SUGGESTED SOLUTION

CA FINAL MAY 2017 EXAM

COSTING

Test Code - F M J 4 0 0 3

BRANCH - (MULTIPLE) (Date : 27.11.2016)

Head Office : Shraddha, 3rd Floor, Near Chinai College, Andheri (E), Mumbai – 69.

Tel : (022) 26836666

Answer-1 :

(i)

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

1

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) such $\Delta_{ij} = C_{ij} - (u_i + v_j)$. 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	

1

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

Δ_{ij} Matrix

4			
6	9		6
	1		-1

1

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

(ii)

Introduce in the cell with negative Δ_{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

1

	12	2	8
		15	
7			1

Now we test the above improved initial solution for optimality-

1

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

1

Δ_{ij} Matrix

3			
5	9		6
	2	1	

Since all Δ_{ij} for non basic cells are positive, the solution as calculated in the above table is the optimal solution. The supply of units from each warehouse to markets, along with the transportation cost is given below-

1

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

1

(iii)

If the clerk wants to consider the carrier of route C to II for giving an order, then his transportation cost must be less than the cost of carrier of routes C to I and C to IV i.e. his transportation cost should be at the most ₹ 3 per unit. If the carrier C to II brings down his cost to ₹ 3, he will get an order for 1 unit, and the schedule will be-

Warehouse	Market	Units	Cost per unit (₹)	Total Cost (₹)
A	II	11	2	22
A	III	2	4	8
A	IV	9	3	27
B	III	15	1	15
C	I	7	4	28
C	II	1	3	3
			Minimum Total Shipping Cost	103

The total shipping cost will be ₹103.

2

Alternative Way for *better understanding* of concept

Issue:

If the clerk is approached by a carrier of route C to II, Who offers to reduce his rate in the hope of **getting some business**, by how much should the rate be reduced before the clerk should consider giving him an order ?

Resolution:

If the clerk wants to consider the carrier of route C to II for giving **some business (minimum ONE unit)**, then Revised Schedule will be

Warehouse	Market	Units
A	II	11
A	III	2
A	IV	9
B	III	15
C	I	7
C	**II**	**1**

But Minimum Shipping Cost Should be **less than** ₹104 (existing situation).

Statement Showing **Cost** *per unit* **C, II**

Warehouse	Market	Units	Cost per unit (Rs.)	Total Cost (₹)
A	II	11	2	22
A	III	2	4	8
A	IV	9	3	27
B	III	15	1	15
C	I	7	4	28
C	II	1	Less Than 4*	Less Than 4*
			Minimum Total Shipping Cost (Less Than)	104

* *Balancing Figure*

Accordingly Carrier should reduce its rate to less than ₹4 or to ₹**3** so that he/ she can get at least some business i.e. ONE unit.

Answer-2 :

COMPUTATION OF REQUIREMENTS

Actual output units

Material Cost Variance = Price Variance + Usage Variance

= ₹ 585 (A) + ₹ 375 (F)

= ₹ 210 (A)

Material Cost Variance = Standard Cost of Standard Quantity for Actual Production (refer as Standard Cost) – Actual Cost

⇒ ₹210 (A) = ₹ 15 × Actual Output – ₹ 6,435

⇒ Actual Output = 415 units

Material Usage Variance = Standard Price × (Standard Quantity – Actual Quantity)

⇒ ₹375 (F) = ₹ 1.5 × (415 units × 10 units – Actual Quantity)

⇒ Actual Quantity = 3,900 units

2

Actual price of material per unit

$$\text{Actual price of Material } \textit{per unit} = \frac{\text{Actual Cost}}{\text{Actual Quantity}}$$

$$= \frac{₹6,435}{3,900 \text{ units}}$$

$$= ₹ 1.65$$

1

Actual wage rate per labour hour

Labour Rate Variance = Actual Hours × (Standard Rate – Actual Rate)

⇒ ₹636 (F) = Actual Hours × (₹ 8 – Actual Rate)

⇒ ₹636 (F) = Actual Hours × ₹ 8 – Actual Cost

⇒ ₹636 (F) = Actual Hours × ₹ 8 – ₹ 16,324

⇒ Actual Hours = 2,120 Hours

$$\text{Actual Wage Rate } \textit{per hour} = \frac{\text{Actual Wages}}{\text{Actual Hours}}$$

$$= \frac{₹16,324}{2,120 \text{ hours}}$$

$$= ₹ 7.7 \textit{ per hour}$$

2

The amount of production overhead incurred

Production Overhead Cost Variance = Expenditure Variance + Volume Variance

= ₹ 400 (F) + ₹ 750 (F)

= ₹ 1,150 (F)

Production Overhead Cost Variance = Absorbed Overheads – Actual Overheads

⇒ ₹ 1,150 (F) = ₹ 50 × 415 units – Actual Overheads

⇒ Actual Overheads = ₹ 19,600

2

The production overhead efficiency variance

Production Overhead Efficiency Variance = Absorbed Overheads – Budgeted Overheads for Actual Hours

= ₹ 10 × (5 Hours × 415 units) – ₹ 10 × 2,120 Hours

= ₹ 450 (A)

1

Answer-3 :

COMPUTATION OF VARIANCES

Overhead Cost Variance = Absorbed Overheads – Actual Overheads

= (₹ 872.00 + ₹ 448.00) – (₹ 1,305.20 + ₹ 556.80)

= ₹ 542.00 (A)

Variable Overhead Cost Variance = Standard Variable Overheads for Production – Actual Variable Overheads

= ₹ 448.00 – ₹ 556.80

= ₹ 108.80 (A)

Fixed Overhead Cost Variance = Absorbed Fixed Overheads – Actual Fixed Overheads

= ₹ 872.00 – ₹ 1,305.20

= ₹ 433.20 (A)

Fixed Overhead Volume Variance = Absorbed Fixed Overheads – Budgeted Fixed Overheads

= ₹ 872.00 – ₹ 1,090.00

= ₹ 218.00 (A)

Fixed Overhead Expenditure Variance = Budgeted Fixed Overheads – Actual Fixed Overheads

= ₹ 0.109 × 10,000 units – ₹ 1,305.20

= ₹ 215.20 (A)

Calendar Variance = Possible Fixed Overheads – Budgeted Fixed Overheads

= ₹ 1,035.50 – ₹ 1,090.00

= ₹ 54.50 (A)

6 x 1 = 6

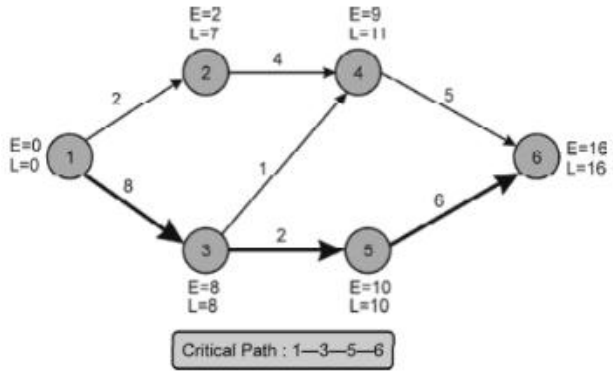
WORKING NOTE

Fixed Overheads = $\frac{\text{Budgeted Fixed Overheads}}{\text{Budgeted Output}} = \frac{₹12,000}{1,20,000 units}$	₹ 0.100
Fixed Overheads element in *Semi-Variable* Overheads i.e. 60% of ₹ 1,800	₹ 1,080
Fixed Overheads = $\frac{\text{Budgeted Fixed Overheads}}{\text{Budgeted Output}} = \frac{₹1,080}{1,20,000 units}$	₹ 0.009
Standard Rate of Absorption of Fixed Overheads *per unit* (₹ 0.100 + ₹ 0.009)	₹ 0.109
Fixed Overheads Absorbed on 8,000 units @ ₹ 0.109	₹ 872
Budgeted Variable Overheads	₹ 6,000
Add : Variable element in Semi-Variable Overheads 40% of ₹ 1,800	₹ 720
Total Budgeted Variable Overheads	₹ 6,720
Standard Variable Cost *per unit* = $\frac{\text{Budgeted Variable Overheads}}{\text{Budgeted Output}} = \frac{₹6,720}{1,20,000 units}$	₹0.056
Standard Variable Overheads for 8,000 units @ ₹ 0.056	₹ 448
Budgeted Annual Fixed Overheads (₹ 12,000 + 60% of ₹ 1,800)	₹ 13,080
Possible Fixed Overheads = $\frac{\text{BudgetedFixedOverheads}}{\text{BudgetedDays}} \times \text{ActualDays}$ $= \left[\frac{₹1,090}{20 Days} \times 19 Days\right]$	₹ 1,035.50
Actual Fixed Overheads (₹ 1,190 + 60% of ₹ 192)	₹ 1,305.20
Actual Variable Overheads (₹ 480 + 40% of ₹ 192)	₹ 556.80

2

Answer-4 :

The **network** for the given problem:



1

The **Critical Path** is 1–3–5–6 with normal duration of 16 weeks. The normal cost of the project is Rs.82,000.

The **Cost Slope** of each activity:-

Activity	Normal		Crash		Cost Slopes		
	Duratio (Weeks)	Cost (Rs.'000)	Duratio (Weeks)	Cost (Rs.'000)	ΔT (Weeks)	ΔC (Rs.'000)	ΔC/ΔT (Rs.'000)
1–2	2	10	1	15	1	5	5
1–3	8	15	5	21	3	6	2
2–4	4	20	3	24	1	4	4
3–4	1	7	1	7	0	0	---
3–5	2	8	1	15	1	7	7
4–6	5	10	3	16	2	6	3
5–6	6	12	2	36	4	24	6

The **Various Paths** in the network are: 1–3–5–6 with project duration = 16 Weeks 1–3–4–6 with project duration = 14 Weeks 1–2–4–6 with project duration = 11 Weeks

The critical path is 1–3–5–6. The normal length of the project is 16 days.

Crashing steps so that the project completion time reduces to 9 weeks with minimum additional cost:

2

Crashing Step 1:

We will first crash the activities on the critical path.

Activity 1–3 of critical path 1–3–5–6 has minimum costs slope. We can crash activity 1–3 by 3 weeks for additional cost of Rs.6,000 (3Weeks × Rs.2,000). Now the project duration is reduced to 13 weeks.

The various paths in the network with revised duration are: 1–3–5–6 with project duration = 13 Weeks
1–3–4–6 with project duration = 11 Weeks 1–2–4–6 with project duration = 11 Weeks

1

Crashing Step 2:

Crash activity 5–6 by 2 weeks for additional cost of Rs.12,000 (2Weeks × Rs.6,000). Now the project duration is reduced to 11 weeks.

The various paths in the network with revised duration are: 1–3–5–6 with project duration = 11 Weeks
1–3–4–6 with project duration = 11 Weeks 1–2–4–6 with project duration = 11 Weeks

1

Crashing Step 3:

Now there are three critical paths: 1–3–5–6 with project duration = 11 Weeks 1–3–4–6 with project duration = 11 Weeks 1–2–4–6 with project duration = 11 Weeks

To reduce the project duration further, we crash activity 4–6 by 2 weeks at an additional costs of Rs. 6,000 (2Weeks × Rs.3,000) and activity 5–6 by two weeks at an additional cost of Rs. 12,000 (2Weeks × Rs.6,000).

1

Statement Showing "Additional Crashing Cost"

Normal Project Length	Job Crashed	Crashing Cost (Rs.)
16	---	---
13	1–3 by 3 Weeks	6,000
11	5–6 by 2 Weeks	12,000
9	4–6 by 2 Weeks & 5–6 by 2 Weeks	18,000
	Total Additional Cost	36,000

2

Answer-5 :

3

Statement Showing "Activity Rate"

Activity	Activity Cost [a] (Rs.)	Activity Driver	No. of Units of Activity Driver [b]	Activity Rate [a] / [b] (Rs.)
Providing ATM Service	1,00,000	No. of ATM Transactions	2,00,000	0.50
Computer Processing	10,00,000	No. of Computer	25,00,000	0.40
Issuing Statements	8,00,000	No. of Statements	5,00,000	1.60
Customer Inquiries	3,60,000	Telephone Minutes	6,00,000	0.60

3

Statement Showing "Cost of Product"

Activity	Checking Accounts (Rs.)	Personal Loans (Rs.)	Gold Visa (Rs.)
Providing ATM Service	90,000 (1,80,000 tr.×Rs. 0.50)	---	10,000 (20,000 tr. × Rs. 0.50)
Computer Processing	8,00,000 (20,00,000 tr. × Rs. 0.40)	80,000 (2,00,000 tr. × Rs. 0.40)	1,20,000 (3,00,000 tr. × Rs. 0.40)
Issuing Statements	4,80,000 (3,00,000 st. × Rs. 1.60)	80,000 (50,000 st. × Rs. 1.60)	2,40,000 (1,50,000 st. × Rs. 1.60)
Customer Inquiries	2,10,000 (3,50,000 min. × Rs. 0.60)	54,000 (90,000 min. × Rs. 0.60)	96,000 (1,60,000 min. × Rs. 0.60)
Total Cost [a]	Rs. 15,80,000	Rs. 2,14,000	Rs. 4,66,000
Units of Product [b]	30,000	5,000	10,000
Cost of each Product [a] / [b]	52.67	42.80	46.60

Answer-6 :

(i) Total Annual Production (in units)

Particulars	**Units**
Sales in 4 quarters	3,07,500
Add: Desired Closing balance	32,500
	3,40,000
Less: Opening Balance	20,000
Total number of units to be produced in the next year	3,20,000
Production Budget in units	(1)

Particulars	**Q-I**	**Q-II**	**Q-III**	**Q-IV**	**Total**
Sales	60,000	75,000	82,500	90,000	3,07,500
Production in current quarter (80% of the sale of current quarter)	48,000	60,000	66,000	72,000	
Production for next quarter (20% of the sale of next quarter)	15,000	16,500	18,000	24,500*	
Total production	**63,000**	**76,500**	**84,000**	**96,500***	**3,20,000**

*Difference in balancing figure (3)

(ii) Raw material consumption budget (in quantity)

Particulars	Q-I	Q-II	Q-III	Q-IV	Total
Units to be produced in each quarter (1)	63,000	76,500	84,000	96,500	3,20,000
Raw material consumption per unit (Kg.) (2)	2	2	2	2	
Total raw material consumption (Kg.) (1x2)	1,26,000	1,53,000	1,68,000	1,93,000	6,40,000

(iii) Raw Material Purchases budget (in quantity) (3)

Particulars	Kg.
Raw material required for production	6,40,000
Add: Desired Closing balance of raw material	10,000
	6,50,000
Less: Opening Balance	20,000
Materials to be purchased	6,30,000

Raw Material Purchases budget (in value) (1)

Quarters	% of Annual requirement (qty.) for purchasing raw material	Quantity of raw material to be purchased (Kg.)	Rate per kg. (Rs)	Amount
I	30	1,89,000 (6,30,000 x 30%)	2	3,78,000
II	50	3,15,000 (6,30,000 x 50%)	3	9,45,000
III	20	1,26,000 (6,30,000 x 20%)	4	5,04,000
		6,30,000		18,27,000

(2)