

MANAGEMENT ACCOUNTING-DECISION MAKING – STAGE-5

Marks

Q. 2 (a) Variable expenses increase:

New sales units	10,000 x 1.10	11,000 units	
New fixed costs	Rs. 268,800 x 0.95	Rs. 255,360	
New net income	Rs. 57,600 x 1.25	Rs. 72,000	

1

$$\begin{aligned} \text{Sales} &= \text{Variable cost} + \text{Fixed cost} + \text{Net income} \\ 11,000 (\text{Rs. } 76.8) &= 11,000 X + \text{Rs. } 255,360 + \text{Rs. } 72,000 \\ \text{Rs. } 844,800 &= 11,000 X + \text{Rs. } 327,360 \\ X &= \text{Rs. } 47.04 \text{ per unit or Rs. } 517,440 \end{aligned}$$

1

$$\text{Increase in variable expenses Rs. } 517,440 - \text{Rs. } 441,600 = \text{Rs. } 75,840$$

1

Break-even point:

$$\text{Contribution margin rate} = (\text{Rs. } 76.8 - \text{Rs. } 47.04) \div \text{Rs. } 76.8 = 0.3875$$

1

$$\text{Break-even point} = \text{Rs. } 255,360 \div 0.3875 = \text{Rs. } 658,994$$

1

(b) Expected net income:

$$\text{Variable cost rate per unit} = \text{Rs. } 441,600 \div 10,000 = \text{Rs. } 44.16$$

	Rs.	
Sales (13,000 x Rs. 76.80)	998,400	
Variable costs (13,000 x Rs. 44.16)	574,080	
Contribution margin	424,320	1
Fixed costs	268,800	
Expected net income	155,520	1
Actual net income [(1.5 x Rs. 57,600) + Rs. 57,600]	144,000	1
Difference	11,520	

Performance was worse than expected as the actual net income is decreased by **Rs. 11,520**.

1

(c)

	Rs.	
Sales (9,500 * x Rs. 76.8)	729,600	1
Variable costs (9,500 x Rs. 39.744 **)	377,568	1
Contribution margin	352,032	
Fixed costs (268,800 + 25,000)	293,800	1
Net income	58,232	1

Net income increases slightly by Rs. 58,232 – Rs. 57,600 = Rs. 632.

Working:

$$* 10,000 \text{ units} \times 0.95 = 9,500 \text{ units}$$

$$** \text{Rs. } 44.16 \times 0.90 = \text{Rs. } 39.744$$

(d) Sale increase:

$$\text{New sales} = \text{Variable cost} + \text{fixed cost} + \text{current net income}$$

$$S = 0.575S + \text{Rs. } 319,800 + \text{Rs. } 57,600$$

1

$$0.425S = \text{Rs. } 377,400$$

$$S = \text{Rs. } 888,000$$

(Where S = Sales)

$$\text{Sales increase required} = \text{Rs. } 888,000 - \text{Rs. } 768,000 = \text{Rs. } 120,000$$

1

Working:

$$\text{Variable cost ratio: Rs. } 441,600 \div \text{Rs. } 768,000 = 0.575$$

$$\text{Fixed cost: Rs. } 268,800 + \text{Rs. } 51,000 = \text{Rs. } 319,800$$

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- Q. 3 (a) (i)** The ranking of the products is relatively straightforward, provided you adopt a systematic approach.

	Rs./ litre				
Maximum demand	200	150	100	120	
	W	X	Y	Z	
Selling price	200	220	240	240	
Variable cost	108	110	118	132	
Contribution	92	110	122	108	
Labour hours used per litre	6	5	8	9	
Contribution per labour hour (Rs.)	15.33	22	15.25	12	
Ranking	2	1	3	4	
	1	+1	+1	+1	= 4

The available labour hours should be allocated first to the contract already made with Y Ltd. The remaining hours should then be allocated to products according to this ranking, and subject to the maximum demand.

Labour hours used per litre of W, X, Y, Z = 6+5+8+9 = 28 hours

	Product	Litres	Hours used	Cumulative hours used	
Y Ltd	W, X, Y, Z	20 each	x 28	560	560
Ranking	X	130	x 5	650	1,210
	W	180	x 6	1,080	2,290
	Y	50	x 8	400	2,690

Summary of recommended production for next three months

Product	Litres	
W	200	
X	150	
Y	70	
Z	20	

Calculation of profit for next three months:

Product	Litres	Contribution		
		Rs./ litre	Rs	
W	200	92	18,400	
X	150	110	16,500	
Y	70	122	8,540	
Z	20	108	2,160	
Total contribution			45,600	1
Fixed overhead *			25,600	
Profit			20,000	1

* **Calculation of fixed overhead per quarter:**

Using product W, fixed overhead per hour = Rs. 48 ÷ 6 = Rs. 8 per hour

Budgeted fixed overhead = 3,200 hours x Rs. 8 = Rs. 25,600

Note:

The calculation of the hourly rate of Rs. 8 per hour could have been based on any of the four products.

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- Q. 3 (a) (ii)** Products Y and Z can both be sold for a higher price than that offered by a supplier. The unsatisfied demand should therefore be met by using the supplier's offer for next quarter.

	Y	Z		
	Rs./ litre	Rs./ litre		
External supplier's price	210	200		
Internal variable cost of manufacturing	118	132		
Saving through internal manufacturing	92	68		
Labour hours used per litre	8	9		
Saving per labour hour	Rs. 1.50	Rs. 7.56		
	1	+1	=	2

It is preferable to manufacture product Y internally and purchase Z from the supplier. The capacity which would have been used to manufacture 20 litres of product Z can now be allocated to product Y (20 litres X 9.0 hours = 180 hours).

Summary of revised recommended production for the net three months:

Product		Hours	Litres	Litres	
W	Internal manufacturing	1,200		200	
X	Internal manufacturing	750		150	
Y	Internal manufacturing	740	92.5		
Y	External purchase		7.5	100	
Z	External purchase			120	
		2,690		570	
		1		+1	= 2

Calculation of revised profit for next three months

Product	Litres	Contribution		
		Rs./ litres	Rs.	
W	200.00	92	18,400	
X	150.00	110	16,500	
Y	92.50	122	11,285	
Y	7.50 (240 – 210)	30	225	
Z	120.00 (240 – 200)	40	4,800	
			51,210	2
Fixed overhead			25,600	
Revised profit			25,610	1

- (b) (i) Statement of additional sales, costs and profit:**

	Rs. '000 ^a			
	(i) Subcontract	(ii) Additional Shift	(iii) Additional Plant	
Additional sales (2000 Ton x Rs. 5,000)	10,000	10,000	10,000	
Cost increases:				
Raw materials	—	1,500	1,500	
Direct wages	—	8,000	6,000	
Subcontractor	8,200	—	—	
Production variable overhead	—	350	350	
Production fixed overhead	—	—	390	
Variable distribution costs	100	100	100	
Administration costs	200	200	200	
Selling and distribution cost	400	400	400	
	8,900	10,550	8,940	
Additional profit/(loss)	1,100	(550)	1,060	
Original budgeted profit	4,000	4,000	4,000	
Amended budget profit	5,100	3,450	5,060	
	2	+2	+2	= 6

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	Rs. '000 ^u	Marks
Workings:		
1. Raw materials = $2 \div 8 \times \text{Rs. } 6,000 =$	Rs. 1,500	1
2. Direct wages:		
(a) Additional shift = $100 \times \text{Rs. } 80 =$	Rs. 8,000	0.5
(b) Additional plant = $2 \div 8 \times \text{Rs. } 24,000 =$	Rs. 6,000	0.5
3. Subcontractor = $2,000 \times \text{Rs. } 4,100 =$	Rs. 8,200	0.5
4. Variable production overhead = $2 \div 8 \times 50\% \times \text{Rs. } 2,800 =$	Rs. 350	1
5. Variable distribution costs = $(2 \div 8) \times (20\% \times \text{Rs. } 2,000) =$	Rs. 100	0.5

(ii) Revised operating budget based on subcontracting being highest budget profit:

	Rs. '000 ^a	
Sales (10,000 x Rs. 5,000)	50,000	
Variable costs:		
Raw materials	6,000	
Direct wages	24,000	
Subcontract	8,200	
Variable production overhead (50%)	1,400	
Production variable costs	39,600	1
Distribution ($20\% \times 2,000,000 \times 10 \div 8$)	500	1
	40,100	
Contribution Margin	9,900	1
Fixed costs:		
Production (50%)	1,400	
Administration (1,200,000 + 200,000)	1,400	
Selling and distribution (1,600,000 + 400,000)	2,000	
	4,800	1
Profit	5,100	1

Q. 4 (a)

	Rs. '000 ^c					
Year	1	2	3	4	5	
Sales at 5% inflation (W-1)	7,350	10,805	12,317	13,954	13,580	1
Materials at 10% inflation	(1,177)	(1,815)	(2,396)	(3,075)	(2,899)	1
Labour at 10% inflation	(2,354)	(3,630)	(4,792)	(6,149)	(5,798)	1
Overheads at 5% inflation	(105)	(221)	(232)	(243)	(255)	1
Capital allowances (depreciation) (W-2)	(2,250)	(1,688)	(1,266)	(949)	(2,847)	1
Taxable profits	1,464	3,451	3,631	3,534	1,783	
Taxation at 35%	512	1208	1,272	1,237	624	1

Working (W-1):

Year 1 = 7,000 (1.05), Year 2 = 9,800 (1.05)², Year 3 = 10,640 (1.05)³, Year 4 = 11,480 (1.05)⁴, Year 5 = 10,640 (1.05)⁵.

The same approach is used to calculate the inflation adjusted cash flows for the remaining items using the following factors:

Inflation Factor @	Year 1	Year 2	Year 3	Year 4	Year 5
5%	1.05	1.1025	1.1576	1.2155	1.2763
10%	1.1	1.21	1.331	1.4641	1.6105

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Working (W-2):

25% writing down allowances on Rs. 9,000 with a balancing allowance in year 5.

Rs. '000^u

Year	Book value at Beginning of the year	Depreciation @ 25%	Accumulated Depreciation	Year end Book Value
1	9,000	2,250	2,250	6,750
2	6,750	1,688	3,938	5,062
3	5,062	1,266	5,204	3,796
4	3,796	949	6,153	2,847
5	2,847	2,847	9,000	0

The cash flow estimates and NPV calculation are as follows:

Rs. '000^f

Year	0	1	2	3	4	5	6
Inflow:							
Sales	–	7,350	10,865	12,317	13,954	13,580	–
Out flow:							
Materials		(1,177)	(1,815)	(2,396)	(3,075)	(2,899)	
Labour		(2,354)	(3,630)	(4,792)	(6,149)	(5,798)	
Overheads		(105)	(221)	(232)	(243)	(255)	
Fixed assets	(9,000)						
Working capital	(600)	(200)	(200)	(200)	(200)	1,400	–
Taxation			(512)	(1,208)	(1,272)	(1,237)	(624)
Total outflows		(3,836)	(6,380)	(8,829)	(10,939)	(8,789)	(624)
Net cash flows		3,514	4,425	3,488	3,015	4,791	(624)
Discount factors at 15%		0.870	0.756	0.658	0.572	0.497	0.432
Present values	(9,600)	3,057	3,345	2,295	1,725	2,381	(270)

The NPV is Rs. 2,933,000 and it is therefore recommended that the project should be undertaken.

- Q. 4 (b)** Calculating the IRR will produce an NPV of zero. NPV is Rs. 2,933,000 at a 15% discount rate. In order to use the interpolation method to calculate the IRR, it is necessary to ascertain a negative NPV. At a discount rate of 30% the NPV is

Year	Cash flows Rs. '000 ^f	Discount factor	PV Rs. '000 ^f
0	(9,600)	1.000	(9,600)
1	3,514	0.769	2,702
2	4,425	0.591	2,615
3	3,488	0.455	1,587
4	3,015	0.350	1,055
5	4,791	0.269	1,289
6	(624)	0.207	(129)
			(481)

Using the interpolation method, the IRR is

$$15\% + \frac{2,933}{2,933 - (-481)} \times (30\% - 15\%)$$

$$15\% + \frac{2,933}{3,414} \times 15\%$$

$$15\% + 12.89\% = 27.89\%$$

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Q. 5 Sensitivity Analysis

	Base case NPV	NPV if 10% sale units are decreased	NPV if 15% variable cost is increased	
Sales (units)	50,000	45,000	50,000	
Sales price per unit (Rs.)	82	82	82	
Variable cost per unit (Rs.)	52	52	59.8	
Sales revenue	4,100,000	3,690,000	4,100,000	
Variable cost	2,600,000	2,340,000	2,990,000	
Contribution margin	1,500,000	1,350,000	1,110,000	1+1+1 = 3
Less fixed cost:				
Cash fixed cost	870,000	870,000	870,000	
Depreciation	185,000	185,000	185,000	
Total fixed cost	1,055,000	1,055,000	1,055,000	
Earning before tax	445,000	295,000	55,000	
Tax 35%	155,750	103,250	19,250	
Earnings after tax	289,250	191,750	35,750	1+1+1 = 3
Depreciation	185,000	185,000	185,000	
Operating cash flow (OCF)	474,250	376,750	220,750	1+1+1 = 3
PV factor @ 15%	3.352	3.352	3.352	
PV @ 15%	1,589,686	1,262,866	739,954	
Investment in year 0	925,000	925,000	925,000	
NPV	664,686	337,866	(185,046)	
	1	+1	+1	= 3

Working:

$$\text{Depreciation} = \frac{\text{Rs. } 925,000 - 0}{5 \text{ years}} = \text{Rs. } 185,000$$

Q. 6

Number of Boats	Cumulative average time per Boat	Total time for all Boats	Incremental time for additional Boats	
	Hours	Hours	Hours	
1	800.0	800.0		
2 (x 80%)	640.0 (x 2)	1,280.0	(1,280 – 800)	480.0
4 (x 80%)	512.0 (x 4)	2,048.0	(2,048 – 1,280)	768.0
8 (x 80%)	409.0 (x 8)	3,276.8	(3,276.8 – 2,048)	1,228.8

(a) Separate piece for a second Boat:

	Rs.
Materials	25,000
Labour (480 hrs x Rs. 25)	12,000
Overhead (150% of labour cost)	18,000
Total cost	55,000
Profit (20%)	11,000
Sales price	66,000

2

(b) A single price for the first two Boats:

	Rs.
Materials cost for two Boats	50,000
Labour (1,280 hrs x Rs. 25)	32,000
Overhead (150% of labour cost)	48,000
Total cost for two Boats	130,000
Profit (20%)	26,000
Total sales price for two Boats	156,000
Price per Boat (+ 2)	78,000

2

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(c) A price for the third and fourth Boats:

	Rs.
Materials cost for two Boats	50,000
Labour (768 hrs x Rs. 25)	19,200
Overhead (150% of labour cost)	28,800
Total cost	98,000
Profit (20%)	19,600
Total sales price for two Boats	117,600
Price per Boat (÷ 2)	58,800

2

(d) A price for the first four Boats together and for the first eight Boats together:

		First four Boats		First eight Boats
		Rs.		Rs.
Materials		100,000		200,000
Labour	(2,048 hrs)	51,200	(3,276.8 hrs)	81,920
Overhead	(150% of labour cost)	76,800	(150% of labor cost)	122,880
Total cost		228,000		404,800
Profit (20%)		45,600		80,960
Total sales amount		273,600		485,760
Boats sold		4		8
Price per Boat		68,400		60,720
		2		+2

= 4

THE END