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FINAL CA

MAY '19

REVISION NOTES

Costing

Part - VI

BUDGETARY CONTROL

Q.1. S.V. Ltd., manufactures a single product. The selling price of the product is Rs.95 per unit. The following are the results obtained by the company during the last two quarters :

		Quarter 1	Quarter 2
Sales units		5,100	4,800
Production units		5,500	4,500
		₹	₹
Direct materials	A	66,000	54,000
	B	55,000	45,000
Manufacturing wages		1,56,750	1,38,000
Factory overheads		86,000	83,000
Selling overheads		1,79,000	1,73,000

The company estimates its sales for the next quarter to range between 5,500 units and 6,500 units, the most likely volume being 6,000 units. The manufacturing programme will match with the sales quantity such that no increase in inventory of finished goods is contemplated in the next quarter :

- The price of direct material B will increase by 10%. There will be no change in the price of direct material A.
- The wage rates will go up by 8%. If the production volume increase beyond 5,500 units, overtime premium of 50% is payable on the increased volume due to overtime working to be done by the variable labour complement component.
- The fixed factory and selling expenses will increase by 20% and 25% respectively.
- A discount in the selling price of 2% is allowed on all sales made at 6,500 units level of output. The selling price, however, will remain unaltered, if the volume of output is below 6,500 units.

While operating at a volume of output of 6,500 units in the next quarter, the company intends to quote for an additional volume of 2,000 units to be supplied to a Government department for its captive consumption. The working capital requirement of this order is estimated at 8% of the sales value of the Government order. The company desires a return of 20% on the capital employed in respect of this order.

Required :

(i) Prepare a flexible budget for the next quarter at 5,500, 6,000 and 6,500 unit levels and determine the profit at the respective volumes.

(ii) Calculate the lowest price per unit to be quoted in respect of the Government order for 2,000 units.

Q.2. Bintan-Indo Manufacturers Ltd. (BIML) is specialist in the manufacturing of Industrial Products. They manufacture and market two types of products uner the name 'X' and 'Y'. Company produces two products from three basic raw matetials 'A', 'B', and 'C'. Company follows a 13- period reporting cycle for budgeting purpose. Each period is four weeks long and has 20 working days. Data relating to the purchase or raw materials are presented below:

Raw Material	Purchases Price	Standard Purchases	Reorder Point	Projected Inventory Status at the end of 5th period (Kg)		Lead Time in Days Working
	(Per Kg)	Lot (Kg)	(Kg)	On Hand	On Order	
A	₹ 1.00	90,000	72,000	96,000	90,000	10
B	₹ 2.00	30,000	45,000	54,000	-	25
C	₹ 1.00	60,000	60,000	84,000	60,000	20

Past experience has shown that adequate inventory levels for 'X' and 'Y' can be maintained if 40 persent of the next periods projected sales are on hand at the end of a reporting period. Other relevant information is as follows:

Product	Raw Material Specifications			Projected Inventory Levels	Projected Sales		
	A	B	C	At the end of current (5^{th} period)	6^{th} period	7^{th} period	8^{th} period
	Kg	Kg	Kg				
X	1.25	0.50	-	18,000	45,000	52,500	57,000
Y	2.00	-	1.50	16,800	42,000	27,000	24,000

The sales of 'X' and 'Y' do not vary significantly from month to month. Consequently, the safety stock incorporated into the reorder point for each of the raw materials in adequate to compensate for variations in the sales of the finished products.

Raw materials orders are placed the day the quantity on hand falls below the reorder point. BIML's suppliers are very trustworthy so that the given lead times are reliable.

The outstanding order for raw materials 'A' and 'C' are due to arrive on the 10^{th} and 4^{th} working day of the 6^{th} period, respectively. Payments for all raw material orders are remitted by the 10^{th} day of the delivery.

You are required to determine the following items for raw materials 'A', and 'B', and 'C' for inclusion in the 6th period report to management:

(a) Projected quantities (in Kg) to be issued to production.
(b) Projected quantities (in Kg) ordered and the date (in terms of working days) the order is to be placed.
(c) The projected inventory balance (in Kg) at the end of the period.
(d) The payments for purchases with due date.

Q.3. A Company manufactures two Products A and B by making use of two types of materials, viz., X and Y Product A requires 10 units of X and 3 units of Y Product B requires 5 units of X and 2 units of Y. The price of X is ₹ 2 per unit and that of Y is ₹ 3 per unit. Standard hours allowed per product are 4 and 3, respectively. Budgeted wages rate is ₹ 8 per hour. Overtime premium is 50% and is payable, if a worker works for more than 40 hours a week. There are 150 workers.

The Sales Manager has estimated the sales of Product A to be 5,000 units and Product B 10,000 units. The target productivity ratio (or efficiency ratio) for the productive hours worked by the direct worker in actually manufacturing the product is 80%, in addition, the non - productive downtime is budgeted at 20% of the productive hours worked. There are twelve 5 day weeks in the budget period and it is anticipated that sales and production will occur evenly throughout the whole period.

It is anticipated that stock at the beginning of the period will be :

Product A 800 units ; Product B 1,680 units. The targeted closing stock expressed in terms of anticipated activity during the budget period are Product A 12 days sales ; Product B 18 days sales. The opening and closing stock of raw materials of X and Y will be maintained according to requirement of stock position for Product A and B.

You are required :

To prepare the following for the next period :

(i) Material usage and Material purchased budget in terms of quantities and values.
(ii) Production budget
(iii) Wages budget for the direct workers.

C. P. M. / P. E. R. T.

Q.1. Given the following information :

Activity	0 – 1	1 – 2	1 – 3	2 – 4	2 – 5	3 – 4	3 – 6	4 – 7	5 – 7	6 – 7
Duration (in days)	2	8	10	6	3	3	7	5	2	8

(i) Draw the arrow diagram.
(ii) Identify critical path and find the total project duration.
(iii) Determine total, free and independent floats.

Q.2. A small assembly plant assembles PCs through 9 interlinked stages according to following precedence / process :

Stage From to	Duration (Hours)
1-2	4
1-3	12
1-4	10
2-4	8
2-5	6
3-6	8
4-6	10
5-7	10
6-7	0
6-8	8
7-8	10
8-9	6

(i) Draw an arrow diagram (network) representing above assembly work.
(ii) Tabulate earliest start, earliest finish, latest start and latest finish time for all the stages.
(iii) Find the critical path and the assembly duration.
(iv) Tabulate total float, free float and independent float.

Q.3. A project consists of eight activities with the following relevant information :

Activity	Immediate Predecessor	Estimated Duration (Days)		
		Optimistic	Most Likely	Pessimistic
A	--	1	1	7
B	--	1	4	7
C	--	2	2	8
D	A	1	1	1
E	B	2	5	14
F	C	2	5	3
G	D,E	3	6	15
H	F,G	1	2	8

(i) Draw the PERT network and find out the expected project completion time.
(ii) What duration will have 95% confidence for project completion?
(For standard normal Z = 1.645, area under the standard normal curve from 0 to Z = 0.45).

Q.4. An Engineering Project has the following activities, whose time estimates are listed below :

Activity (i - j)	Estimated duration (in months)		
	Optimistic	Most likely	Pessimistic
1-2	2	2	14
1-3	2	8	14
1-4	4	4	16
2-5	2	2	2
3-5	4	10	28
4-6	4	10	16
5-6	6	12	30

(i) Draw the project network and find the critical path.

(ii) Find the expected duration and variance for each activity. What is the expected project length?

(iii) Calculate the variance and standard deviation of the project length.

(iv) What is the probability that the project will be completed at least eight months earlier than expected time?

(v) If the project due date is 38 months, what is the probability of not meeting the due date?

Given that :

Z	0.50	0.67	1.00	1.33	2.00
Probability	0.3085	0.2514	0.1587	0.0918	0.0228

Q.5. The following list of activities must be accomplished in order to complete a construction project:

Activity	Time (in weeks)	Predecessor
A	3	None
B	8	None
C	4	A,B
D	2	B
E	1	A
F	7	C
G	5	E,F
H	6	D,F
I	8	G,H
J	9	I

Draw a network diagram for this project.

Find the critical path and the duration of the project.

Q.6. Draw the network for the following activity data :

Activity	Preceded by
A	None
B	None
C	A
D	B,C
E	D
F	E
G	B,C
H	F
I	F,G
J	H,I
K	B
L	F,G,K

Q.7. The following Table gives the activities and other relevant data for a project :

Activity	Normal Time (days)	Crash Time (days)	Normal Cost (₹)	Crash Cost (₹)
1 – 2	4	3	600	800
1 – 3	2	5	400	400
1 – 4	5	4	750	900
2 – 3	7	5	400	600
2 – 5	7	6	800	1,000
3 – 5	2	1	500	650
4 – 5	5	4	600	850

Indirect cost per day for the project is ₹ 200.

(i) Draw the network of the project.
(ii) Find the normal duration and cost of the project.
(iii) Find the optimum duration and cost of the project.

Q.8. A small project consists of six activities with following information :

Activity i – j	Normal duration (days)	Crash duration (days)	Crashing cost (₹ per day)
1 – 2	9	6	20
1 – 3	8	5	25
1 – 4	15	10	30
2 – 4	5	3	10
3 – 4	10	6	15
4 – 5	2	1	40

(i) Draw the network and obtain normal and minimum project durations.
(ii) Find the additional cost of the project for the minimum project duration.

Q.9. The table below provides cost and time estimates of seven activities of a project :

Activity (i – j)	Time estimate (weeks)		Direct cost estimates (₹ in thousands)	
	Normal	Crash	Normal	Crash
1 – 2	2	1	10	15
1 – 3	8	5	15	21
2 – 4	4	3	20	24
3 – 4	1	1	7	7
3 – 5	2	1	8	15
4 – 6	5	3	10	16
5 – 6	6	2	12	36

(i) Draw the project network corresponding to normal time.
(ii) Determine the critical path and the normal duration and normal cost of the project.
(iii) Crash the activities so that the project completion time reduces to 9 weeks, with minimum additional cost.