in the long term.	Market Price or Price just below market price
(iii)	'Y' is a new product to the company and the market. It has an inelastic market. There needs to be an assured profit to cover high initial costs and the unusual sources of capital have uncertainties blocking them.	Skimming Pricing
(iv)	'Z' is a perishable item, with more than 80% of its shelf life over.	Any Cash Realizable value*

(* this amount decreases every passing day)

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)

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

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 (10 Marks)

Statement Showing Impact on Airline's Profit if Flight Y-09 is Discontinued (5 marks)

Contribution Margin lost if the flight is discontinued		-784000
Less: Flight Costs which can be avoided if the flight is discontinued:		
Flight Promotion	35000	
Fuel for Aircraft	255000	
Liability Insurance (1/3 x `1,53,000)	51000	
Salaries, Flight Assistants	45500	
Overnight Costs for Flight Crew and Assistants	18000	404500
		-379500

If Aves Airlines Ltd. goes for discontinuation of flight K-09, its profit will go down by `3,79,500.

Following costs are **not relevant** to the decision: **(5 marks)**

a. Salaries, flight crew - Fixed annual salaries which will not change

b. Baggage loading and flight preparation- This is an allocated cost, which will continue even if the flight is discontinued.
c. Depreciation of aircraft -Sunk Cost
d. Liability insurance (two third)
e. Hanger parking fee- This cost will be incurred regardless of whether the flight is made.

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)**

(iv)

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

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 (5 Marks)

Statement Showing "Cost and Profit for the Next Year" (3 marks)

Particulars	Existing Volume, etc.	Volume, Costs, etc. after 10% Increase	Estimated Sale, Cost, Profit, etc.*
	(`)	(`)	(`)
Sale	5,00,000	5,50,000	5,72,000
Less: Direct Materials	2,50,000	2,75,000	2,69,500
Direct Labour	1,00,000	1,10,000	1,07,800
Variable Overheads	40,000	44,000	43,120
Contribution	1,10,000	1,21,000	1,51,580
Less: Fixed Cost#	60,000	60,000	58,800
Profit	50,000	61,000	92,780

(*) for the next year after increase in selling price @ 4% and overall cost reduction by 2%.

(#) Fixed Cost = Existing Sales – Existing Marginal Cost – 12.5% on `4,00,000

= `5,00,000 – `3,90,000 – `50,000

= `60,000

Percentage Profit on Capital Employed equals to 23.19% (92,780/400,000*100) **(1 mark)**

Since the Profit of `92,780 is more than 23% of capital employed, the proposal of the Sales Manager can be adopted. **(1 mark)**

Question 8 (5 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 = $\frac{95000 \text{ units}}{0.80}$

=118750

Capacity Level at Shut Down Point**(1 mark)** $=\frac{102500\ units}{118750\ units} * 100$

= 86.32 %

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