SUGGESTED SOLUTION

CA FINAL NOVEMBER 2016 EXAM

ADVANCED MANAGEMENT ACCOUNTING

Test Code - F N J 6 0 7 6

BRANCH - (MUMBAI) (Date : 11.09.2016)

Head Office : Shraddha, 3rd Floor, Near Chinai College, Andheri (E), Mumbai – 69.
Tel : (022) 26836666

Answer-1 :

Activities / Cost Drivers for 'SM' hospital

Activities	Cost Driver
Purchase of medical supplies, maintain records/inventory (dispense medications)	Number of medicationorders filled
Reservation/Scheduling, inpatient registration, billing and insurance verification (admit patients)	Number of patients admitted
Prepare patient, perform ECG procedure, interpret results (administer ECG tests)	Number of tests
Obtain specimens, perform test, report results (administer laboratory tests)	Number of test by type

(4 Marks)

Answer-2 :

Assigning Digit Values to Cash Flows

Year 1			Year 2			Year 3		
CF	Prob.	Digits	CF	Prob.	Digits	CF	Prob.	Digits
7,500	0.20	0-1	10,000	0.10	0-0	7,500	0.10	0-0
10,000	0.50	2-6	12,500	0.30	1-3	10,000	0.20	1-2
12,500	0.30	7-9	15,000	0.20	4-5	12,500	0.50	3-7
			17,500	0.40	6-9	15,000	0.20	8-9

(2 Marks)

Identifying Cash Flows Matching Random Numbers

Set	Year 1		Year 2		Year 3	
	R. No.	CF	R. No.	CF	R. No.	CF
1	4	10,000	4	15,000	2	10,000
2	9	12,500	6	17,500	3	12,500
3	5	10,000	7	17,500	8	15,000
4	0	7,500	1	12,500	6	12,500
5	3	10,000	1	12,500	5	12,500

(2 Marks)

Calculated Simulated Average NPVs

Set	Year 1		Year 2		Year 3		Initial Outflow	NPV
	PVF* = 0.909		PVF* = 0.826		PVF* = 0.751			
	CF	PV	CF	PV	CF	PV		
1	10,000	9,090	15,000	12,390	10,000	7,510	25,000	3,990
2	12,500	11,363	17,500	14,455	12,500	9,388	25,000	10,206
3	10,000	9,090	17,500	14,455	15,000	11,265	25,000	9,810
4	7,500	6,818	12,500	10,325	12,500	9,388	25,000	1,531
5	10,000	9,090	12,500	10,325	12,500	9,388	25,000	3,803
							Total	29,340
							Average NPV	**5,868**

(4 Marks)

* PVF (Present Value Factor) at 10% discount rate.

Answer-3 :

The given problem is a balanced minimization problem.

Subtracting minimum element of each row from all the elements of that row, the given problem reduces to-

Mechanist	Job1	Job 2	Job 3	Job 4	Job 5
A	8	1	1	0	6
B	7	5	6	0	5
C	5	3	4	0	2
D	1	3	6	0	2
E	3	4	3	0	4

(1 Mark)

Subtract the minimum element of each column from all the elements of that column. Draw theminimum number of lines horizontal or vertical so as to cover all zeros.

Mechanist	Job1	Job 2	Job 3	Job 4	Job 5
A	7	0	0	0	4
B	6	4	5	0	3
C	4	2	3	0	0
D	0	2	5	0	0
E	2	3	2	0	2

(2 Marks)

Since the minimum number of lines covering all zeros is equal to 4 which is less than thenumber of columns / rows (=5), the above table will not provide optimal solution. Subtract theminimum uncovered element (=2) from all uncovered elements and add to the elements lyingon the intersection of two lines, we get the following matrix-

Mechanist	Job1	Job 2	Job 3	Job 4	Job 5
A	7	0	0	2	6
B	4	2	3	0	3
C	2	0	1	0	0
D	0	2	5	2	2
E	0	1	0	0	2

(2 Marks)

Since the minimum number of horizontal and vertical lines to cover all zeros is equal to five which is equal to the order of the matrix, the above table will give the optimal solution. Theoptimal assignment is made below-

Mechanist	Job1	Job 2	Job 3	Job 4	Job 5
A	7	0	~~0~~	2	6
B	4	2	3	0	3
C	2	~~0~~	1	~~0~~	0
D	0	2	5	2	2
E	~~0~~	1	0	~~0~~	2

(2 Marks)

The optimal assignment is given below-

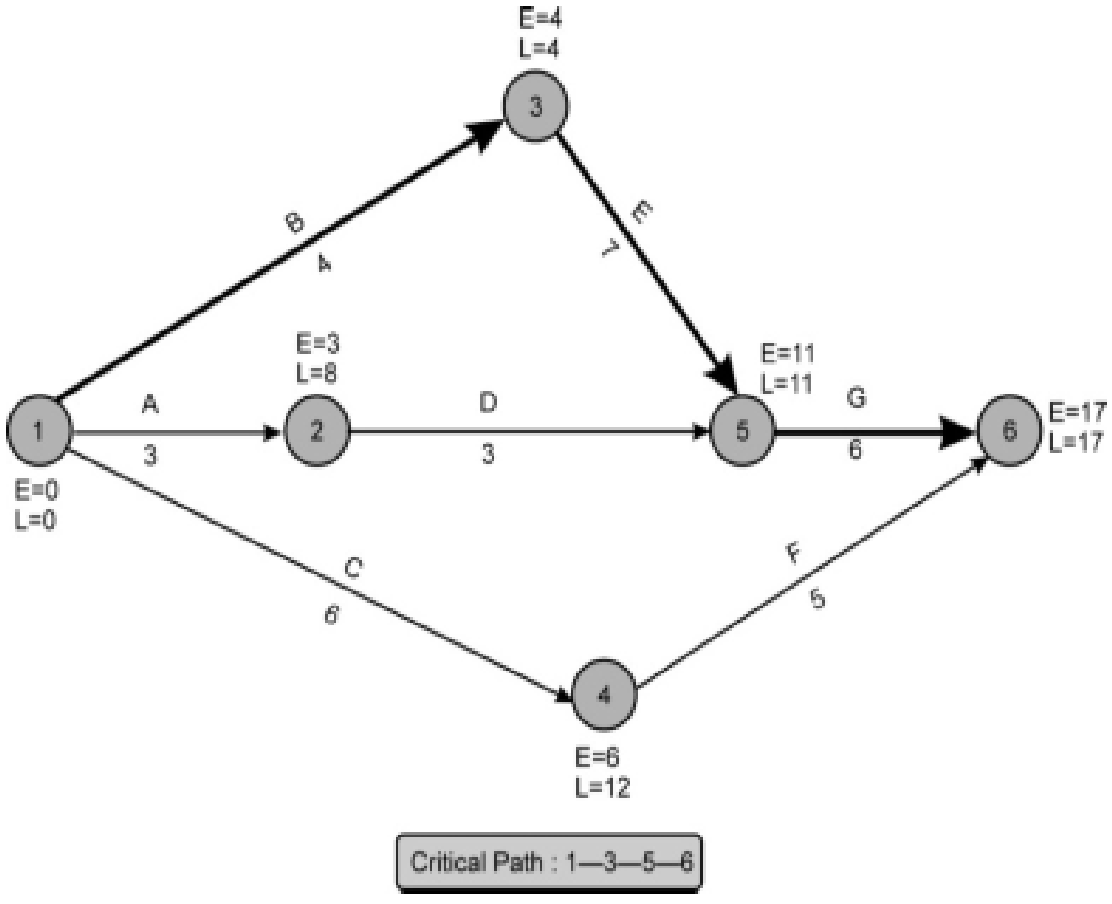
Mechanist	Job	Wages
A	2	3
B	4	2
C	5	4
D	1	3
E	3	9
	Total	21

The total least cost associated with the optimal mechanist-job assignment equals to 21.

(1 Mark)

Answer-4 :

(i) The network for the given problem



(3 Marks)

The Expected Time and Variance for each of the activities (in Days)

Activity	Time Estimates (Days)			Expected Time	Variance
	Optimistic (t_o)	Pessimistic (t_p)	Most Likely (t_m)	$t_e = \frac{t_o + 4t_m + t_p}{6}$	$S_t^2 = \left(\frac{t_p - t_o}{6}\right)^2$
A (1–2)	1	5	3	3	$\frac{4}{9}$
B (1–3)	1	7	4	4	1
C (1–4)	2	10	6	6	$\frac{16}{9}$
D (2–5)	2	8	2	3	1
E (3–5)	3	15	6	7	4
F (4–6)	2	8	5	5	1
G (5–6)	2	14	5	6	4

(3 Marks)

Probability of Completing the Project by Schedule Time T_s is given by Z = $\frac{T_s - T_e}{\sigma_e}$

Expected Project Length (T_e) = 17 Days

Variance of the Critical Path 1–3–5–6 (σ_e^2) [1+4+4] = 9

Standard Deviation of the Critical Path (σ_e) $\left[\sqrt{9}\right]$ = 3

(ii) Probability of *not meeting* the target time of 22 days

Probability of Completing the Project by Schedule Time T_s is given by Z = $\frac{T_s - T_e}{\sigma_e}$

Accordingly probability of meeting the target time of 22 days is given by Z = $\frac{22 - 17}{3}$

= 1.67*

Probability (Z = 1.67) = 0.9525

Probability of not meeting the target time of 22 days [1– 0.9525] = 0.0475

Or = 4.75%

(iii) Expected Time if the project to be completed with 99% chance

Probability of Completing the Project by Schedule Time T_s is given by Z $= \frac{T_s - T_e}{\sigma_e}$

Accordingly,

$$Z = \frac{T_s - 17}{3}$$

At 99% Chance Z equals to 2.33

Accordingly,

$$2.33 = \frac{T_s - 17}{3}$$

Or $T_s = 23.99$

Hence, expected time of completing the project with 99% of chances is 23.99 or 24 Days.

(4 Marks)

Answer-5 :

Working Note

The usual learning curve model is

$y = ax^b$

Where

y	=	Average time per unit for x units
a	=	Time required for first unit
x	=	Cumulative number of units produced
b	=	Learning coefficient

(1 Mark)

W.N.1

Time required for first 15 units based on revised learning curve of 80% (when the time required for the first unit is 10 hours)

y	=	$10 \times (15)^{-0.322}$
log y	=	log 10 - 0.322 × log 15
log y	=	log 10 - 0.322 × log (5 × 3)
log y	=	log 10 - 0.322 × [log 5 + log 3]
log y	=	1 - 0.322 × [0.69897 + 0.47712]
log y	=	0.6213
y	=	antilog of 0.6213
y	=	4.181 hours
Total time for 15 units	=	15 units × 4.181 hours
	=	62.72 hours

(1 Mark)

Time required for first 14 units based on revised learning curve of 80% (when the time required for the first unit is 10 hours)

y	=	$10 \times (14)^{-0.322}$
log y	=	log10 - 0.322 × log 14
log y	=	log10 - 0.322 × log (2 × 7)
log y	=	log10 - 0.322 × [log 2 + log 7]
log y	=	1 - 0.322 × [0.3010 + 0.8451]
log y	=	0.63096
y	=	antilog of 0.63096
y	=	4.275 hrs
Total time for 14 units	=	14 units × 4.275 hrs
	=	59.85 hrs

(1 Mark)

Time required for 25 units based on revised learning curve of 80% (when the time required for the first unit is 10 hours)

Total time for first 15 units	=	62.72 hrs
Total time for next 10 units	=	28.70 hrs [(62.72 - 59.85) hours × 10 units]
Total time for 25 units	=	62.72 hrs + 28.70 hrs
	=	91.42 hrs

(1 Mark)

W.N.2

Computation of Standard and Actual Rate

Standard Rate	=	$\frac{\text{Rs.1,19,288}}{\text{180.74 hrs.}}$
	=	Rs.660.00 per hr.
Actual Rate	=	$\frac{\text{Rs.79,704}}{\text{118.08 hrs.}}$
	=	Rs. 675.00 per hr.

(1 Mark)

W.N.3

Computation of Variances

Labour Rate Variance	=	Actual Hrs × (Std. Rate – Actual Rate)
	=	118.08 hrs × (Rs.660.00 – Rs.675.00)
	=	Rs.1,771.20 (A)
Labour Efficiency Variance	=	Std. Rate × (Std. Hrs – Actual Hrs)
	=	Rs.660 × (91.42 hrs – 118.08 hrs)
	=	Rs.17,595.60 (A)

(1 Mark)

Statement of Reconciliation (Actual Figures Vs Budgeted Figures)

Particulars	**Rs.**
Actual Cost	79,704.00
Less: Labour Rate Variance (Adverse)	1,771.20
Less: Labour Efficiency Variance (Adverse)	17,595.60
Budgeted Labour Cost (Revised)*	60,337.20

Budgeted Labour Cost (Revised)*

= Std. Hrs. × Std. Rate

= 91.42 hrs. × Rs.660

= Rs. 60,337.20

(4 Marks)

Answer-6 :

STATEMENT SHOWING "Causes of Change in Profit in 2013"

		Rs.' lakhs	**Rs.' lakhs**
Profit Earned in 2012			40
Add:	Increase in Profit due to:		
	Sales Price Variance	70.00 (F)	
	Sales Margin Volume Variance ['100 * 20%]	20.00 (F)	90
Add:	Savings in Material Cost due to:		
	Material Price Variance	13.50 (F)	
	Material Usage Variance	12.50 (F)	26
Add: Net Savings in Wages			
	Labour Rate Variance	7.00 (A)	
	Labour Efficiency Variance	10.00 (F)	3
Add:	Net Savings in Variable Overheads due to:		
	Expenditure Variance	4.00 (A)	
	Efficiency Variance	5.00 (F)	1

Less:	Decrease in Profit due to:	
	Increase in Fixed Overheads	70
Profit in 2013		90

(6 Marks)

WORKING NOTES

(1) Sales

Sales in 2013 Price $\left(\text{Rs.770 lakhs x } \frac{100\%}{110\%}\right)$	Rs.700 lakhs
Increase in Sales Volume (16.67% or 1/6th over that in 2012)	Rs.100 lakhs
Or Say Sales Volume Variance	
Sales Price Variance (Rs.770 lakhs – Rs. 700 lakhs) Rs.70 lakhs	Rs.70 lakhs

(2) Material

Material Price per Kg. in 2012 $\left(\frac{\text{Rs.300 lakhs}}{\text{1.20 lakhs kgs.}}\right)$	Rs.250
Material Price per Kg. in 2013 $\left(\frac{\text{Rs.324 lakhs}}{\text{1.35 lakhs kgs.}}\right)$	Rs.240
Saving in Material Price per Kg.	Rs.10
Increase in expected Material Consumption In 2013 (1/6 of 1,20,000 Kgs.)	20,000 Kgs.
Total expected Consumption in 2013 (1,20,000 Kgs.+ 20,000 Kgs.)	1,40,000 Kgs.
Actual Consumption in 2012	1,35,000 Kgs.
Saving in Materials	5,000 Kgs.
Material Price Variance (1,35,000 xRs.10)	Rs.13,50,000 (F)
Material Usage variance (5,000Kgs. xRs.250)	Rs.12,50,000 (F)

(3) Wages

Labour hour rate in 2012 $\left(\frac{\text{Rs.120 lakhs}}{\text{24 lakh hrs.}}\right)$	Rs.5
Labour hour rate in 2013 $\left(\frac{\text{Rs.137 lakhs}}{\text{26 lakh hrs.}}\right)$	Rs.5.2692
Increase in expected Labour due to Volume increase in 2013 (1/6 of 24lakh hrs.)	4,00,000 hrs.
Total expected Hours required in 2013 (24,00,000 hrs.+ 1/6 of 24,00,000 hrs.)	28,00,000 hrs.
Actual Labour Hours used in 2013	26,00,000 hrs.
Saving in Labour Hours	2,00,000 hrs.
Labour Rate Variance [26,00,000 hrs.x (Rs. 5 – Rs. 5.2692...)]	Rs.7,00,000(A)
Labour Efficiency Variance (2,00,000 hrs. xRs. 5)	Rs.10,00,000 (F)

(4) Variable Overheads (V.O.)

Variable Overhead hour rate in 2012 $\left(\frac{\text{Rs.60 lakhs}}{\text{24 lakhs hrs.}}\right)$	Rs.2.5
Labour hour rate in 2013 $\left(\frac{\text{Rs.69 lakhs}}{\text{26 lakhs hrs.}}\right)$	Rs.2,6538
Increase in expected V.O. due to Volume increase in 2013 (1/6 of 24lakh hrs.)	4,00,000 hrs.
Total expected Hours required in 2013 (24,00,000 hrs.+ 1/6 of 24,00,000 hrs.)	28,00,000 hrs.
Actual Variable Overheads Hours used in 2013	26,00,000 hrs.
Saving in Variable Overheads Hours	2,00,000 hrs.
V.O. Expenditure Variance [26,00,000 hrs.x (Rs. 2.5 – Rs. 2.6538...)]	Rs.4,00,000(A)
V.O. Efficiency Variance (2,00,000 hrs. xRs. 2.5)	Rs.5,00,000(F)
(Assumed Variable Overheads are related to direct labour hours)	

(5) Fixed Overheads

Increase in 2013 over 2012 (Rs.150 lakhs – Rs. 80 lakhs)	Rs. 70 lakhs

(6) P/V Ratio in 2012

$\left[\frac{\text{Rs.(80+40) Lakhs}}{\textit{Rs}.600 \text{ lkhs}}\right]$ x 100	20%

(4 Marks)