PAPER – 5: ADVANCED MANAGEMENT ACCOUNTING

QUESTIONS

CVP Analysis

1. The profit for the year of Garena Ltd. works out to 12.5% of the capital employed and the relevant figures are as under:

Sales.. ₹5,00,000
Direct Materials... ₹2,50,000
Direct Labour..₹1,00,000
Variable Overheads..₹40,000
Capital Employed... ₹4,00,000

The new Sales Manager who has joined the company recently estimates for next year a profit of about 23% on capital employed, provided the volume of sales is increased by 10% and simultaneously there is an increase in Selling Price of 4% and an overall cost reduction in all the elements of cost by 2%.

Required

Find out by computing in detail the cost and profit for next year, whether the proposal of Sales Manager can be adopted.

Decision Making

2. A company produces three products (X, Y and Z). Extracts from the original budget for December 2019 are shown below:

	X	Y	Z
Sellling price (₹ per unit)	24	41	44
Total cost (₹ per unit)	20	20	35
Labour hours per unit	0.5	1.5	1.5
Machine hours per unit	1	2	0.75
Production and sales (units)	10,000	6,000	10,000

Variable costs are 40% of the total cost of each unit.

Fixed costs are absorbed at the rate of 150% of variable costs based on the budgeted production quantities as shown above.

It has now become known that during December 2019 essential maintenance work will have to be carried out. This will limit the availability of resources to

Labour Hours: 12,500 hours

Machine Hours: 30,000 hours

Required

Produce, using marginal costing principles, profit maximising production plan for December 2019 and the resulting profit or loss.

Decision Making

3. JCL Limited, a manufacturing company has three divisions: J, C and L. The company's all divisions are not performing well. Company wants to evaluate the potential closure of division "L". The cost and revenue information is given below:

	Division J and C (₹)	Division L (₹)	Total (₹)
Sales	1,70,000	24,000	1,94,000
Variable Cost	88,400	14,400	1,02,800
Contribution Margin	81,600	9,600	91,200
Traceable Fixed Cost	66,000	12,200	78,200
Divisional Profit	15,600	-2,600	13,000
Un-allocated fixed cost			5,000
Income before tax			8,000

Required

Calculate the increase or decrease in the profit after closure of division L if all traceable fixed cost of division L are avoidable. Should the division L be closed?

Assume that traceable fixed cost of division "L" having 50% of staff salary can be reassigned to other divisions. What is the effect of closure of division L with this assumption?

Cost Plus/ Mark-up Pricing

4. JTC Ltd. is specialists in the manufacture of sports goods. They manufacture croquet mallets but purchase the wooden balls, iron arches and stakes required to complete a croquet set.

Mallets consist of a head and handle. Handles use 2.5 board feet per handle at ₹ 50 per board foot. Spoilage loss is negligible for the manufacture of handles. Heads frequently split and create considerable scrap.

A head requires 0.40 board feet of high quality lumber costing ₹ 60 per board foot. Spoilage normally works out to 20% of the completed heads. 4% of the spoiled heads can be salvaged and sold as scrap at ₹ 10 per spoiled head.

In the department machining and assembling the mallets, 6 men work 8 hours per day for 25 days in a month. Each worker can machine and assemble 12 mallets per uninterrupted 40 minutes time frame. In each 8 hours working day, 15 minutes are allowed for coffee-break, 8 minutes on an average for training and 9 minutes for supervisory instructions. Besides 10% of each day is booked as idle time to cover checking in and checking out changing operations, getting materials and other miscellaneous matters. Workers are paid at a comprehensive rate of ₹ 6 per hour.

The department is geared to produce 20,000 mallets per month and the monthly expenses of the department are as under:

	(₹)
Finishing and painting of the mallets……………………….	20,000
Lubricating oil for cutting machines…………………………….	600
Depreciation for cutting machine………………………………..	1,400
Repairs and maintenance………………………………………….	200
Power to run the machines………………………………………	400
Plant Manager's salary……………………………………………	9,400
Other overheads allocated to the department………......….	60,000

Required

As the mallets are machined and assembled in lots of 250, prepare a total cost sheet for one lot and advise the management on the selling price to be fixed per mallet in order to ensure a minimum 33.33% margin on the selling price.

Return on Investment Pricing

5. The cost of production and sales of 80,000 units per annum of product 'I' are:

Material……………………..	₹ 4,80,000	Labour………………	₹ 1,60,000
Variable Overhead………..	₹ 3,20,000	Fixed overhead……	₹ 5,00,000

The fixed portion of capital employed is ₹12 lacs and the varying portion is 50% of sales turnover.

Required

Determine the selling price per unit to earn a return of 12% net on capital employed (net of Tax @ 40%).

Budget – Ratio

6. Calculate from the following figures:
   (i) Efficiency ratio,
   (ii) Activity, Ratio and
   (iii) Capacity Ratio:

   Budgeted Production………….. 528 units

Standard Hours per unit………..10

Actual Production………………..450 units

Actual Working Hours………….. 6,000

Customer Profitability Analysis

7. ABC Ltd., a manufacturer of sports goods, operates its entire business through its three customers i.e. Customer X, a retailer and Customer Y and Customer Z, who are wholesalers. ABC Ltd. prices its products at variable unit cost plus 20%.

   Details of the company's customers (X, Y and Z) for the previous period are as follows:

Item	Customer X (Retailer)	Customer Y (Wholesaler)	Customer Z (Wholesaler)	Activity Rate
Order fulfilled (at variable cost plus 20%)	4 (each of ₹37,500)	12 (each of ₹2,12,500)	3 (each of ₹4,00,000)	₹600
Discount allowed (on order value)	5%	12.5%	12%	-
Regular Deliveries Made	4	0	3	₹250
Expedited Deliveries	2	0	2	₹750

   Customer Y is given a 12.5% discount (instead of 12% usually given to wholesalers) for collecting the goods using its own transport.

   Required

   Present a customer profitability statement. Comment on the special discount to Y.

Linear Programming

8. Cake company produces three types of cakes – X, Y, and Z. It uses cream and flour as raw material of which 7,000 kg and 9,000 kg respectively are available. The raw material requirements per box of cake are given below:

	Requirement (kg/ box)		
Raw Material	X	Y	Z
Cream	3	4	5
Flour	5	3	5

   The preparation time for each box of Cake X is three times that of Cake Y and 6 times that of Cake Z. The entire time of the firm can produce the equivalent of 5,000 boxes of cake X. The minimum production of X, Y and Z are 800, 950 and 900 boxes respectively.

Also, the ratios of the number of boxes produced of X and Y must be equal to 2:3. The profits per box of X, Y and Z are ₹ 1,000, ₹800 and ₹600 respectively

Required

Formulate the problem (no need to solve) as a liner programming model in order to maximize profit.

Present constraints with co-efficient of variables as minimum whole number values.

Assignment Problem – Minimisation

9. A factory is going to modify of a plant layout to install four new machines X_1, X_2, X_3 and X_4. There are 5 vacant places P, Q, R, S and T available. Because of limited space machine X_2 cannot be placed at R and X_3 cannot be placed at P. The cost of locating machine to place in Rupees is shown below:

(₹)

	P	Q	R	S	T
X_1	9	11	15	10	11
X_2	12	9	--	10	9
X_3	--	11	14	11	7
X_4	14	8	12	7	8

Required

Determine the optimal assignment schedule in such a manner that the total costs are kept at a minimum.

PERT/ CPM

10. The following table gives the activities in a construction project and the time duration of each activity:

Activity	Predecessors	Normal Time (Days)
A	---	16
B	---	20
C	A	8
D	A	10
E	B,C	6
F	D,E	12

Required

(i) Draw the activity network of the project.

(ii) Find critical path.

(iii) Find the total float and free-float for each activity.

Simulation

11. Finance Controller of Dunk Limited has drawn the following projections with probability distribution:

Raw Material		Wages & Other Variable Overheads		Sales	
₹ in '000	**Probability**	**₹ in 000**	**Probability**	**₹ in 000**	**Probability**
08 – 10	0.2	11 – 13	0.3	34 – 38	0.1
10 – 12	0.3	13 – 15	0.5	38 – 42	0.3
12 – 14	0.3	15 – 17	0.2	42 – 46	0.4
14 – 16	0.2			46 – 50	0.2

Opening cash balance is ₹ 40,000 and fixed cost is estimated at ₹ 15,000 per month.

Required

Simulate cash flow projection and expected cash balance at the end of the sixth month. Use the following single digit random numbers.

Raw Material	4 3 1 0 4 6
Wages & Other Variable Overheads	2 7 9 1 8 9
Sales	0 6 6 0 2 8

Learning Curve

12. The Crocodile Ltd. makes mementos for offering chief guests and other dignitaries at functions. A customer wants 4 identical pieces of hand-crafted gifts for 4 dignitaries invited to its function.

For this product, Company estimates the following costs for the 1st unit of the product.

Particulars of Costs	₹ / unit
Direct Variable Costs (excluding labour)	1,000
Direct Labour (20 hours @ ₹ 25 hour)	500

90 % learning curve ratio is applicable and one labourer works for one customer's order.

Required

(i) What is the price per piece to be quoted for this customer if the targeted contribution is ₹ 750 per unit?

(ii) If 4 different labourers made the 4 products simultaneously to ensure faster delivery to the customer, can the price at (i) above be quoted? Why?

13. West Wood Appliances Ltd. (WWAL) manufactures consumer durable products in a very highly competitive market. WWAL is considering launching a new product 'W-9' into the market and gathered the following data:

Expected Market Price- ₹ 5,000 per unit

Direct Material Cost- ₹ 1,850 per unit

Direct Labour Cost- ₹ 80 per hour

Variable Overhead Cost- ₹ 1,000 per unit

Packing Machine Cost (specially to be purchased for this product)- ₹5,00,000

WWAL expects the selling price for the new product will continue throughout the product's life and a total of 1,000 units can be sold over the entire lifetime of the product.

Direct labour costs are expected to reduce as the volume of output increases due to the effects of 80% learning curve (index is -0.3219). The expected time to be taken for the first unit is 30 hours and the learning effect is expected to end after 250 units have been produced. Units produced after first 250 units will take the same time as the 250^{th} unit.

Required

(i) Calculate the expected total labour hours over the life time of the product 'W-9'.

(ii) Profitability of product 'W-9' that WWAL will earn over the life time of the product.

(iii) Average target labour cost per unit over the life time of the product if WWAL requires average profit of ₹ 800 per unit, to achieve its long term objectives.

Note: $250^{-0.3219} = 0.1691$, $249^{-0.3219} = 0.1693$

Miscellaneous

14. Some statements are given below. Identify name of the cost with examples and state whether it is relevant/ non relevant in decision making.

(i) Costs are historical costs which have already been incurred and can not change by any decision made in future.

(ii) It is measure of benefits foregone by rejecting the second-best alternative of resources in favour of the best.

(iii) It is portioning of cost which involves payments to outsiders i.e. it gives rise to cash expenditure as opposed to such costs as depreciation.

(iv) Total cost is changed (increase or decrease) due to change in the level of activity, technology or production process or method of production.

(v) Cost used in evaluation of a product to reflect the use of resources but that have no observable cost.

15. State the appropriate pricing policy in each of the following independent situations:

(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.

(ii) 'X' is a new product for the company, but not for the market. B's success is crucial for the company's survival in the long term.

(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 usual sources of capital have uncertainties blocking them.

(iv) 'Z' is a perishable item, with more than 80% of its shelf life over.

16. Classify the following measures under appropriate categories in a Balanced Scorecard for a banking company which excels in its home loan products:

(i) A new product related to life insurance is being considered for a tie up with the successful housing loan disbursements.

e.g. every housing loan applicant to be advised to take a life policy or compelled to take a fire insurance policy.

(ii) How different sectors of housing loans with different interest rates have been sanctioned, their volumes of growth in the past 4 quarters.

(iii) How many days are taken to service a loan, how many loans have taken longer, what additional loans are to be released soon, etc.

SUGGESTED ANSWERS/HINTS

1. Statement Showing "Cost and Profit for the Next Year"

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% $\left(\frac{₹92,780}{₹4,00,000} \text{ x } 100\right)$

Since the Profit of ₹92,780 is more than 23% of capital employed, the proposal of the Sales Manager can be adopted.

2.

	X	Y	Z	Total	Available
Labour hours per unit	0.50	1.5	1.5		
Machine hours per unit	1	2	0.75		
Production and sales (units)	10,000	6,000	10,000		
Labour hours needed for budget	5,000	9,000	15,000	29,000	12,500
Machine hours needed for budget	10,000	12,000	7,500	29,500	30,000

	X	Y	Z
Selling price (per unit)	24	41	44
Variable cost (per unit)	8	8	14
Contribution per unit	16	33	30
Labour hours (per unit)	0.5	1.5	1.5
Contribution per labour hour	32	22	20
Rank	1st	2nd	3rd

Available labour hours are 12,500, so company production plan would be

Product	Production	Hours	Balance
X	10,000	5,000	7,500
Y	5,000	7,500	NIL

Profitability Statement

	X	Y	Total
Output (units)	10,000	5,000	
Revenue	2,40,000	2,05,000	4,45,000
Variable costs	80,000	40,000	1,20,000
Contribution	1,60,000	1,65,0000	3,25,000
Less: Fixed Costs*			4,02,000
Loss			(77,000)

- Fixed Cost is (10,000x12+6000x12+10000x21)

3. Statement Showing Comparative Profit if all traceable cost of division L is avoidable

	Total operation of company if it		Benefit or cost to closure L
	Keep Division L	**Closure of L**	
Sales	1,94,000	1,70,000	(24,000)
Less: Variable Expenses	1,02,800	88,400	14,400
Contribution	91,200	81,600	(9,600)
Less: Total Fixed Cost	83,200	71,000	12,200
Profit	8,000	10,600	2,600

Profit will increase by ₹2,600 closure of division L

Effect of closure with assumption	(₹)
Reduction in variable cost	14,400
Reduction in FC (12,200-6,100)	6,100
Total Benefits	20,500
Reduction in Sales	24,000
Reduction in profit by closure of Div. L	3,500

4. **JTC Ltd.**

Cost Sheet of One Lot of 250 Croquet Mallets

Computation of Total Cost:	**(₹)**
Direct Material	
Handles (2.5 feet × 250 units × ₹50)	31,250

Heads (1.20 × 250 × 0.40 × ₹60) [W.N.-1]	7,200
Less: Scrap Recovery (4% × 50 × ₹10)	(20)
Direct Labour (8Hrs × ₹6 × 250 / 120) [W.N.-2]	100
Prime Cost	38,530
Factory & Other Overheads	
Variable, Finishing & Painting (20,000 × 250 / 20,000) [W.N.-3]	250
Fixed (₹72,000 × 250 / 18,000) [W.N.-4]	1,000
Total Cost	39,780
Price Quotation:	**(₹)**
Cost *per mallet* (₹39,780 / 250 Units)	159.12
Add: Profit (50% on Cost)	79.56
Selling Price	238.68

Working Notes

1. Since 20% of completed heads are spoiled, output of 1 unit requires input of 1.20 units (1 + 0.20); so, total heads processed, 300 (1.20 × 250), of which spoiled heads are 50.

2.

Total Time *in a day*	(8 × 60)	480 minutes
Less: Idle Time	48 minutes	
Coffee Break	15 minutes	
Instructions	9 minutes	
Training	8 minutes	80 minutes
Productive Time *per day*:		400 minutes

Therefore, mallets to be produced per man per day, 120 units (400/40 × 12).

Since mallets are produced at the rate of 120 mallets per man day, so total monthly production will be18,000 mallets (120 units × 6 men × 25 days).

3. Finishing and painting overheads are assumed to be variable for the production of 20,000 mallets.

4. All the other expenses are fixed and are to be absorbed by 18,000 (120 units × 6 men × 25 Days) mallets of monthly production.

5. Return of 12% Net (after tax of 40%) on Capital Employed is equivalent to 20% (Gross) [12% ÷ (1 – 0.4)] on Capital Employed.

Let Selling Price per unit to be 'K'

Since Total Sales = Total Cost + Profit

80,000 K = 14,60,000 + 20% (12,00,000 + 0.5 × 80,000K)

Or, 80,000 K = 14,60,000 + 2,40,000 + 8,000K

Or, 72,000 K = 17,00,000

Or, 'K' = $\frac{17,00,000}{72,000}$

= ₹23.61

Hence Selling Price per unit will be ₹23.61.

6. **(i)** Efficiency Ratio = $\frac{\text{Standard Hours (for actual production)}}{\text{Actual Hours (worked)}} \times 100$

$= \frac{450 \text{ units} \times 10 \text{ hrs.}}{6,000 \text{ hrs.}} \times 100$

= 75%

(ii) Activity Ratio = $\frac{\text{Standard Hours (for actual production)}}{\text{Budgeted Hours}} \times 100$

$= \frac{450 \text{ units} \times 10 \text{ hrs.}}{528 \text{ units} \times 10 \text{ hrs.}} \times 100$

= 85.23%

(iii) Capacity Ratio = $\frac{\text{Actual Hours (worked)}}{\text{Budgeted Hours}} \times 100$

$= \frac{6,000 \text{ hrs.}}{528 \text{ units} \times 10 \text{ hrs.}} \times 100$

= 113.64%

7. **Statement Showing Customer Profitability Analysis**

Particulars	**Customers X (Retailer)**	**Customer Y (Wholesaler)**	**Customers Z (Wholesaler)**
Gross Revenue	1,50,000	25,50,000	12,00,000
Discount Allowed	7,500	3,18,750	1,44,000
Net Revenue	1,42,500	22,31,250	10,56,000
Variable Costs	1,25,000	21,25,000	10,00,000

Contribution	17,500	1,06,250	56,000
Order processing cost	2,400	7,200	1,800
Regular Deliveries	1,000	0	750
Expedited Deliveries	1,500	0	1,500
Net Profit	₹12,600	₹99,050	₹51,950
Profit Margin (%)	8.4%	3.88%	4.33%

Extra discount 0.5% of 25,50,000 = ₹12,750. B is the customer with highest order value. If Y required 15 expediated deliveries. It would cost the company ₹11,250. The discount is only marginally higher while also avoiding the risk of delay and consequent displeasure. Hence, it is justified.

8. Let the firm produced x boxes of Cake X, y boxes of Cake Y and z boxes of Cake Z.

The profit per box of Cake X, B and Z is 1,000, 800 and 600 respectively. Since objective of the firm is to maximize the profit, therefore, the objective function is given by

Maximize

$Z = 1{,}000x + 800y + 600z$

Condition-1:

The firm uses two raw materials cream and flour of which 7,000 and 9,000 units respective are available. As per the given data, the raw material constraints can be formulated as given below:

$3x + 4y + 5z \le 7{,}000$ and

$5x + 3y + 5z \le 9{,}000$ and

Condition-2;

The labour time for each box of Cake X is thrice that of cake Y and Six times that Cake Z. Also, the labour force can produce the equivalent of 5,000 boxes of Cakes.

$x + y/3 + z/6 \le 5{,}000$ *Or*

$6x + 2y + z \le 30{,}000$

Condition-3:

The minimum demand of the three cakes is 800, 950 and 900 boxes respectively.

Hence,

$x \ge 800$,

$y \geq 950$,

$z \geq 900$,

Condition-4:

Since the ratios of the number of boxes produced of A & B must be equal to 2:3, therefore

$\frac{1}{2} x = 1/3y$

$3x=2y$

9. Dummy machine (X_5) is inserted to make it a balanced cost matrix and assume its installation cost to be zero. Cost of install at cell X_3 (P) and X_2 (R) is very high marked as M.

	P	Q	R	S	T
X_1	9	11	15	10	11
X_2	12	9	M	10	9
X_3	M	11	14	11	7
X_4	14	8	12	7	8
X_5 (Dummy)	0	0	0	0	0

Step 1

Subtract the minimum element of each row from each element of that row-

	P	Q	R	S	T
X_1	0	2	6	1	2
X_2	3	0	M	1	0
X_3	M	4	7	4	0
X_4	7	1	5	0	1
X_5 (Dummy)	0	0	0	0	0

Step 2

Subtract the minimum element of each column from each element of that column-

	P	Q	R	S	T
X_1	0	2	6	1	2
X_2	3	0	M	1	0
X_3	M	4	7	4	0

X_4	7	1	5	0	1
X_5 (Dummy)	0	0	0	0	0

Step 3

Draw lines to connect the zeros as under-

	P	**Q**	**R**	**S**	**T**
X_1	$\boxed{0}$	2	6	1	2
X_2	3	$\boxed{0}$	M	1	0
X_3	M	4	7	4	$\boxed{0}$
X_4	7	1	5	$\boxed{0}$	1
X_5 (Dummy)	0	0	$\boxed{0}$	0	0

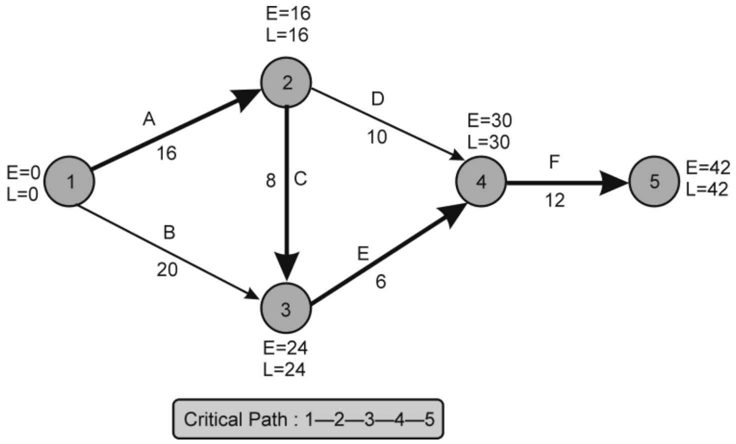
There are five lines which are equal to the order of the matrix. Hence the solution is optimal. We may proceed to make the assignment as under-

	P	**Q**	**R**	**S**	**T**
X_1	$\boxed{0}$	2	6	1	2
X_2	3	$\boxed{0}$	M	1	$\cancel{0}$
X_3	M	4	7	4	$\boxed{0}$
X_4	7	1	5	$\boxed{0}$	1
X_5 (Dummy)	$\cancel{0}$	$\cancel{0}$	$\boxed{0}$	$\cancel{0}$	$\cancel{0}$

The following is the assignment which keeps the total cost at minimum-

Machines	**Location**	**Costs (₹)**
X_1	P	9
X_2	Q	9
X_3	T	7
X_4	S	7
X_5 (Dummy)	R	0
	Total	32

10. (i) The **Network** for the given problem:



(ii) Critical Path: 1–2–3–4–5 (A–C–E–F).

(iii) Total Float and **Free Float** for each activity:

Activity	Duration	EST	EFT	LST	LFT	Slack of Tail Event	Slack of Head Event	Total Float	Free Float
	D_{ij}	E_i	$E_i + D_{ij}$	$L_j - D_{ij}$	L_j	$L_i - E_i$	$L_j - E_j$	LST – EST	Total Float – Slack of Head Event
A (1–2)	16	0	16	0	16	0	0	0	0
B (1–3)	20	0	20	4	24	0	0	4	4
C (2–3)	8	16	24	16	24	0	0	0	0
D (2–4)	10	16	26	20	30	0	0	4	4
E (3–4)	6	24	30	24	30	0	0	0	0
F (4–5)	12	30	42	30	42	0	0	0	0

11. Allocation of Random Numbers

Raw Material			Wages & Other Variable Overheads			Sales		
Mid Point	**Cum. Prob.**	**Random Nos.**	**Mid Point**	**Cum. Prob.**	**Random Nos.**	**Mid Point**	**Cum. Prob.**	**Rando m Nos.**
9	0.2	0 – 1	12	0.3	0 – 2	36	0.1	0
11	0.5	2 – 4	14	0.8	3 – 7	40	0.4	1 – 3
13	0.8	5 – 7	16	1.0	8 – 9	44	0.8	4 – 7
15	1.0	8 – 9				48	1.0	8 – 9

Simulation Table (₹ in 000)

Month	Raw Material	Wages & Other V.O	Sales	Fixed Cost	Net Cash Flow	Cash Balancing (Opening ₹40 thousand)
1	11	12	36	15	-2	38
2	11	14	44	15	+4	42
3	9	16	44	15	+4	46
4	9	12	36	15	0	46
5	11	16	40	15	-2	44
6	13	16	48	15	+4	**48**

12. (i)

	₹ / u Avg. / unit (4 units)
Variable Cost	1,000
Labour	405
Target Contribution	750
Price to be Quoted	2,155

(ii) No, Corocodile Ltd. cannot quote this price for varying products because the learning curve Ratio does not apply to non-repeated jobs. Each product will carry a different price according to its direct labour hours.

13. Calculation of Total Labour Hours Over the Life Time of The Product 'W-9'

The average time per unit for 250 units

$Y_x = ax^b$

Or, $Y_{250} = 30 \times 250^{-0.3219}$

Or, $Y_{250} = 30 \times 0.1691$

Or, $Y_{250} = 5.073$ hours

Total time for 250 units = 5.073 × 250 units

= 1,268.25 hours

The average time per unit for 249 units

$Y_{249} = 30 \times 249^{-0.3219}$

Or, $Y_{249} = 30 \times 0.1693$

Or, $Y_{249} = 5.079$ hours

Total time for 249 units = 5.079 × 249 units

= 1,264.67 hours

Time for 250th unit = 1,268.25 hours – 1,264.67 hours

= 3.58 hours

Total Time for 1,000 units = (750 × 3.58 hours) + 1,268.25 hours

= 3,953.25 hours

Profitability of the Product 'W-9'

Sales 1,000 Units

Particulars	**Amount (Rs.)**
Sales	50,00,000
Less: Direct Material	18,50,000
Direct Labour (3,953.25 hours × Rs. 80)	3,16,260
Variable Overheads (1,000 units× Rs. 1,000)	10,00,000
Contribution	18,33,740
Less: Packing Machine Cost	5,00,000
Profit	13,33,740

Average Target Labour Cost *per unit*

Particulars	Amount (Rs.)
Expected Sales Value	50,00,000
Less: Desired Profit (1,000 units × Rs. 800)	8,00,000
Target Cost	42,00,000
Less: Direct Material (1,000 units × Rs. 1,850)	18,50,000
Variable Cost (1,000 units × Rs. 1,000)	10,00,000
Packing Machine Cost	5,00,000
Target Labour Cost	8,50,000
Average Target Labour Cost *per unit* (Rs. 8,50,000 ÷ 1,000 units)	850

14.

	Name of the cost	Example	Relevant/ non relevant
(i)	Sunk Cost	Written down value of machine already purchased	Not relevant in decision making
(ii)	Opportunity Cost	Funds invested in business or deposited into bank	Useful in decision making
(iii)	Out of Pocket Costs	Commission to salesman on sales, Carriage inward.	Relevant for decision making
(iv)	Differential Cost	Include all fixed and variable cost which are increased/ decreased	Relevant in specific decision making
(v)	Notional Cost	Notional Rent for use of space	Relevant if company actually benefit by using resources alternatively

15.

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.

16. (i) New Product *tie up* --- Innovation / Learning Perspective

(ii) Growth of Volume --- Financial Perspective

(iii) Time for Loan / Fresh Products --- Customer Perspective