SUGGESTED SOLUTION

CA FINAL NOVEMBER 2016 EXAM

ADVANCED MANAGEMENT ACCOUNTING

Test Code - F N J 6 0 7 7

BRANCH - (MUMBAI) (Date : 11.09.2016)

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Answer-1 :

Calculation of Life-cycle Costs

	CF (Rs.)	OF (Rs.)
Initial Cost	28,000	40,000
Add: Annual Operating Costs	1,48,656	1,11,492
	(Rs.24,000 × 6.194)	(Rs.18,000 × 6.194)
Total Life Cycle Costs	1,76,656	1,51,492

The annuity of 12% finance costs for 12 years is 6.194.

Analysis

When we compare only the initial cost, we will tend to purchase CF system, for its cheap acquisition cost. But when we compare the total life-cycle costs, the OF system is mostpreferable, for its lowest total life-cycle costs.

(5 Marks)

Answer-2 :

Let y_1, y_2, y_3 be the number of units produced of products P, Q and R respectively.

Objective function:

Then the profit gained by the industry is given by

$$Z = 3y_1 + 8y_2 + 2y_3$$

(1 Mark)

Here it is assumed that all the units of products P and Q are sold.

Condition-1:

In first operation, P takes 3 hrs of manufacturer's time and Q takes 4 hrs of manufacturer's time. Therefore, total number of hours required in first operation becomes-

$$3y_1 + 4y_2$$

(1 Mark)

In second operation, per unit of P takes 3 hrs of manufacturer's time and per unit Q takes 5 hrs of manufacturer's time. Therefore, the total number of hours used in secondoperation becomes

$$3y_1 + 5y_2$$

(1 Mark)

Since there are 18 hrs available in first operation and 21 hrs in second operation, therestrictions become

$$3y_1 + 4y_2 \leq 18$$
$$3y_1 + 5y_2 \leq 21$$

(1 Mark)

Condition-2:

Since the maximum number of units of R that can be sold is 5, therefore,

$$y_3 \leq 5$$

(1 Mark)

Condition-3:

Further, the company gets three units of by product R for every unit of product Q produced, therefore

$$y_3 = 3y_2$$

(1 Mark)

Now, the allocation problem of the industry can be finally put in the following linearprogramming problem:

Maximise

$$Z = 3y_1 + 8y_2 + 2y_3$$

(1 Mark)

Subject to the Constraints:

$$3y_1 + yx_2 \leq 18$$
$$3y_1 + 5y_2 \leq 21$$
$$y_3 \leq 5$$
$$y_3 = 3y_2$$
$$y_1, y_2, y_3 \geq 0$$

(1 Mark)

Answer-3 :

Computation of Cost Indifference Points for three alternatives

Cost Indifference Point of two machines $= \dfrac{\text{Difference in Fixed Cost}}{\text{Difference in Variable Cost per unit}}$

Machine M_1& M_2 $= \dfrac{\text{Rs.2,50,000 - Rs.1,50,000}}{(Rs.100 + Rs.70 + Rs.30) - (Rs.50 + Rs.40 + Rs.10)}$

$= \dfrac{\text{Rs.1,00,000}}{\text{Rs.100}}$

= 1,000 units

(2 Marks)

Machine M_2& M_3 $= \dfrac{\text{Rs.1,50,000 - Rs.70,000}}{(Rs.150 + Rs.200 + Rs.50) - (Rs.100 + Rs.70 + Rs.30)}$

$= \dfrac{\text{Rs.80,000}}{Rs.200}$

= 400 units

(2 Marks)

Machine M_1& M_3 $= \dfrac{\text{Rs.2,50,000 - Rs.70,000}}{(Rs.150+Rs.200+Rs.50)-(Rs.50+Rs.40+Rs.10)}$

$= \dfrac{\text{Rs.1,80,000}}{\text{Rs.300}}$

= 600 units

(2 Marks)

From the above computations, it is clear that at activity level below the indifference point thealternative (machine) with lower fixed cost and higher variable costs should be used. In casethe activity level exceeds the indifference point, a machine with lower variable cost per unit (orhigher contribution per unit) and higher fixed cost, is more profitable to operate.

At the activity level equal to the indifference point both machines are on equal footing. Hencefrom the above we conclude as follows:

Activity Level	**Machine Preference**
Less than 400 units	M_3
Exactly 400 units	Either M_2or M_3
Above 400 units but less than 1,000 units	M_2
Exactly 1,000 units	Either M_1 or M_2
Above 1,000 units	M_1

When expected level of activity is 1,200 units i.e. more than 1,000 units, Machine M_1 shouldbe used.

(2 Marks)

Answer-4 :

Determination of Initial Selling Price

Let the Selling Price be Rs.K

Sales Value: Rs.4,000K

Annual Cash Cost	**(Rs.)**
Variable Cost (4,000 units × Rs.125)	5,00,000
Advertisement and Other Expenses	75,000
Additional Fixed Costs	37,500
Total Cash Cost	6,12,500

(2 Mark)

Depreciation per annum (Rs.12,50,000 / 4) = Rs.3,12,500

Profit for Taxation = 4,000 × Rs.K - (Rs.6,12,500 + Rs.3,12,500)

= Rs.4,000K - Rs.9,25,000

Tax at 30% on Profit	=	30% of {Rs.4,000K - Rs.9,25,000}
	=	Rs.1,200K - Rs.2,77,500
Total Annual Cash Outflow	=	Rs.6,12,500 + (Rs.1,200K - Rs.2,77,500)
	=	Rs.1,200K + Rs.3,35,000
Net Annual Cash Inflow	=	Rs.4,000K - (Rs.1,200K + Rs.3,35,000)
	=	Rs.2,800K - Rs.3,35,000
Now, Present Value of Initial Cash Outflow	=	Present Value of Cash Inflow
Or, Rs.12,50,000	=	(Rs.2,800K - Rs.3,35,000) × 2.854
Or, K	=	Rs.276.06

Hence Selling Price should be Rs.276.06 per unit.

(5 Mark)

Answer-5 :

The given information can be tabulated in following transportation problem-

Manager	Assignment			Time Available (Hours)
	Transfer Pricing (₹)	Corporate Valuation (₹)	Statutory Audit (₹)	
S	1,800	2,250	2,850	176
D	2,100	1,950	1,800	176
K	2,400	2,100	2,250	176
Time Required (Hours)	143	154	176	

(1 Mark)

The given problem is an unbalanced transportation problem. Introducing a dummy assignmentto balance it, we get-

Manager	Assignment				Time Available (Hours)
	Transfer Pricing (₹)	Corporate Valuation (₹)	Statutory Audit (₹)	Dummy (₹)	
S	1,800	2,250	2,850	0	176
D	2,100	1,950	1,800	0	176
K	2,400	2,100	2,250	0	176
Time Required (Hours)	143	154	176	55	528

(1 Mark)

The objective here is to maximize total billing amount of the auditors. For achieving this objective, let us convert this maximization problem into a minimization problem by subtracting all the elements of the above payoff matrix from the highest payoff i.e. ‘2,850.

Manager	Assignment				Time Available (Hours)
	Transfer Pricing (₹)	Corporate Valuation (₹)	Statutory Audit (₹)	Dummy (₹)	
S	1,050	600	0	2,850	176
D	750	900	1,050	2,850	176
K	450	750	600	2,850	176
Time Required (Hours)	143	154	176	55	528

(1 Mark)

Now, let us apply VAM method to the above matrix for finding the initial feasible solution.

Manager	Assignment				Time Avail. (Hours)	Difference
	Transfer Pricing (₹)	Corp. Valuation (₹)	Stat. Audit (₹)	Dummy (₹)		
S	1,050	600	0 [176]	2,850	176/0	600 - -
D	750	900 [121]	1,050	2,850 [55]	176/55/0	150, 150 1,950
K	450 [143]	750 [33]	600	2,850	176/33/0	150, 300, 2,100
Time Required	143/0	154/121/0	176/0	55/0	528	
Difference	300 300 -	150 150 150	600 -- -	0 0 0		

(2 Marks)

The initial solution is given below. It can be seen that it is a degenerate solution since the number of allocation is 5. In order to apply optimality test, the total number of allocations should be 6 (m + n -1). To make the initial solution a non-degenerate, we introduce a very small quantity in the least cost independent cell which is cell of K, Statutory Audit.

Manager	Assignment			
	Transfer Pricing (₹)	Corp. Valuation (₹)	Stat. Audit (₹)	Dummy (₹)
S	1,050	600	0 [176]	2,850
D	750	900 [121]	1,050	2,850 [55]
K	450 [143]	750 [33]	600 [e]	2,850

Let us test the above solution for optimality-

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

				u_i
-150	150	0	2,100	-600
600	900	750	2,850	150
450	750	600	2,700	0
v_j 450	750	600	2,700	

Now we calculate $\Delta_{ij} = C_{ij} - (u_i + v_j)$ for non basic cells which are given in the table below-

(2 Marks)

Δ_{ij} Matrix

1,200	450		750
150		300	
			150

Since, all allocations in $\Delta_{ij} = C_{ij} - (u_i + v_j)$ are non negative, the allocation is optimal. The allocation of assignments to managers and their billing amount is given below:

(1 Marks)

Manager	**Assignment**	**Billing Amount**
S	Statutory Audit	Rs.5,01,600 (176 hrs. x Rs.2,850)
D	Corporate Valuation	Rs.2,35,950 (121 hrs. x Rs.1,950)
K	Transfer Pricing	Rs.3,43,200 (143 hrs. x Rs.2,400)
K	Corporate Valuation	Rs.69,300 (33 hrs. x Rs.2,100)
Total Billing		Rs.11,50,050

(2 Marks)

Answer-6 :

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

A comparison of loss figures indicated as above points out that loss is reduced by '15,000 ('16,000 - '14,500) if plant is shut down.

Shut Down Point $= \dfrac{\text{Rs.3,50,000 - Rs.1,45,000}}{\text{Rs.8-Rs.6}}$

Capacity Level of Shut Down Point

At 100% Level Production $= 1{,}18{,}750 \left(\dfrac{95{,}000 \text{ units}}{0.80}\right)$

Capacity Level at Shut Down $= 86.32\% \left(\dfrac{\text{Rs.1,02,500 units}}{1{,}18{,}750 \text{ units}}\right)$

(12 Marks)