

PYQ RTP COMPILER

Chp14 Marginal Cost

Costing CA Intermediate Regular Batch May / Sep 2025



Past Year Questions (PYQs)

May 2018 to Jan 2025

PYQ Analysis

Exam	Q No.	Marks	Requirement	Special Points
PYQ - Jan 2025	1a	5	i) BEP (3m) ii) Indifference Point (2m)	New Que Structure, Solution is Easy
PYQ - Jan 2025	3b	6	Effect on profit for each alternative, suggest alternative with max. profit	New Pattern and Easy
PYQ - Sep 2024	MCQ 11	2	Revised PV Ratio	Regular
PYQ - Sep 2024	1c	4	i) special offer within cap - accept or not ii) Advice iii) special offer if cap exceeding	Advice Part is New
PYQ - Sep 2024	5b	7	Contribution and Profit	Offer Quantity is based on remaining available material
PYQ - May 2024	MCQ 2	2	Profit of next year after increase in sales volume	Basic Easy
PYQ - May 2024	DQ 5b	4	BES, Sales req for desired profit	Two alternative solutions

PYQ Analysis

Exam	Q No.	Marks	Requirement	Special Points
PYQ - Nov 2023	4b	5	Decision to shut & Shut Down Points	additional cost of shutdown, shutdown point
PYQ - May 2023	1c	5	BES, Total Sales etc.	Part iii & Part iv are good rest is easy
PYQ - May 2023	4c	5	Product Mix	Basic Easy
PYQ - Nov 2022	4a	10	Ranking and Optimum Product mix based on limiting factor	limiting factor is area of land, min and max both limits
PYQ - Nov 2022	1d	5	BEP, MOS, Profit	Basic Easy
PYQ - May 2022	1c	5	Which Machine to choose	Easy Basic
PYQ - May 2022	4b	5	FC, BES, Profit	Easy Basic
PYQ - Dec 2021	2b	10	BEP, PV Ratio, Revised BEP	Basic Easy
PYQ - July 2021	1d	5	Cost Indifference Point, BEP	Basic Easy
PYQ - July 2021	6b	5	What is Margin of Safety? What does a large MOS indicates? How can you calculate MOS?	Theory
PYQ - Jan 2021	3a	10	BEP of Merged Plant, Profitability at 80% utilization, Target sales to desire profit, change in sp to sustain increse in FC	Merging to be done at 100% and last part treatment
PYQ - Jan 2021	3b	10	Avg SP to earn desired profit	Calculation of Capacity utilization split for different parts of year, Semi Variable Cost Calculation

PYQ Analysis

Exam	Q No.	Marks	Requirement	Special Points
PYQ - Jan 2021	1a	5	Revised FC, Revised Sales, New BEP	change in SP and FC but no change in qty so VC in total will remain same
PYQ - Nov 2020	1b	5	Best possible mix and Contribution from best mix	Same as ICAI SM
PYQ - Nov 2020	6e	5	Differentiate between Marginal and Absorption Costing	Theory
PYQ - Nov 2019	5a	10	lowest price to be quoted for additional order.	Sales upto 5000 units will be at old SP only
PYQ - Nov 2019	1d	5	VC p.u., FC, PV Ratio	Very less data. Cal of VC by incremental cost / incremental units
PYQ - May 2019	5a	5	BEP units, Reduction in FC	Part ii is IMP – reduction in FC
PYQ - May 2019	6e	5	What are the limitations of marginal costing?	Theory
PYQ - Nov 2018	2b	10	FC, BEP, Target Sale, etc	Here desired profit is in the form of % of sales so target sales will be computed by equation
PYQ - May 2018	1c	5	PV ratio, FC, BEP	change in profit / change in sales
PYQ - May 2018	5b	10	Can we increase SP? Sales to earn profit of 20% on sales?	Part ii is Good

1. (a) XYZ Company has an option to buy any one of the two machines N or M to manufacture its unique industrial component P. Each of the machines have the capacity to produce same quality of component P and are almost identical except for the fact that they are being manufactured by a different manufacturers. The specifications for each Machine are:

Machine M : It has the capacity to produce 50,000 components of P per annum, the fixed costs being ₹ 1,50,000 and could generate a profit of ₹ 2,25,000 on the sale of all the components produced.

PYQ Jan 2025 – 1a

Machine N : It is also having the equal capacity to produce same number of components as that of Machine M per annum and all the components thus produced could be sold in the open market without any difficulty. Fixed cost of Machine N is ₹ 60,000 less than that of Machine M and yield a profit of ₹ 1,60,000 by selling all the components that are produced.

The selling price of each component of P is ₹ 100.

Required :

- (i) Calculate break even sales in value for each machine. 3
- (ii) Calculate sales levels in units where both the machines are equally profitable. 2

PYQ Jan 2025 – 1a

Part (i)

	Machine M	Machine N
Fixed cost	150,000	90,000
		(150,000 – 60,000)
Profit	225,000	160,000
Contribution	375,000	250,000
units	50,000	50,000
Contribution p.u.	7.5 p.u.	5.0 p.u.
Break even sales in units (Fixed cost / cont p.u.)	20,000 units	18,000 units
Break even sales in value @ 100. p.u.	20,00,000	18,00,000

PYQ Jan 2025 – 1a

Part (ii)

sales level at which both machines have equal profit is called as Indifference point

cal. of VC p.u.

	Machine M	Machine N
Selling price p.u.	100	100
contrib. when p.u.	7.5	5
VC p.u.	92.5	95

$$\text{Indifference point} = \frac{\text{Increase in fixed cost}}{\text{savings in VC p.u.}} = \frac{60,000}{95 - 92.5} = 24000 \text{ units}$$

(b) SW Limited manufactures Lenin bed covers. The present cost data are as below :

6

Variable Cost of manufacturing per unit : ₹ 200

Variable cost of selling and distribution per unit : ₹ 100

Fixed costs : ₹ 16,00,000

Selling price per unit : ₹ 800

Expected Profit for the coming year : ₹ 8,00,000

The management could sense a stage of stagnation/deterioration in future sales with the new entrant RK Enterprises. The SW limited has approached to one marketing consulting firm for the study of cost volume profit analysis. The firm suggested three alternatives to fuel the sales growth by tinkering with the selling price.

PYQ Jan 2025 – 3b

Alternatives	Reduce selling price %	Projected increase in sales (units) % (from the sales level that would generate ₹ 8,00,000 profit)
1	10.00	15
2	12.50	20
3	15.00	25

Required :

Calculate the effect on profits under each alternative and recommend which alternative is most likely to be adopted to get the maximum profit.

PYQ Jan 2025 – 3b

WN-1. cal of units sold at present

SP p.u.	800
VC p.u.	300
200 + 100	_____
cont p.u.	500 p.u.

$$\begin{aligned}\text{sales units} &= \frac{\text{FC} + \text{desired profit}}{\text{cont p.u.}} = \frac{1600,000 + 800,000}{500 \text{ p.u.}} \\ &= 4800 \text{ units}\end{aligned}$$

PYQ Jan 2025 – 3b

Statement of Profit Comparison

Particulars	Present	Alternative		
		1	2	3
Sales level (units)	4800	5520	5760	6000
Selling price p.u.	800	720	700	680
Variable cost p.u.	300	300	300	300
Contribution p.u.	<u>500</u>	<u>420</u>	<u>400</u>	<u>380</u>
Total contribution	2400,000	2318400	2304000	2280,000
Fixed cost	1600,000	1600,000	1600,000	1600,000
Profit	<u>800,000</u>	<u>7,18,400</u>	<u>7,04,000</u>	<u>6,80,000</u>

Comment: Alternative I will be adopted to get max profit.

PYQ Sep 2024 – MCQ 11

11. PS Limited is facing downfall in its demand. Marketing team has suggested to reduce the selling price by 5% to compete in the market. Variable cost is 76% of the current selling price.

You are required to find out the PN Ratio after reducing the price by 5%

- (A) 20%
- (B) 24%
- (C) 25.26%
- (D) 19%

$$\begin{aligned} SP &= 100 \\ VC &= 76 \end{aligned}$$

(b)

$$\begin{aligned} \text{new} \\ SP &= 95 \\ VC &= \frac{76}{19} \end{aligned}$$

$$PVR = 20\%$$

PYQ Sep 2024 – 1c

(c) *JC Ltd. has a production capacity of 80,000 units per year. Presently a company produces 60,000 units. Its cost structure is as under:*

Material Cost ₹ 6 per unit

Labour Cost ₹ 4 per unit

Variable overheads ₹ 2 per unit

Total fixed cost ₹ 3,00,000 per annum. Present selling price ₹ 20 per unit in the month of January, 2024 company received an offer from a Japanese client to supply 20,000 units at a price of ₹ 14 per unit with the additional shipping cost of ₹ 8,000.

PYQ Sep 2024 – 1c

Required:

- (i) On the basis of changes in the profit, advice to the company, whether the offer should be accepted or not?*
- (ii) Will your advice be different, if the customer is local one?*
- (iii) If Japanese client offer for supply of 30,000 units to a price of ₹ 14 (part supply of order not accepted) and shipping cost treated as variable cost, analyze the impact on the profit of JC Ltd., if order accepted.*

(4 Marks)

PYQ Sep 2024 – 1c

(c) (i) Statement Showing “Cost and Profit under Both Situation”

Particulars	Existing Production (60,000 units) (₹)	After Offer (80,000 units) (₹)
Sales		
Existing (60,000 x ₹ 20)	12,00,000	12,00,000
Offer (20,000 x ₹ 14)	-	2,80,000
Total Sales	12,00,000	14,80,000
Less: Direct Materials @ ₹ 6	3,60,000	4,80,000
Direct Labour @ ₹ 4	2,40,000	3,20,000
Variable Overheads @ ₹ 2	1,20,000	1,60,000
Contribution	4,80,000	5,20,000
Less: Additional Shipping cost	-	8,000
Less: Fixed Cost	3,00,000	3,00,000
Profit	1,80,000	2,12,000

PYQ Sep 2024 – 1c

Since the Profit has increased by ₹ 32,000, the proposal of the Japanese client should be accepted

(ii) Yes, the advice will be different, if the customer is local one since the company is currently selling at ₹ 20 in local market and therefore, selling at discounted price of ₹ 14 may impact its local market.

(iii) **Statement Showing “Cost and Profit”**

Particulars	After Offer (80,000 units) (₹)
Sales	
Existing (50,000 x ₹ 20)	10,00,000
Offer (30,000 x ₹ 14)	4,20,000
Total Sales	14,20,000

PYQ Sep 2024 – 1c

Less: Direct Materials @ ₹ 6	4,80,000
Direct Labour @ ₹ 4	3,20,000
Variable Overheads @ ₹ 2	1,60,000
Additional Shipping cost (₹ 8,000/20,000 units) x 30,000 units	12,000
Contribution	4,48,000
Less: Fixed Cost	3,00,000
Profit	1,48,000

If offer of Japanese client to supply 30,000 units at a price of ₹ 14 is accepted, **the Profit will decrease by ₹32,000 from the current level.**

PYQ Sep 2024 – 5b

(b) *ABC Ltd. is a well-known company for producing baby care products.*

The company produces and sells two variants of organic shampoo for children: "Baby Rose" and "Baby Lily". The sales and cost data for both products are provided below:

Particulars	Baby Rose	Baby Lily
<i>Current demand and Sales (Number of bottles)</i>	4,000	3,000
<i>Production Capacity (Number of bottles)</i>	7,500	6,000
<i>Selling Price per bottle (₹)</i>	600	750
<i>Variable Costs per bottle:</i>		
- <i>Direct Materials (₹ 20 Per litre)</i>	160	200
- <i>Other Variable Costs</i>	270	350

PYQ Sep 2024 – 5b

The fixed costs amount to ₹ 5,00,000 and ₹ 4,50,000 for Baby Rose and Baby Lily respectively. The Production Manager has informed that 1,00,000 litres of material is available for production. A dealer has approached the company and proposed to purchase both products at the existing selling prices, which are to be produced by utilizing the remaining unused material. However, he has insisted that all the bottles must be packed with eco-friendly packaging, which will result in an additional cost of ₹ 10 per bottle for the company. Presently, the company is not using eco-friendly material for packing of bottles.

Required:

*Prepare a detailed statement showing the overall contribution and profit of the company after acceptance of the dealer's proposal. **(7 Marks)***

PYQ Sep 2024 – 5b

(b) Statement showing the Overall contribution and profit of the company

Particulars	Baby Rose	Baby Lily	Total
	(₹)	(₹)	(₹)
Selling price per bottle	600	750	-
Less: Direct Materials	160	200	-
Other variable costs	270	350	-
Additional packaging	10	10	-
Contribution per bottle	160	190	-
Material required per bottle	8 litres	10	-
Contribution per litre of material	20	19	-

PYQ Sep 2024 – 5b

Ranking on the basis of Contribution per litre of material	I	II	
	Baby Rose (4,000 + 3,500 bottles)	Baby Lily (3,000 + 1,000 bottles)	
Selling price per bottle	600	750	-
Sales Value	45,00,000	30,00,000	
Variable Cost			
Direct Materials	7,500 units x ₹ 160 = 12,00,000	4,000 units x ₹ 200 = 8,00,000	
Other Variable Costs	7,500 units x ₹ 270 = 20,25,000	4,000 units x ₹ 350 = 14,00,000	
Eco-friendly pack cost	3,500 units x ₹ 10 = 35,000	1,000 units x ₹ 10 = 10,000	

PYQ Sep 2024 – 5b

Total Variable Costs	32,60,000	22,10,000	
Contribution	4,000 units x 170 3,500 units x 160 = 12,40,000	3,000 units x 200 1,000 units x 190 = 7,90,000	20,30,000
Less: Fixed Cost	5,00,000	4,50,000	9,50,000
Profit	7,40,000	3,40,000	10,80,000

WN1

	Baby Rose	Baby Lily
Raw Material used per unit of bottle (a)	8 litres (₹ 160/₹ 20)	10 litres (₹ 200/₹ 20)
Current Demand and Sales (b)	4,000 bottles	3,000 bottles
Total Raw Material used (c = a x b)	32,000 litres	30,000 litres

WN2

Raw Material available after current sales = 1,00,000 litres – 62,000 litres
= 38,000 litres

Since the contribution per unit of Baby Rose is higher than Baby Lily, the company will produce and sale Baby Rose shampoo to the dealer.

PYQ Sep 2024 – 5b

Number of units that can be produced in 38,000 litres = $38,000 \text{ litres} / 8 \text{ litres}$
= 4,750 bottles

However, the Production capacity of Baby Rose is 7,500 bottles, only 3,500 bottles can be produced.

Raw materials used in 3,500 bottles = $8 \text{ litres} \times 3,500 \text{ bottles} = 28,000 \text{ litres}$

Remaining material = 10,000 litres

Number of Baby Lily that can be produced in 10,000 litres = $10,000 \text{ litres} / 10 \text{ litres}$
= 1,000 bottles

PYQ Sep 2024 – 5b

Alternatively, Solution can also be presented in following way:

Statement showing the Overall contribution and profit of the company

Particulars	Baby Rose	Baby Lily	Total
	(₹)	(₹)	(₹)
Selling price per bottle	600	750	-
Less: Direct Materials	160	200	-
Other variable costs	270	350	-
Contribution per bottle Before additional packaging	170	200	-
Contribution per bottle per unit of raw material Before additional packaging	21.25	20	
Ranking on the basis of Contribution per bottle per unit of raw material	I	II	

PYQ Sep 2024 – 5b

Particulars	Current Sales (WN2)	Additional Sales of Baby Rose (3,500 bottles)	Additional Sales of Baby Lily (1,000 bottles)	Total
	(₹)	(₹)	(₹)	(₹)
Selling price per bottle	-	600	750	-
Less: Direct Materials	-	160	200	-
Other variable costs	-	270	350	-
Additional packaging	-	10	10	-
Contribution per unit	-	160	190	-
Total Contribution	12,80,000	5,60,000	1,90,000	20,30,000
Less: Fixed Cost	9,50,000	-	-	9,50,000
Profit	3,30,000	5,60,000	1,90,000	10,80,000

PYQ Sep 2024 – 5b

WN1

		Baby Rose	Baby Lily
Raw Material used per unit of bottle	(a)	8 litres (₹ 160/₹ 20)	10 litres (₹ 200/₹ 20)
Current Demand and Sales	(b)	4,000 bottles	3,000 bottles
Total Raw Material used	(c = a x b)	32,000 litres	30,000 litres

WN2

Statement showing the current contribution and profit of the company

Particulars	Baby Rose	Baby Lily	Total
	(₹)	(₹)	(₹)
Selling price per bottle	600	750	-
Less: Direct Materials	160	200	-
Other variable costs	270	350	-
Contribution per bottle Before additional packaging	170	200	-
Contribution per bottle per unit of raw material Before additional packaging	21.25	20	
Total Contribution Before additional packaging	6,80,000	6,00,000	12,80,000
Less: Fixed Cost	5,00,000	4,50,000	9,50,000
Profit	1,80,000	1,50,000	3,30,000

PYQ Sep 2024 – 5b

WN3

Raw Material available after current sales = 1,00,000 litres – 62,000 litres
= 38,000 litres

Since the contribution per unit of Baby Rose is higher than Baby Lily, the company will produce and sale Baby Rose shampoo to the dealer.

Number of units that can be produced in 38,000 litres = $38,000 \text{ litres} / 8 \text{ litres}$
= 4,750 bottles

However, the Production capacity of Baby Rose is 7,500 bottles, only 3,500 bottles can be produced.

Raw materials used in 3,500 bottles = $8 \text{ litres} \times 3,500 \text{ bottles} = 28,000 \text{ litres}$

Remaining material = 10,000 litres

Number of Baby Lily that can be produced in 10,000 litres = $10,000 \text{ litres} / 10 \text{ litres}$
= 1,000 bottles

PYQ May 2024 – MCQ 2

2. During the current year, Profit Volume Ratio of CED company is 25% and its Break even sales are ₹ 48,00,000. Margin of safety is 40%. It is expected that present fixed cost will increase by 10% during the next year, but selling price and variable cost per unit will remain same. What will be the profit for the next year if present sale volume is expected to increase by 15% ?

(A) ₹ 11,00,000

(B) ₹ 8,00,000

(C) ₹ 9,80,000

(D) ₹ 6,80,000

2

PYQ May 2024 – MCQ 2

PYQ May 2024 – MCQ 2

CY

$$PV = 25\%, \quad BES = 48L, \quad MOS\% = 40\%, \quad BES = 60\%$$

$$BES = \frac{FC}{PV}, \quad FC = BES \times PV = 12L$$
$$\text{Total Sale} = \frac{48L}{60\%} = 80L$$

NY

$$PV \text{ ratio} = 25\%, \quad (\text{since SP p.u. VC p.u. unchanged})$$

$$\text{Sales} = 80L \times 115\% = 92L$$

$$FC = 12L \times 110\% = 13.2L$$

$$\text{Profit} = (92L \times 25\%) - 13.2L = 980,000$$

PYQ May 2024 – Q5b

(b) The following information is given by PQR Ltd:

Year	Sales (₹)	Profit (Loss (₹))
2022-23	1,80,00,000	(3,80,000)
2023-24	2,40,00,000	11,20,000

You are required to:

- (i) Calculate the Break even sales.
- (ii) In 2024-25, it is estimated that the variable cost will go up by 5% and fixed cost will reduce by ₹ 4,80,000. Selling price will remain same. Calculate the sales volume to earn a profit of ₹ 15,00,000.

PYQ May 2024 – Q5b

(b) (i) Break-even sales = $\frac{\text{Fixed Cost}}{\text{P/V Ratio}}$

P/V Ratio = $\frac{\text{Change in Profit}}{\text{Change in Sales}} \times 100$ or, $\frac{15,00,000}{2,40,00,000 - 1,80,00,000} \times 100$

Or, $\frac{15,00,00}{60,00,000} \times 100$ or, 25%

Fixed Cost = Contribution – Profit

= ₹ 2,40,00,000 × 25% – ₹ 11,20,000

= ₹ 60,00,000 – ₹ 11,20,000 = ₹ 48,80,000

Break-even sales = $\frac{48,80,000}{25\%}$ = ₹ 1,95,20,000

PYQ May 2024 – Q5b

(iii) Desired Contribution in 2024-25 = Revised Fixed Cost + Target Profit

$$= (\text{₹ } 48,80,000 - \text{₹ } 4,80,000) + \text{₹ } 15,00,000$$
$$= \text{₹ } 59,00,000$$

Earlier P/V ratio = 25%. So Variable Cost ratio = 75%.

Selling price remain the same.

Variable cost increased by 5% i.e. Variable Cost ratio will be 78.75% (75+5% of 75).

Now revised P/V ratio = 21.25%

$$\text{Sales Volume in 2024-25} = \frac{59,00,000}{21.25\%} = \text{₹ } 2,77,64,706 (\text{approx.})$$

PYQ May 2024 – Q5b

If it is assumed that variable cost will go up by 5% on total. So, it will be increased from 75% to 80% and solution can be done in following way:

(i) Desired Contribution in 2024-25 = Revised Fixed Cost + Target Profit

$$= (\text{₹ } 48,80,000 - \text{₹ } 4,80,000) + \text{₹ } 15,00,000$$
$$= \text{₹ } 59,00,000$$

Earlier P/V ratio = 25%. So Variable Cost ratio = 75%.

Selling price remain the same.

Variable cost increased by 5% i.e. Variable Cost ratio will be 80% (75%+5%).

Now revised P/V ratio = 20%

$$\text{Sales Volume in 2024-25} = \frac{59,00,000}{20\%} = \text{₹ } 2,95,00,000$$

PYQ Nov 2023 – Q4b

- (b) *R Ltd. produces and sells 60,000 units of product 'AN', at its Noida Plant. The selling price of the product is ₹ 15 per unit. The variable cost is 80% of selling price per unit. Fixed cost during this period is ₹ 4,20,000. The company is continuously suffering losses, and management plans to shut down the Noida Plant.*

The fixed cost is expected to be reduced by ₹ 2,50,000.

Additional costs of plant shut down are expected at ₹ 25,000.

You are required to comment on:

- (i) Whether the Noida plant be shut down?*
- (ii) Find the shut-down point in units.*

(5 Marks)

PYQ Nov 2023 – Q4b

(b)

Statement of profit

Particulars	₹
Selling Price	15 per unit
Less : Variable cost	12 per unit
Contribution	3 per unit
Capacity	60,000 units
Total contribution (60,000 units × ₹ 3)	1,80,000
Less: Fixed Cost	4,20,000
Loss	(2,40,000)

PYQ Nov 2023 – Q4b

Shut down cost

Particular	₹
Fixed cost	1,70,000
Additional cost	25,000
Shut down cost	1,95,000

(i) Since the loss of Noida plant exceeds shut down cost it is better to shut down the plant.

(ii) Shut down point: $\frac{\text{Total fixed cost} - \text{Shut down cost}}{\text{Contribution per unit}}$

$$\frac{4,20,000 - 1,95,000}{3} = 75,000 \text{ units}$$

PYQ May 2023 – Q1c

(c) The following information pertains to ZB Limited for the year:

Profit volume ratio	30%
Margin of Safety (as % of total sales)	25%
Fixed cost	₹ 12,60,000

You are required to calculate:

- (i) Break even sales value (₹).
- (ii) Total sales value (₹) at present,
- (iii) Proposed sales value (₹) if company wants to earn the present profit after reduction of 10% in fixed cost,
- (iv) Sales in value (₹) to be made to earn a profit of 20% on sales assuming fixed cost remains unchanged,
- (v) New Margin of Safety if the sales value at present as computed in (ii) decreased by 12.5%. **(5 Marks)**

PYQ May 2023 – Q1c

(c) (i) **Calculation of Break-even sales in value:**

$$= \text{Fixed Cost} \div \text{P/V Ratio}$$

$$= ₹ 12,60,000 \div 30\% = ₹ 42,00,000$$

(ii) **Calculation of Total Sales value:**

$$\text{Sales value (S)} = \text{Break-even Sales} + \text{Margin of Safety}$$

$$\text{Or, } S = 42,00,000 + 0.25 S$$

$$\text{Or, } 0.75 S = 42,00,000$$

$$\text{Or, } S = 42,00,000 \div 0.75$$

$$\text{Or, Sales} = ₹ 56,00,000$$

(iii) **Calculation of proposed sales value to earn present profit:**

$$\text{Present profit} = \text{Sales} - \text{Variable cost} - \text{Fixed Cost}$$

$$= ₹ 56,00,000 - 70\% \text{ of } 56,00,000 - ₹ 12,60,000$$

$$= ₹ 56,00,000 - ₹ 39,20,000 - ₹ 12,60,000$$

$$= ₹ 4,20,000$$

PYQ May 2023 – Q1c

$$\text{Proposed Sales value (S)} = 0.7S + (90\% \text{ of ₹ } 12,60,000) + 4,20,000$$

$$S = 0.7S + 11,34,000 + 4,20,000$$

$$S = 15,54,000 \div 0.3 = \text{₹ } 51,80,000$$

(iv) Calculation of sales value to earn 20% on sales:

$$\text{Sales Value (S)} = 0.7 S + 12,60,000 + 0.2S$$

$$S = 12,60,000 \div 0.10 = \text{₹ } 1,26,00,000$$

(v) New Margin of Safety:

$$= (\text{Sales} - \text{BES}) \div \text{Sales}$$

$$= (87.5\% \text{ of } 56,00,000 - 42,00,000) \div (87.5\% \text{ of } 56,00,000)$$

$$= (49,00,000 - 42,00,000) \div 49,00,000$$

$$= 7,00,000 \div 49,00,000 = 14.29\%$$

PYQ May 2023 – Q4c

- (c) *MNP Company Limited produces two products 'A' and 'B'. The relevant cost and sales data per unit of output is as follows.*

Particulars	Product A	Product B
	(₹)	(₹)
<i>Direct material</i>	55	60
<i>Direct labour</i>	35	45
<i>Variable factory overheads</i>	40	20
<i>Selling Price</i>	180	175

The availability of machine hours is limited to 55,000 hours for the month. The monthly demand for product 'A' and product 'B' is 5,000 units and 6,000 units, respectively. The fixed expenses of the company are ₹1,40,000 per month. Variable factory overheads are ₹ 4 per machine hour. The company can produce both products according to the market demand.

Required:

Calculate the product mix that generates maximum profit for the company in the situation and also calculate profit of the company.

(5 Marks)

PYQ May 2023 – Q4c

Particulars	Product A ₹	Product B ₹
Selling Price	180	175
Variable cost:		
Direct Material	55	60
Direct labour	35	45
Variable factory overheads	<u>40</u>	<u>20</u>
	<u>130</u>	<u>125</u>
Contribution	50	50
Machine hour (p.u.)	10	5
Contribution per hour	5	10
Rank	II	I

PYQ May 2023 – Q4c

Calculation of Product Mix

Hours available	55,000
Product B (6000 x 5)	<u>30,000</u>
Balance Hours	25,000
Product A (2500 x 10)	<u>25,000</u>
Balance Hours	0

Calculation of Profit

	₹
Contribution	
A 2500 units x 50	
B 6000 units x 50	4,25,000
Less: Fixed cost	<u>(1,40,000)</u>
Profit	2,85,000

PYQ Nov 2022 – 4a

- (a) An agriculture based company having 210 hectares of land is engaged in growing three different cereals namely, wheat, rice and maize annually. The yield of the different crops and their selling prices are given below:

	Wheat	Rice	Maize
Yield (in kgs per hectare)	2,000	500	100
Selling Price (₹ per kg)	20	40	250

The variable cost data of different crops are given below:

(All figures in ₹ per kg)

Crop	Labour charges	Packing Materials	Other variable expenses
Wheat	8	2	4
Rice	10	2	1
Maize	120	10	20

PYQ Nov 2022 – 4a

The company has a policy to produce and sell all the three kinds of crops. The maximum and minimum area to be cultivated for each crop is as follows:

Crop	Maximum Area (in hectares)	Minimum Area (in hectares)
<i>Wheat</i>	160	100
<i>Rice</i>	50	40
<i>Maize</i>	60	10

You are required to:

- (i) Rank the crops on the basis of contribution per hectare.*
 - (ii) Determine the optimum product mix considering that all the three cereals are to be produced.*
 - (iii) Calculate the maximum profit which can be achieved if the total fixed cost per annum is ₹ 21,45,000.*
- (10 Marks)**

(Assume that there are no other constraints applicable to this company)

PYQ Nov 2022 – 4a

(a) (i) Statement showing Ranking of crops on the basis of Contribution per hectare

Sl. No	Particulars	Wheat	Rice	Maize
(I)	Sales price per kg (₹)	20	40	250
(II)	Variable cost* per kg (₹)	<u>14</u>	<u>13</u>	<u>150</u>
(III)	Contribution per kg (₹)	6	27	100
(IV)	Yield (in kgs per hectare)	2,000	500	100
(V)	Contribution per hectare (₹)	12,000	13,500	10,000
(VI)	Ranking	II	I	III

*Variable cost = Labour Charges + Packing Material + Other Variable Expenses

Therefore, to maximize profits, the order of priority of production would be Rice, Wheat and Maize.

PYQ Nov 2022 – 4a

(ii) & (iii) Statement showing optimum product mix considering that all the three cereals are to be produced and maximum profit thereof

Sl. No.	Particulars	Wheat	Rice	Maize	Total
(i)	Minimum Area (in hectare)	100	40	10	150
(ii)	Remaining area (in hectare)				60
(iii)	Distribution of remaining area based on ranking considering Maximum area	50	10	-	60
(iv)	Optimum mix (in hectare)	150	50	10	210
(v)	Contribution per hectare (₹)	12,000	13,500	10,000	
(vi)	Total contribution (₹)	18,00,000	6,75,000	1,00,000	25,75,000
(vii)	Fixed cost (₹)				21,45,000
(viii)	Maximum Profit (₹)				4,30,000

Optimum Product Mix and calculation of maximum profit earned by company can also be presented as below

PYQ Nov 2022 – 4a

(ii) Optimum Product Mix:

Particular	Area (in hectares)	Yield (kg per hectare)	Total Production (in kgs)
(a) Maximum of Rice	50	500	25000
(b) Minimum of Maize	10	100	1000
(c) Balance of Wheat	<u>150</u>	2000	<u>300000</u>
	210		326000

(iii) Calculation of maximum profit earned by the company:

	Production (in kgs)	Contribution (₹ per kg)	Total contribution (₹)
(a) Rice	25,000	24	6,75,000
(b) Maize	1,000	100	1,00,000
(c) Wheat	3,00,000	6	<u>18,00,000</u>
Total contribution			25,75,000
Less: Total Fixed Cost per annum			<u>(21,45,000)</u>
Maximum profits earned by the company			4,30,000

PYQ Nov 2022 – 1d

- (d) ABC Ltd sells its Product 'Y' at a price of ₹ 300 per unit and its variable cost is ₹ 180 per unit. The fixed costs are ₹ 16,80,000 per year uniformly incurred throughout the year. The Profit for the year is ₹ 7,20,000.

You are required to calculate:

- (i) BEP in value (₹) and units.
- (ii) Margin of Safety
- (iii) Profits made when sales are 24,000 units.
- (iv) Sales in value (₹) to be made to earn a net profit of ₹ 10,00,000 for the year.

PYQ Nov 2022 – 1d

(d) (i) Calculation of BEP in value

$$P / V \text{ ratio} = \frac{\text{Sales price} - \text{Variable Cost}}{\text{Sales}} = \frac{300 - 180}{300} = 40\%$$

$$\text{Break Even Point in Value (₹)} = \frac{\text{Fixed Cost}}{P / V \text{ ratio}} = \frac{16,80,000}{40\%} = ₹ 42,00,000$$

$$\text{Break Even Point in Units} = \frac{\text{Fixed Cost}}{\text{Contribution}} = \frac{16,80,000}{120} = 14,000 \text{ Units}$$

$$(\text{Alternatively, } \frac{₹ 42,00,000}{300} = 14000 \text{ units})$$

PYQ Nov 2022 – 1d

$$(ii) \text{ Margin of safety (In Amount)} = \frac{\text{Profit}}{\text{P / V ratio}} = \frac{7,20,000}{40\%} = ₹ 18,00,000$$

Margin of safety may also be calculated by deducting BEP sales from present sale.
Present sale is ₹ 60,00,000 i.e. $(16,80,000 + 7,20,000)/40\%$.

$$\text{Margin of safety (In units)} = \frac{\text{Profit}}{\text{Contribution per unit}} = \frac{7,20,000}{120} = 6,000 \text{ units}$$

(iii) Profit when sales are 24,000 units

Particular	(₹)
Contribution (24,000 × 120)	28,80,000
Less: Fixed cost	<u>16,80,000</u>
Profit	12,00,000

PYQ Nov 2022 – 1d

(iv) Sales in value to earn a net profit of ₹10,00,000

$$\frac{\text{Fixed Cost} + \text{Desired profit}}{\text{P / V Ratio}} = \frac{16,80,000 + 10,00,000}{40\%} = ₹ 67,00,000$$

PYQ May 2022 – 1c

- (c) *Top-tech a manufacturing company is presently evaluating two possible machines for the manufacture of superior Pen-drives. The following information is available:*

<i>Particulars</i>	<i>Machine A</i>	<i>Machine B</i>
<i>Selling price per unit</i>	₹ 400.00	₹ 400.00
<i>Variable cost per unit</i>	₹ 240.00	₹ 260.00
<i>Total fixed costs per year</i>	₹ 350 lakhs	₹ 200 lakhs
<i>Capacity (in units)</i>	8,00,000	10,00,000

Required:

- (i) *Recommend which machine should be chosen?*
- (ii) *Would you change your answer, if you were informed that in near future demand will be unlimited and the capacities of the two machines are as follows?*

Machine A - 12,00,000 units

Machine B - 12,00,000 units

Why?

PYQ May 2022 – 1c

		Machine-A	Machine-B	Total
A	Selling price per unit (₹)	400	400	
B	Variable cost per cost (₹)	240	260	
C	Contribution per unit (₹) [A-B]	160	140	
D	Units	8,00,000	10,00,000	
E	Total contribution (₹ [C×D])	12,80,00,000	14,00,00,000	26,80,00,000
F	Fixed Cost (₹)	3,50,00,000	2,00,00,000	5,50,00,000
G	Profit [E-F] (₹)	9,30,00,000	12,00,00,000	21,30,00,000
H	Profit per unit [G÷D] (₹)	116.25	120.00	

- (i) Machine B has the higher profit of ₹2,70,00,000 than the Machine-A. Further, Machine-B's fixed cost is less than the fixed cost of Machine-A and higher capacity. Hence, **Machine B be recommended.**

Note: This question can also be solved as below:

Indifferent point = Difference in fixed cost / difference in variable cost per unit

$$= 1,50,00,000 / 20 = 7,50,000 \text{ units}$$

PYQ May 2022 – 1c

At the level of demand 7,50,000 units both machine options equally profitable.

If demand below 7,50,000 units, select machine B (with lower FC).

If demand above 7,50,000 units, select machine A (with lower VC).

- (ii) When the capacities of both the machines are same and demand for the product is unlimited, calculation of profit will be as follows:

		Machine-A	Machine-B	Total
A	Contribution per unit (₹)	160	140	
B	Units	12,00,000	12,00,000	
C	Total contribution (₹) [A×B]	19,20,00,000	16,80,00,000	36,00,00,000
D	Fixed Cost (₹)	3,50,00,000	2,00,00,000	5,50,00,000
E	Profit [C-E] (₹)	15,70,00,000	14,80,00,000	30,50,00,000
F	Profit per unit [E÷B] (₹)	130.83	123.33	

Yes, the preference for the machine would change because now, Machine A is having higher contribution and higher profit, hence recommended.

PYQ May 2022 – 4b

- (b) *UV Limited started a manufacturing unit from 1st October 2021. It produces designer lamps and sells its lamps at ₹ 450 per unit.*

During the quarter ending on 31st December, 2021, it produced and sold 12,000 units and suffered a loss of ₹ 35 per unit.

During the quarter ending on 31st March, 2022, it produced and sold 30,000 units and earned a profit of ₹ 40 per unit.

You are required to calculate:

- (i) Total fixed cost incurred by UV Ltd. per quarter.*
- (ii) Break Even sales value (in rupees)*
- (iii) Calculate Profit, if the sale volume reaches 50,000 units in the next quarter (i.e., quarter ending on 30th June, 2022).* **(5 Marks)**

PYQ May 2022 – 4b

(b)

	Quarter ending 31 st December, 2021 (₹)	Quarter ending 31 st March, 2022 (₹)
Sales (No. of units sold x ₹ 450 per unit)	54,00,000	1,35,00,000
Profit (Loss)	(4,20,000) [12,000 × 35]	12,00,000 [30,000 × 40]

$$\text{P/V Ratio} = \frac{\text{Change in profit}}{\text{Change in Sales}} \times 100$$

$$\therefore \frac{16,20,000}{81,00,000} \times 100 = 20\%$$

$$\begin{aligned} \text{(i) Fixed Cost} &= \text{Sales} \times \text{P/V ratio} - \text{profit} \\ &= ₹ 1,35,00,000 \times 20\% - 12,00,000 \\ &= ₹ 15,00,000 \end{aligned}$$

PYQ May 2022 – 4b

Alternative Presentation for the calculation of Fixed cost

	Quarter ending 31 st December, 2021 (₹)	Quarter ending 31 st March, 2022 (₹)
Sales (No. of units sold x ₹ 450 per unit)	54,00,000	1,35,00,000
Profit (Loss)	(4,20,000) [12,000 × 35]	12,00,000 [30,000 × 40]
Total cost	58,20,000	1,23,00,000

$$\begin{aligned}\text{VC per unit} &= (1,23,00,000 - 58,20,000) / (30,000 - 12,000) \\ &= 64,80,000 / 18,000 = ₹ 360 \text{ per unit}\end{aligned}$$

$$\text{Fixed cost} = \text{TC} - \text{VC}, \quad 58,20,000 - (360 \times 12,000 \text{ units}) = ₹ 15,00,000$$

(ii) Break even sales value (in Rupees)

$$\begin{aligned}&= \frac{\text{Fixed cost}}{\text{P/V ratio}} \times 100 \\ &= \frac{15,00,000}{20\%} = ₹ 75,00,000\end{aligned}$$

PYQ May 2022 – 4b

(iii) Profit, if sales reach 50,000 units for the quarter ending 30th June, 2022

	(₹)
Sales (50,000 × ₹ 450)	2,25,00,000
Less: Variable cost	1,80,00,000
Contribution	45,00,000
Less: Fixed cost	15,00,000
Profit	30,00,000

PYQ Dec 2021 – 2b

- (b) AZ company has prepared its budget for the production of 2,00,000 units. The variable cost per unit is ₹ 16 and fixed cost is ₹ 4 per unit. The company fixes its selling price to fetch a profit of 20% on total cost.

You are required to calculate:

- (i) Present break-even sales (in ₹ and in quantity).
 - (ii) Present profit-volume ratio.
 - (iii) Revised break-even sales in ₹ and the revised profit-volume ratio, if it reduces its selling price by 10%.
 - (iv) What would be revised sales- in quantity and the amount, if a company desires a profit increase of 20% more than the budgeted profit and selling price is reduced by 10% as above in point (iii).
- (10 Marks)**

PYQ Dec 2021 – 2b

(b) Variable Cost per Unit = ₹16

Fixed Cost per Unit = ₹ 4, Total Fixed Cost = 2,00,000 units x ₹ 4 = ₹8,00,000

Total Cost per Unit = ₹20

Selling Price per Unit = Total Cost + Profit = ₹ 20 + ₹ 4 = ₹ 24

Contribution per Unit = ₹ 24 - ₹16 = ₹ 8

$$(i) \text{ Present Break-even Sales (Quantity)} = \frac{\text{Fixed cost}}{\text{Contribution margin per unit}} = \frac{\text{₹ 8,00,000}}{\text{₹ 8}} \\ = 1,00,000 \text{ units}$$

Present Break-even Sales (₹) = 1,00,000 units x ₹ 24 = ₹ 24,00,000

$$(ii) \text{ Present P/V Ratio} = \frac{8}{24} \times 100 = 33.33\%$$

(iii) Revised Selling Price per Unit = ₹ 24 - 10% of ₹ 24 = ₹ 21.60

Revised Contribution per Unit = ₹ 21.60 - ₹ 16 = ₹ 5.60

$$\text{Revised P/V Ratio} = \frac{5.60}{21.60} \times 100 = 25.926\%$$

$$\text{Revised Break-even point (₹)} = \frac{\text{Fixed cost}}{\text{P/V ratio}} = \frac{8,00,000}{25.926\%} = ₹ 30,85,705$$

PYQ Dec 2021 – 2b

$$\text{Revised Break-even point (units)} = \frac{\text{Fixed cost}}{\text{Contribution margin per unit}} = \frac{8,00,000}{5.60} = 1,42,857$$

units

$$\text{Revised Break-even point (₹)} = 1,42,857 \text{ units} \times ₹ 21.60 = ₹ 30,85,711$$

(iv) Present profit = ₹ 8,00,000

$$\text{Desired Profit} = 120\% \text{ of } ₹ 8,00,000 = ₹ 9,60,000$$

Sales to earn a profit of ₹ 9,60,000

$$\text{Total contribution required} = 8,00,000 + 9,60,000 = ₹ 17,60,000$$

$$\frac{\text{Fixed cost} + \text{Desired profit}}{\text{Contribution per unit}} = \frac{8,00,000 + 9,60,000}{5.60} = 3,14,286 \text{ units}$$

$$\text{Revised sales (in ₹)} = 3,14,286 \text{ units} \times ₹ 21.60 = ₹ 67,88,578$$

PYQ Jul 2021 – 1d

- (d) LR Ltd. is considering two alternative methods to manufacture a new product it intends to market. The two methods have a maximum output of 50,000 units each and produce identical items with a selling price of ₹ 25 each. The costs are:

	Method-1 Semi-Automatic (₹)	Method-2 Fully-Automatic (₹)
Variable cost per unit	15	10
Fixed costs	1,00,000	3,00,000

You are required to calculate:

- (1) Cost Indifference Point in units. Interpret your results.
- (2) The Break-even Point of each method in terms of units. **(4 x 5 = 20 Marks)**

PYQ Jul 2021 – 1d

(d) (i) Cost Indifference Point

	Method-1 and Method-2 (₹)
Differential Fixed Cost (I)	₹ 2,00,000 (₹ 3,00,000 – ₹ 1,00,000)
Differential Variable Costs (II)	₹ 5 (₹ 15 – ₹ 10)
Cost Indifference Point (I/II) (Differential Fixed Cost / Differential Variable Costs per unit)	40,000

Interpretation of Results

At activity level below the indifference points, the alternative **with lower fixed costs and higher variable costs should be used**. At activity level above the indifference point, alternative with **higher fixed costs and lower variable costs should be used**.

No. of Product	Alternative to be Chosen
Product $\leq$ 40,000 units	Method-1, Semi-Automatic
Product $\geq$ 40,000 units	Method-2, Automatic

PYQ Jul 2021 – 1d

(ii) Break Even point (in units)

	Method-1	Method-2
$\text{BEP (in units)} = \frac{\text{Fixed cost}}{\text{Contribution per unit}}$	$\frac{1,00,000}{(25-15)} = 10,000$	$\frac{3,00,000}{(25-10)} = 20,000$

PYQ Jan 2021 – 3a

(a) Two manufacturing companies A and B are planning to merge. The details are as follows:

	A	B
Capacity utilisation (%)	90	60
Sales (₹)	63,00,000	48,00,000
Variable Cost (₹)	39,60,000	22,50,000
Fixed Cost (₹)	13,00,000	15,00,000

Assuming that the proposal is implemented, calculate:

- (i) Break-Even sales of the merged plant and the capacity utilization at that stage.
- (ii) Profitability of the merged plant at 80% capacity utilization.
- (iii) Sales Turnover of the merged plant to earn a profit of ₹ 60,00,000.
- (iv) When the merged plant is working at a capacity to earn a profit of ₹ 60,00,000, what percentage of increase in selling price is required to sustain an increase of 5% in fixed overheads.

(10 Marks)

PYQ Jan 2021 – 3a

(a) Workings:

1. Statement showing computation of Breakeven of merged plant and other required information

S. No.	Particulars	Plan A		Plant B		Merged Plant (100%) (₹)
		Before (90%) (₹)	After (100%) (₹)	Before (60%) (₹)	After (100%) (₹)	
(i)	Sales	63,00,000	70,00,000	48,00,000	80,00,000	1,50,00,000
(ii)	Variable cost	39,60,000	44,00,000	22,50,000	37,50,000	81,50,000
(iii)	Contribution (i - ii)	23,40,000	26,00,000	25,50,000	42,50,000	68,50,000
(iv)	Fixed Cost	13,00,000	13,00,000	15,00,000	15,00,000	28,00,000
(v)	Profit (iii - iv)	10,40,000	13,00,000	10,50,000	27,50,000	40,50,000

PYQ Jan 2021 – 3a

$$2. \quad \text{PV ratio of merged plant} = \frac{\text{Contribution}}{\text{Sales}} \times 100$$

$$= \frac{\text{₹ } 68,50,000}{\text{₹ } 1,50,00,000} \times 100 = 45.67 \%$$

$$(i) \quad \text{Break even sales of merged plant} = \frac{\text{Fixed Cost}}{\text{P/V Ratio}}$$

$$= \frac{\text{₹ } 28,00,000}{45.67\%}$$

$$= \text{₹ } 61,30,939.34 \text{ (approx.)}$$

$$\text{Capacity utilisation} = \frac{\text{₹ } 61,30,939.34}{\text{₹ } 1,50,00,000} \times 100 = 40.88\%$$

PYQ Jan 2021 – 3a

(ii) Profitability of the merged plant at 80% capacity utilisation

$$= (\text{₹ } 1,50,00,000 \times 80\%) \times \text{P/v ratio} - \text{fixed cost}$$

$$= \text{₹ } 1,20,00,000 \times 45.67\% - \text{₹ } 28,00,000$$

$$= \text{₹ } 26,80,400$$

(iii) Sales to earn a profit of ₹ 60,00,000

$$\text{Desired sales} = \frac{\text{Fixed Cost} + \text{desired profit}}{\text{P/V Ratio}}$$

$$= \frac{\text{₹ } 28,00,000 + \text{₹ } 60,00,000}{45.67\%}$$

$$= \text{₹ } 1,92,68,666 \text{ (approx.)}$$

(iv) Increase in fixed cost

$$= \text{₹ } 28,00,000 \times 5\% = \text{₹ } 1,40,000$$

Therefore, percentage increase in sales price

$$= \frac{\text{₹ } 1,40,000}{\text{₹ } 1,92,68,666} \times 100 = 0.726\% \text{ (approx.)}$$

PYQ Jan 2021 – 3b

- (b) XYZ Ltd. is engaged in the manufacturing of toys. It can produce 4,20,000 toys at its 70% capacity on per annum basis. Company is in the process of determining sales price for the financial year 2020-21. It has provided the following information:

Direct Material ₹ 60 per unit

Direct Labour ₹ 30 per unit

Indirect Overheads:

Fixed ₹ 65,50,000 per annum

Variable ₹ 15 per unit

Semi-variable ₹ 5,00,000 per annum up to 60% capacity and ₹ 50,000 for every 5% increase in capacity or part thereof up to 80% capacity and thereafter ₹ 75,000 for every 10% increase in capacity or part thereof.

PYQ Jan 2021 – 3b

Company desires to earn a profit of ₹ 25,00,000 for the year. Company has planned that the factory will operate at 50% of capacity for first six months of the year and at 75% of capacity for further three months and for the balance three months, factory will operate at full capacity.

You are required to :

- (1) Determine the average selling price at which each of the toy should be sold to earn the desired profit.*
- (2) Given the above scenario, advise whether company should accept an offer to sell each Toy at:*
 - (a) ₹ 130 per Toy*
 - (b) ₹ 129 per Toy*

(10 Marks)

PYQ Jan 2021 – 3b

(b) (1) Statement of Cost

	For first 6 months	For further 3 months	For remaining 3 months	Total
	$6,00,000 \times \frac{6}{12} \times 50\%$ $= 1,50,000$ units	$6,00,000 \times \frac{3}{12} \times 75\%$ $= 1,12,500$ units	$6,00,000 \times \frac{3}{12}$ $= 1,50,000$ units	4,12,500 units
Direct Material	90,00,000	67,50,000	90,00,000	2,47,50,000
Direct labour	45,00,000	33,75,000	45,00,000	1,23,75,000
Indirect – Variable Expenses	22,50,000	16,87,500	22,50,000	61,87,500
Indirect – Fixed Expenses	32,75,000	16,37,500	16,37,500	65,50,000

PYQ Jan 2021 – 3b

Indirect Semi-variable expenses				
- For first six months @ 5,00,000 per annum	2,50,000			
- For further three months @ 6,50,000* per annum		1,62,500		
- For further three months @ 8,50,000** per annum			2,12,500	6,25,000
Total Cost	1,92,75,000	1,36,12,500	1,76,00,000	5,04,87,500
Desired Profit				25,00,000
Sales value				5,29,87,500
Average Sales price per Toy				128.45

- (2) (a) Company Should accept the offer as it is above its targeted sales price of ₹ 128.45 per toy.
- (b) Company Should accept the offer as it is above its targeted sales price of ₹ 128.45 per toy.

PYQ Jan 2021 – 1a

(a) During a particular period ABC Ltd has furnished the following data:

Sales ₹ 10,00,000

Contribution to sales ratio 37% and

Margin of safety is 25% of sales.

A decrease in selling price and decrease in the fixed cost could change the "contribution to sales ratio" to 30% and "margin of safety" to 40% of the revised sales. Calculate:

(i) Revised Fixed Cost.

(ii) Revised Sales and

(iii) New Break-Even Point.

PYQ Jan 2021 – 1a

(a) Contribution to sales ratio (P/V ratio) = 37%

Variable cost ratio = $100\% - 37\% = 63\%$

Variable cost = ₹ 10,00,000 x 63% = ₹ 6,30,000

After decrease in selling price and fixed cost, sales quantity has not changed. Thus, variable cost is ₹ 6,30,000.

Revised Contribution to sales = 30%

Thus, Variable cost ratio = $100\% - 30\% = 70\%$

Thus, Revised sales = $\frac{₹ 6,30,000}{70\%} = ₹ 9,00,000$

Revised, Break-even sales ratio = $100\% - 40\%$ (revised Margin of safety) = 60%

PYQ Jan 2021 – 1a

- (i) **Revised fixed cost** = revised breakeven sales x revised contribution to sales ratio
= ₹ 5,40,000 (₹ 9,00,000 x 60%) x 30%
= ₹ 1,62,000
- (ii) **Revised sales** = ₹ 9,00,000 (as calculated above)
- (iii) **Revised Break-even point** = Revised sales x Revised break-even sales ratio
= ₹ 9,00,000 x 60%
= ₹ 5,40,000

PYQ Nov 2020 – 1b

- (b) Moon Ltd. produces products 'X', 'Y' and 'Z' and has decided to analyse its production mix in respect of these three products - 'X', 'Y' and 'Z'.

You have the following information :

	X	Y	Z
Direct Materials ₹ (per unit)	160	120	80
Variable Overheads ₹ (per unit)	8	20	12

Direct labour :

Departments:	Rate per Hour (₹)	Hours per unit	Hours per unit	Hours per unit
		X	Y	Z
Department-A	4	6	10	5
Department-B	8	6	15	11

PYQ Nov 2020 – 1b

From the current budget, further details are as below :

	X	Y	Z
<i>Annual Production at present (in units)</i>	10,000	12,000	20,000
<i>Estimated Selling Price per unit (₹)</i>	312	400	240
<i>Sales departments estimate of possible sales in the coming year (in units)</i>	12,000	16,000	24,000

There is a constraint on supply of labour in Department-A and its manpower cannot be increased beyond its present level.

Required:

- (i) Identify the best possible product mix of Moon Ltd.*
- (ii) Calculate the total contribution from the best possible product mix.*

PYQ Nov 2020 – 1b

(b) (i) Statement Showing “Calculation of Contribution/ unit”

Particulars	X (₹)	Y (₹)	Z (₹)
Selling Price (A)	312	400	240
Variable Cost:			
Direct Material	160	120	80
Direct Labour			
Dept. A (Rate x Hours)	24	40	20
Dept. B (Rate x Hours)	48	120	88
Variable Overheads	8	20	12
Total Variable Cost (B)	240	300	200
Contribution per unit (A - B)	72	100	40

PYQ Nov 2020 – 1b

Hours in Dept. A	6	10	5
Contribution per hour	12	10	8
Rank	I	II	III

Existing Hours = $10,000 \times 6\text{hrs.} + 12,000 \times 10\text{ hrs.} + 20,000 \times 5\text{ hrs.} = 2,80,000\text{ hrs.}$

Best possible product mix (Allocation of Hours on the basis of ranking)

Produce 'X' = 12,000 units

Hours Required = 72,000 hrs (12,000 units $\times$ 6 hrs.)

Balance Hours Available = 2,08,000 hrs (2,80,000 hrs. – 72,000 hrs.)

Produce 'Y' (the Next Best) = 16,000 units

Hours Required = 1,60,000 hrs (16,000 units $\times$ 10 hrs.)

Balance Hours Available = 48,000 hrs (2,08,000 hrs. – 1,60,000 hrs.)

Produce 'Z' (balance) = 9,600 units (48,000 hrs./ 5 hrs.)

PYQ Nov 2020 – 1b

(ii)

Statement Showing “Contribution”

Product	Units	Contribution/ Unit (₹)	Total Contribution (₹)
X	12,000	72	8,64,000
Y	16,000	100	16,00,000
Z	9,600	40	3,84,000
Total			28,48,000

PYQ Nov 2019 – 5a

- (a) PJ Ltd manufactures hockey sticks. It sells the products at ₹ 500 each and makes a profit of ₹ 125 on each stick. The Company is producing 5,000 sticks annually by using 50% of its machinery capacity.

The cost of each stick is as under:

Direct Material	₹ 150
Direct Wages	₹ 50
Works Overhead	₹ 125 (50% fixed)
Selling Expenses	₹ 50 (25% variable)

The anticipation for the next year is that cost will go up as under:

Fixed Charges	10%
Direct Wages	20%
Direct Material	5%

There will not be any change in selling price.

There is an additional order for 2,000 sticks in the next year.

Calculate the lowest price that can be quoted so that the Company can earn the same profit as it has earned in the current year?
(10 Marks)

PYQ Nov 2019 – 5a

(a) Selling Price = ₹ 500

Profit = ₹ 125

No of Sticks = 5,000

Particular	Current Year (₹)	Next Year (₹)
Direct Material	150	157.50 (150 + 5%)
Direct Wages	50	60 (50+20%)
Works Overheads	62.50 (125 × 50%)	62.5
Selling Expenses	12.50 (50 × 25%)	12.5
Total Variable Cost	275	292.50
Fixed Cost (62.5 × 5,000) = 3,12,500; (37.5 × 5,000) = 1,87,500	5,00,000	5,50,000

Let: Lowest Price Quoted = K

Now, Sales = Target Profit (5,000 units × ₹ 125) + Variable Cost + Fixed Cost

Or, = (5,000 × 500) + (2,000 × K) = **6,25,000** + 20,47,500 + 5,50,000

Or, K = ₹ **361.25**

So, Lowest Price that can be quoted to earn the profit of ₹ 6,25,000 (same as current year) is ₹ 361.25

PYQ Nov 2019 – 1d

(d) When volume is 4,000 units; average cost is ₹ 3.75 per unit. When volume is 5,000 units, average cost is ₹ 3.50 per unit. The Break-Even point is 6,000 units.

Calculate: (i) Variable Cost per unit (ii) Fixed Cost and (iii) Profit Volume Ratio.

CA. PRANAV POPAT

PYQ Nov 2019 – 1d

(d) (i) Variable cost per unit = $\frac{\text{Change in Total cost}}{\text{Change in units}}$

$$= \frac{(\text{₹ } 3.50 \times 5,000 \text{ units}) - (\text{₹ } 3.75 \times 4,000 \text{ units})}{5,000 - 4,000}$$

$$= \frac{\text{₹ } 17,500 - \text{₹ } 15,000}{1,000} = \text{₹ } 2,500/1000 = \text{₹ } 2.5$$

(ii) Fixed cost = Total Cost – Variable cost (at 5,000 units level)
= ₹17,500 – ₹2.5 × 5,000 = **₹5,000**

(iii) Contribution per unit = $\frac{\text{Fixed cost}}{\text{BEP (in units)}}$ = $\frac{\text{₹ } 5,000}{6,000 \text{ units}}$ = 0.833

P/V Ratio = $\frac{\text{Contribution per unit}}{\text{Sale price per unit}}$ = $\frac{0.833}{2.5 + 0.833}$ = **25%**

PYQ May 2019 – 5a

Question 5

(a) *M/s Gaurav Private Limited is manufacturing and selling two products:*

'BLACK' and 'WHITE' at selling price of ₹ 20 and ₹ 30 respectively.

The following sales strategy has been outlined for the financial year 2019-20:

- (i) Sales planned for the year will be ₹ 81,00,000 in the case of 'BLACK' and ₹ 54,00,000 in the case of 'WHITE'.*
- (ii) The selling price of 'BLACK' will be reduced by 10% and that of 'WHITE' by 20%.*
- (iii) Break-even is planned at 70% of the total sales of each product.*
- (iv) Profit for the year to be maintained at ₹ 8,26,200 in the case of 'BLACK' and ₹ 7,45,200 in the case of 'WHITE'. This would be possible by reducing the present annual fixed cost of ₹ 42,00,000 allocated as ₹ 22,00,000 to 'BLACK' and ₹ 20,00,000 to 'WHITE'.*

You are required to calculate:

- (1) Number of units to be sold of 'BLACK' and 'WHITE' to Break even during the financial year 2019-20.*
 - (2) Amount of reduction in fixed cost product-wise to achieve desired profit mentioned at (iv) above.*
- (5 Marks)**

PYQ May 2019 – 5a

(a) (i)

Statement showing Break Even Sales

Particulars	Black	White
Sales Planned	81,00,000	54,00,000
Selling Price (₹)	18	24
Number of Units to be sold	4,50,000	2,25,000
Break Even sales (in Units), 70% of total sales	3,15,000	1,57,500
Or		
Break Even sales (in ₹), 70% of total sales	56,70,000	37,80,000

(ii)

Statement Showing Fixed Cost Reduction

Profit to be maintained (₹)	8,26,200	7,45,200
Margin of Safety (70% of Sales) (₹)	24,30,000	16,20,000
PVR (Profit/ Margin of Safety) x 100	34%	46%
Contribution (Sales x 34% or 46%) (₹)	27,54,000	24,84,000
Less: Profit (₹)	8,26,200	7,45,200
Revised Fixed Cost (₹)	19,27,800	17,38,800
Present Fixed Cost (₹)	22,00,000	20,00,000
Reduction in Fixed Cost	2,72,200	2,61,200

PYQ May 2019 – 5a

(a) (i)

Statement showing Break Even Sales

Particulars	Black	White
Sales Planned	81,00,000	54,00,000
Selling Price (₹)	18	24
Number of Units to be sold	4,50,000	2,25,000
Break Even sales (in Units), 70% of total sales	3,15,000	1,57,500
Or		
Break Even sales (in ₹), 70% of total sales	56,70,000	37,80,000

(ii)

Statement Showing Fixed Cost Reduction

Profit to be maintained (₹)	8,26,200	7,45,200
Margin of Safety (70% of Sales) (₹)	24,30,000	16,20,000
PVR (Profit/ Margin of Safety) x 100	34%	46%
Contribution (Sales x 34% or 46%) (₹)	27,54,000	24,84,000
Less: Profit (₹)	8,26,200	7,45,200
Revised Fixed Cost (₹)	19,27,800	17,38,800
Present Fixed Cost (₹)	22,00,000	20,00,000
Reduction in Fixed Cost	2,72,200	2,61,200

PYQ Nov 2018 – 2b

- (b) A manufacturing company is producing a product 'A' which is sold in the market at ₹45 per unit. The company has the capacity to produce 40000 units per year. The budget for the year 2018-19 projects a sale of 30000 units.

The costs of each unit are expected as under:

	₹
Materials	12
Wages	9
Overheads	6

Margin of safety is ₹ 4,12,500.

You are required to:

- calculate fixed cost and break-even point.
- calculate the volume of sales to earn profit of 20% on sales.
- if management is willing to invest ₹ 10,00,000 with an expected return of 20%, calculate units to be sold to earn this profit.
- Management expects additional sales if the selling price is reduced to ₹ 44. Calculate units to be sold to achieve the same profit as desired in above (iii). **(10 Marks)**

PYQ Nov 2018 – 2b

$$(b) \text{ Margin of Safety} = \frac{\text{Profit}}{\text{P / V ratio}} = ₹ 4,12,500$$

$$= \frac{\text{Profit}}{45 - (12 + 9 + 6)} = ₹ 4,12,500$$
$$\frac{45}{45}$$

$$= \frac{\text{Profit}}{18} = 4,12,500$$
$$\frac{45}{45}$$

$$\text{Profit} = 1,65,000 \quad \text{OR } P/V = (18/45) \times 100 = 40\%$$

(i) **Fixed Cost**

$$\text{Profit} = (\text{Sales} \times \text{P/V Ratio}) - \text{Fixed Cost}$$

$$1,65,000 = \left((30,000 \times 45) \times \frac{18}{45} \right) - \text{Fixed Cost}$$

$$\text{Or Fixed Cost} = 5,40,000 - 1,65,000$$
$$= ₹ 3,75,000$$

PYQ Nov 2018 – 2b

OR

Profit = Contribution – Fixed Cost = ₹ 5,40,000 – ₹ 3,75,000 = ₹ 1,65,000

P/V Ratio = $\frac{18}{45} = 40\%$

Break-even Point = Total Sales – Margin of Safety
= ₹ (30,000 × 45) – 4,12,500
= 13,50,000 – 4,12,500 = ₹ 9,37,500

PYQ Nov 2018 – 2b

Or

$$\text{BEP} = \frac{\text{Fixed Cost}}{\text{P / V ratio}} = \frac{3,75,000}{\frac{18}{45}} = \frac{3,75,000}{40\%} = ₹9,37,500 \text{ OR } 20833.33 \text{ Units}$$

(ii) Let's assume, Sales Volume = S unit so total sales value is 45 S and
Contribution is 45 S - 27 S = 18 S

Now, Contribution = Fixed Cost + Desired Profit

$$18 S = 3,75,000 + 9 S \text{ (20\% of 45 S)}$$

$$\text{Or, } 9S = 3,75,000$$

$$\text{So, } S = \frac{3,75,000}{9} \text{ Units}$$

$$\text{Volume of sales} = \frac{3,75,000 \times 45}{9} = ₹ 18,75,000 \text{ OR } 41666.67 \text{ Units}$$

So, ₹ 18,75,000 sales are required to earn profit on 20% of sales

PYQ Nov 2018 – 2b

$$\begin{aligned} \text{(iii) Contribution} &= \text{Fixed Cost} + \text{Desired Profit} \\ 18S &= 3,75,000 + \text{Return on Investment} \\ 18S &= 3,75,000 + 2,00,000 \\ S &= \frac{5,75,000}{18} \text{ Units} = \mathbf{31,945} \text{ Units (approx.)} \end{aligned}$$

So, 31,945 Units to be sold to earn a return of ₹ 2,00,000.

$$\begin{aligned} \text{(iv) Revised Contribution} &= \text{Fixed Cost} + \text{Desired Profit} \\ 17S &= 3,75,000 + 2,00,000 \\ S &= \frac{5,75,000}{17} \text{ Units} \\ S &= \mathbf{33,824} \text{ units (approx.)} \end{aligned}$$

∴ Additional Sales to be sold to achieve the same profit is 33,824 Units.

PYQ May 2018 – 1c

(c) Following figures have been extracted from the books of M/s. RST Private Limited:

Financial Year	Sales (₹)	Profit/Loss (₹)
2016-17	4,00,000	15,000(loss)
2017-18	5,00,000	15,000 (Profit)

You are required to calculate:

- (i) Profit Volume Ratio
- (ii) Fixed Costs
- (iii) Break Even Point
- (iv) Sales required to earn a profit of ₹ 45,000.
- (v) Margin of Safety in Financial Year 2017-18.

PYQ May 2018 – 1c

(c)

	Sales (₹)	Profit (₹)
Year 2016	4,00,000	15,000 (loss)
Year 2017	5,00,000	15,000 (profit)
Difference	1,00,000	30,000

(i)
$$\text{P/V Ratio} = \frac{\text{Difference in profit}}{\text{Difference in Sales}} \times 100 = \frac{30,000}{1,00,000} \times 100 = 30 \%$$

(ii)

	(₹)
Contribution in 2016 (4,00,000 × 30%)	1,20,000
Add: Loss	<u>15,000</u>
Fixed Cost*	<u>1,35,000</u>

*Contribution = Fixed cost + Profit

∴ Fixed cost = Contribution – Profit

PYQ May 2018 – 1c

(iii) Break-even point $= \frac{\text{Fixed cost}}{\text{P/V ratio}} = \frac{1,35,000}{30\%} = ₹ 4,50,000$

(iv) Sales to earn a profit of ₹ 45,000

$$\frac{\text{Fixed cost} + \text{Desired profit}}{\text{P / V ratio}} = \frac{1,35,000 + 45,000}{30\%} = ₹ 6,00,000$$

(v) Margin of safety in 2017 –18

Margin of safety = Actual sales – Break-even sales

$$= 5,00,000 - 4,50,000 = ₹ 50,000.$$

PYQ May 2018 – 5b

- (b) PH Gems Ltd. is manufacturing readymade suits. It has annual production capacity of 2,000 pieces. The Cost Accountant has presented following information for the year to the management:

Particulars	Amount (₹)	Amount (₹)
Sales 1,500 pieces @ ₹ 1,800 per piece		27,00,000
Direct Material	5,94,200	
Direct Labour	4,42,600	
Overheads (40% Fixed)	11,97,000	22,33,800
Net Profit		4,66,300

Evaluate following options:

- (i) If selling price is increased by ₹ 200, the sales will come down to 60% of the total annual capacity. Should the company increase its selling price?
- (ii) The company can earn a profit of 20% on sales if the company provide TIEPIN with ready-made suit. The cost of each TIEPIN is ₹ 18. Calculate the sales to earn a profit of 20% on sales.

(10 Marks)

PYQ May 2018 – 5b

(b) (i) Evaluation of Option (i)

Selling Price = ₹ 1800 + ₹ 200 = ₹ 2,000

Sales = 2000 x 60% = 1200 Pieces

	(₹)
Sales (1,200 pieces @ ₹ 2,000)	24,00,000
Less: Direct Material $\left(\frac{₹ 5,94,200}{1,500 \text{ units}} \times 1,200 \right)$	4,75,360
Direct Labour $\left(\frac{₹ 4,42,600}{1,500 \text{ units}} \times 1,200 \right)$	3,54,080
Variable Overhead $\left(\frac{₹ 11,97,000 \times 60\%}{1,500 \text{ units}} \times 1,200 \right)$	5,74,560
Contribution	9,96,000
Less: Fixed cost (Rs. 11,97,000 x 40%)	4,78,800
Profit	5,17,200

PYQ May 2018 – 5b

(b) (ii) Evaluation of Option (ii)

	(₹)
Sales	1,800.00
Less: Direct Material $\left(\frac{₹ 5,94,200}{1,500} \right)$	396.13
Cost of Tie PIN	18.00
Direct Labour $\left(\frac{₹ 4,42,600}{1,500} \right)$	295.07
Variable Overheads $\left(\frac{₹11,97,000 \times 60\%}{1,500} \right)$	478.80
Contribution	612.00
P/V Ratio $(₹ 612/1800 \times 100)$	34.0%

Sales to required earn a profit of 20%

$$\text{Sales} = \frac{₹ 4,78,800 + 0.20 \text{ of Sales}}{34.00\%}$$

$$\text{Sales} = ₹ 34,20,000 \text{ or } 1,900 \text{ units } (₹ 34,20,000/1800)$$

PYQ May 2018 – 5b

Sales to required earn a profit of 20%

$$\text{Sales} = \frac{\text{₹ 4,78,800} + 0.20 \text{ of Sales}}{34.00\%}$$

$$\text{Sales} = \text{₹ 34,20,000 or 1,900 units (₹ 34,20,000/1800)}$$

To earn profit 20% on sales of readymade suit (along with TIE PIN) company has to sold 1,900 units i.e. 95% of the full capacity. This sales level of 1,900 units is justified only if variable cost is constant. Any upside in variable cost would impact profitability, to achieve the desired profitability. Production has to be increased but the scope is limited to 5% only.

PYQ May 2018 – 5b

(c) Following figures have been extracted from the books of M/s. RST Private Limited:

Financial Year	Sales (₹)	Profit/Loss (₹)
2016-17	4,00,000	15,000(loss)
2017-18	5,00,000	15,000 (Profit)

(c)

	Sales (₹)	Profit (₹)
Year 2016	4,00,000	15,000 (loss)
Year 2017	5,00,000	15,000 (profit)
Difference	1,00,000	30,000

(i)
$$\text{P/V Ratio} = \frac{\text{Difference in profit}}{\text{Difference in Sales}} \times 100 = \frac{30,000}{1,00,000} \times 100 = 30 \%$$

PYQ May 2018 – 5b

- (ii)
- | | (₹) |
|---|-----------------|
| Contribution in 2016 ($4,00,000 \times 30\%$) | 1,20,000 |
| Add: Loss | <u>15,000</u> |
| Fixed Cost* | <u>1,35,000</u> |
- *Contribution = Fixed cost + Profit
- $\therefore$ Fixed cost = Contribution – Profit
- (iii) Break-even point = $\frac{\text{Fixed cost}}{\text{P/V ratio}} = \frac{1,35,000}{30\%} = ₹ 4,50,000$
- (iv) Sales to earn a profit of ₹ 45,000
- $$\frac{\text{Fixed cost} + \text{Desired profit}}{\text{P / V ratio}} = \frac{1,35,000 + 45,000}{30\%} = ₹ 6,00,000$$
- (v) Margin of safety in 2017 –18
- Margin of safety = Actual sales – Break-even sales
- $$= 5,00,000 - 4,50,000 = ₹ 50,000.$$

Revision Test Papers (RTPs)

May 2018 to Jan 2025

RTP Analysis

Exam	Q No.	Requirement	Special Points
RTP - Jan 2025	1	Case Scenario MCQ - (i) FC pu (ii) Overall BEP Units (iii) max units at given price (iv) maximum units supply (v) Correct Price based on Cost	New Question: Scenario of Charity at no profit no loss, fixed to be considered for only charity part 10%, real use of BEP in practical case, max units supplied using machine capacity, correct price means considering normal fixed cost per unit
RTP - Jan 2025	7	MCQ - BEP, Cash BEP, PV Ratio	Cal of VC pu and FC using incremental approach
RTP - Jan 2025	17	Min Price to Quote	Very Special Problem with full usage of concept of relevant cost, sunk cost, opportunity cost and all together unique situation in question
RTP - Sep 2024	17	Rate of Return post tax, Break Even Multiple Product	Same as Study Mat Question
RTP - May 2024	11	BEP, Profit, MOS etc	Cal of COGS and COS and in turn actual values of variable costs (taken Admin as production related even after word general is used)
RTP - Nov 2023	12a	BEP for next year	taking opening and current separate to calculate BEP is new point
RTP - Nov 2023	12b	Identify profitable process	Illogical Solution in RTP
RTP - May 2023	13	BEP at different scenarios	Easy but New

RTP Analysis

Exam	Q No.	Requirement	Special Points
RTP - Nov 2022	13a	Conceptual Points	Easy Basic
RTP - Nov 2022	13b	Cost of a satisfactory brain scan, decide using which machine is beneficial	FC will remain unchanged so only VC is compared in Part II (illogical as both MC have different Fixed Costs)
RTP - May 2022	12	PV ratio, Total Contri, BES of existing and proposed sales mix	Same as ICAI SM
RTP - Nov 2021	13	BEP, FC	Same as ICAI SM
RTP - May 2021	11	PV ratio, Total Contri, BES of existing and proposed sales mix	Same as ICAI SM
RTP - Nov 2020	13	BEP, Target Sales etc.	NA
RTP - May 2020	11	BEP, Profit, MOS etc	Cal of COGS and COS and in turn actual values of variable costs
RTP - Nov 2019	13	BEP, PV Ratio, Sales for EBIT, Sales for PAT	EBIT and PAT Point is New
RTP - May 2019	12	BEP and Target Sales	Easy Basic
RTP - Nov 2018	13	BEP	Same as ICAI SM
RTP - May 2018	13	Choose Best Option of Increasing Profit	Number of units calculation, Price Elasticity Point

RTP Jan 2025 - Q1 (Case Scenario MCQ)

1. Popular company produces various articles for student purposes. It has been in industry since last 25 years. Company had a very humble start but gained popularity over the years due to excellent quality products which were sold at very competitive prices. Company has huge reserves and feel that it is also obligated to give back to the society from which it has grown.

Last year management decided to produce and supply special quality school bags, water bottles, & geometry boxes to NGOs, at no price, as a social responsibility. These articles were simple looking but were more durable, that would not have wore-off easily and could have been used for long-term.

This year management wants to add another dimension to this social work. It approached charitable schools and government run schools and offered them the supply of the same articles, at cost. This will help students in these schools to get these things at a very low price compared to market.

RTP Jan 2025 - Q1 (Case Scenario MCQ)

The variable costs are ₹ 100, ₹ 80, and ₹ 40 for school bags, water bottles, and geometry boxes, respectively. These articles are made using a single machine. 0.20 hours of machine operation is required for manufacturing 1 unit of school bag. Similarly, machine hours required for each units of water bottle and geometry box is 0.15 hours and 0.10 hours, respectively. Fixed overhead related to machine is ₹ 7,40,000 per year. Machine can operate for 8,000 hours in a year.

Company has decided to sell its 80% capacity production in markets. Rest is divided amongst the 2 undergoing social works, equally.

All Schools requests these items in the ratio of 2:3:5, as per their demand by the school students.

RTP Jan 2025 - Q1 (Case Scenario MCQ)

Company wants to set a price for these articles to be offered to the schools. Management has few questions they need the answers to. They assigned the task to their team. Team made rough calculations but as there were too many people on the team, each came up with different answers. As a Chartered accountant, you have been approached. Understand the case closely, find the correct answers and help management to set a price.

Answer the following:

- (i) What is allocated fixed cost per unit of School bags, water bottles, and geometry boxes?
 - (a) 18.5, 13.875, 9.75
 - (b) 18.5, 13.875, 9.25
 - (c) 18.5, 13.785, 9.25
 - (d) 18.5, 13.785, 9.50

RTP Jan 2025 - Q1 (Case Scenario MCQ)

- (ii) If the prices were ₹ 200, ₹ 160, and ₹ 100, what would be the overall break-even point in units in relation to fixed cost allocated to these supplies?
- (a) 308.33 units
 - (b) 500 units
 - (c) 508.33 units
 - (d) 1,000 units
- (iii) Find out the maximum number of units of each article that can be given at the prices given in Part (ii).
- (a) 61, 92, 154
 - (b) 200, 300, 500
 - (c) 101, 152, 254
 - (d) 100, 150, 250

RTP Jan 2025 - Q1 (Case Scenario MCQ)

- (iv) What will be the maximum units that can be supplied to the schools of each article?
- (a) 1103, 1645, 2726
 - (b) 1093, 1655, 2748
 - (c) 1185, 1777, 2962
 - (d) 1133, 1675, 2958
- (v) What should be the correct price for each item as per the management's decision?
- (a) 118.50, 93.875, 49.75
 - (b) 118.50, 93.785, 49.25
 - (c) 118.50, 93.785, 49.50
 - (d) 118.50, 93.875, 49.25

RTP Jan 2025 - Q1 (Case Scenario MCQ)

Note: Figures are rounded off to the nearest figures to remove approximation error, wherever required.

1. (i) (b) Fixed overhead = 740000

Total machine hours = 8000 hours

Fixed OH per hour = ₹ 92.5

Fixed OH per unit of:

- School bag = $0.20 \times 92.5 = ₹ 18.5$
- Water bottle = $0.15 \times 92.5 = ₹ 13.875$
- Geometry box = $0.10 \times 92.5 = ₹ 9.25$

(ii) (d) Hours allocated = $8000 \times 10\% = 800$ hours

Fixed overhead allocated = $800 \times 92.5 = ₹ 74,000$

Contribution:

- Bag = $200 - 100 = 100$
- Bottle = $160 - 80 = 80$

RTP Jan 2025 - Q1 (Case Scenario MCQ)

- Geometry = $100 - 40 = 60$

$$\text{Composite contribution} = 100 \times 2/10 + 80 \times 3/10 + 60 \times 5/10 = ₹ 74$$

Overall breakeven point for this assignment is = fixed cost allocated/composite contribution = $74,000/74 = \mathbf{1,000 \text{ units}}$

- (iii) (b) 1000 units are to be distributed in the ratio of 2:3:5

Bag = 200 units, bottle = 300 units, geometry = 500 units

- (iv) (c) Total hours = 800 hours

let total no of units = X

Supply: bag $2/10 \times X$; bottle $3/10 \times X$; geometry $5/10 \times X$

Hours: $(2X/10) \times 0.20 + (3X/10) \times 0.15 + (5X/10) \times 0.10 = 800$
hours

$$X = 5925$$

RTP Jan 2025 - Q1 (Case Scenario MCQ)

Units of :

- Bag = $2/10 \times 5925 = 1185$
- Bottle = $3/10 \times 5925 = 1777.5$ or 1777
- Geometry = $5/10 \times 5925 = 2962.5$ or 2962

(v) (d) Correct price is AT COST.

COST = Marginal Cost Per Unit + Fixed Overhead
Cost Allocated Per Unit

	Bag	Bottle	Geometry
Variable cost per unit	100	80	40
Fixed cost per unit	18.5	13.875	9.25
Total	118.5	93.875	49.25

RTP Jan 2025 - Q7 (MCQ)

7. Ms. Gauri has the business of selling pens. She has setup this pen retailing for over 10 years with good profit volume ratio. Her average cost from the retailing is ₹ 11.25 per unit if she sells 16,000 units and is ₹ 11 per unit if she sells 20,000 units.

For the current month, she also charged ₹ 5,000 towards depreciation and the rental payment due.

The excess of sales revenue over the variable costs is ₹ 3.333 per unit.

You are required to CALCULATE Break-even Point (in units), Cash Break-even Point (in units) and Profit Volume Ratio.

- (a) Break-even Point- 6,000 units, Cash Break-even Point- 6,000 units and Profit Volume Ratio- 33.33%
- (b) Break-even Point- 6,000 units, Cash Break-even Point- 4,500 units and Profit Volume Ratio- 25%
- (c) Break-even Point- 4,500 units, Cash Break-even Point- 4,500 units and Profit Volume Ratio- 33.33%
- (d) Break-even Point- 4,500 units, Cash Break-even Point- 4,500 units and Profit Volume Ratio- 25%

RTP Jan 2025 - Q7 (MCQ)

7. (b) Variable cost per unit = $\frac{\text{Change in Total cost}}{\text{Change in units}}$

$$= \left(\frac{(\text{₹ } 11 \times 20,000 \text{ units}) - (\text{₹ } 11.25 \times 16,000 \text{ units})}{20,000 \text{ units} - 16,000 \text{ units}} \right)$$

$$= \left(\frac{\text{₹ } 2,20,000 - \text{₹ } 1,80,000}{4,000 \text{ units}} \right) = \text{₹ } 10$$

Fixed cost = Total Cost – Variable cost (at 20,000 units level)

$$= (\text{₹ } 11 \times 20,000 \text{ units}) - (\text{₹ } 10 \times 20,000 \text{ units})$$

$$= \text{₹ } 20,000$$

RTP Jan 2025 - Q7 (MCQ)

$$\begin{aligned} \text{(i) Break-even Point (in units)} &= \left(\frac{\text{Fixed Costs}}{\text{Contribution per unit}^*} \right) \\ &= \left(\frac{\text{₹ 20,000}}{\text{₹ 3.333}} \right) \\ &= \mathbf{6,000 \text{ units}} \end{aligned}$$

* Contribution is the excess of sales revenue over the variable costs.

$$\begin{aligned} \text{(ii) Cash Break-even Point (in units)} &= \left(\frac{\text{Cash Fixed Costs}^{**}}{\text{Contribution per unit}} \right) \\ &= \left(\frac{\text{₹ 20,000} - \text{₹ 5,000}}{\text{₹ 3.333}} \right) \\ &= \mathbf{4,500 \text{ units}} \end{aligned}$$

** depreciation and other non-cash fixed costs are excluded from the fixed costs to compute cash break-even point.

$$\begin{aligned} \text{(ii) P/V Ratio} &= \frac{\text{Contribution per unit}}{\text{Sale price per unit}} \\ &= \left(\frac{\text{₹ 3.333}}{\text{₹ 10} + \text{₹ 3.333}} \right) \\ &= \mathbf{25\%} \end{aligned}$$

RTP Jan 2025 - Q17

17. XYZ Ltd. is a company involved in production and construction specialised equipment and machines on the demand of customers. The company received an order for construction of a specialised machine, it had nearly completed this job relating to construction of a specialised machine, when it discovered that the customer had gone out of business. At this stage, the position of the job was as under:

	(₹)
Original cost estimate	27,50,000
Costs incurred so far	24,80,000
Costs to be incurred	3,70,000
Progress payment received from original customer	15,50,000

After searches, a new customer for the machine has been found. He is interested to take the machine, if certain modifications are carried out. The new customer wanted the machine in its original condition, but without its AI device and with certain other modifications. The costs of these additions and modifications are estimated as under:

RTP Jan 2025 - Q17

Direct Materials (at cost)	₹ 1,05,000
Direct Wages Dept.: X	35 men days
Dept.: Y	55 men days
Variable Overheads	30% of Direct Wages in each Dept.
Delivery Costs	₹ 15,500

Fixed overheads will be absorbed at 50% of direct wages in each department.

The following additional information is available:

- (1) The direct materials required for the modification are in stock and if not used for modification of this order, they will be used in another job in place of materials that will now cost ₹ 1,50,000.
- (2) Department X is working normally and hence any engagement of labour will have to be paid at the direct wage rate of ₹ 1,000 per man day.

RTP Jan 2025 - Q17

- (3) Department Y is extremely busy. Its direct wages rate is ₹ 1,200 per man day and it is currently yielding a contribution of ₹ 3 per rupee of direct wages.
 - (4) Additional supervisory required for the modification cost ₹ 80,000.
 - (5) The cost of the AI device that the new customer does not require is ₹ 1,35,000. If it is taken out, it can be used in another job in place of a different mechanism. The latter mechanism has otherwise to be bought for ₹ 1,05,000. The dismantling and removal of the control mechanism will take 5 man day in department X.
 - (6) If the conversion is not carried out, some of the materials in the original machine can be used in another contract in place of materials that would have cost ₹ 2,00,000. It would have taken 5 men days of work in department X to make them suitable for this purpose. The remaining materials will realize ₹ 1,50,000 as scrap. The drawings, which are included as part for the job can be sold for ₹ 45,000.
- You are required to CALCULATE the minimum price, which the company can afford to quote for the new customer as stated above.

RTP Jan 2025 - Q17

17. Statement of Minimum Price Which the Company Can Afford to Quote for the New Customer

	(₹)	(₹)
Cost to be incurred to bring the machine in its original condition		3,70,000
Direct Material (Replacement Value)		1,50,000
Direct Wages		
Dept. X: (35 men days × ₹ 1,000)	35,000	
Dept. Y: (55 men days × ₹ 1,200)	66,000	
Opportunity Cost of Contribution Lost by Dept. Y (₹66,000 × ₹3)	1,98,000	2,99,000
Variable Overheads [30% × (₹35,000 + ₹ 66,000)]		30,300
Delivery Costs		15,500
Additional Supervisory required for modification		80,000
Saving Due to Alternative Use of AI Device		

RTP Jan 2025 - Q17

Bought Out Price	1,05,000	
Less: Dismantling & Removal Cost (5 men day × ₹1,000)	5,000	
Less: Variable Cost (30% × ₹ 5,000)	1,500	(98,500)
Net Loss on Material Cost Savings (W.N.)		1,93,500
Opportunity Cost of Remaining Materials which can be sold as scrap		1,50,000
Opportunity Cost of Sale of Drawings		45,000
Total Minimum Price which may be quoted		12,34,800

Working Note

	(₹)
Loss on Material Cost Saving of Machine	2,00,000
Less: Conversion Cost (5 men days × ₹1,000)	5,000
Less: Variable Cost (30% × ₹5,000)	1,500
Net Loss on Material Cost Saving of Machine	1,93,500

17. RS Ltd. manufactures and sells a single product X whose selling price is ₹ 100 per unit and the variable cost is ₹ 60 per unit.
- (i) If the Fixed Costs for this year are ₹ 24,00,000 and the annual sales are at 60% margin of safety, CALCULATE the rate of net return on sales, assuming an income tax level of 40%
 - (ii) For the next year, it is proposed to add another product line Y whose selling price would be ₹ 150 per unit and the variable cost ₹ 100 per unit. The total fixed costs are estimated at ₹ 28,00,000. The sales mix of X : Y would be 5 : 3. COMPUTE the break-even sales in units for both the products.

RTP May 2024 – Q11

11. The analysis of cost sheet of A Ltd. for the last financial year has revealed the following information for it's product R:

Elements of Cost	Variable Cost portion	Fixed Cost
Direct Material	30% of cost of goods sold	--
Direct Labour	15% of cost of goods sold	--
Factory Overhead	10% of cost of goods sold	₹ 2,30,000
General & Administration Overhead	2% of cost of goods sold	₹ 71,000
Selling & Distribution Overhead	4% of cost of sales	₹ 68,000

Last year 5,000 units were sold at ₹185 per unit.

You being an associate to cost controller of the A Ltd., CALCULATE :

- (i) Break-even Sales (in rupees),
- (ii) Profit earned during last year,
- (iii) Margin of safety (in %) and
- (iv) the profit if the sales were 10% less than the actual sales.

RTP May 2024 – Q11

11. Workings:

Calculation of Cost of Goods Sold (COGS):

$$\text{COGS} = \{(\text{DM} - 0.3 \text{ COGS}) + (\text{DL} - 0.15 \text{ COGS}) + (\text{FOH} - 0.10 \text{ COGS} + ₹ 2,30,000) + (\text{G\&AOH} - 0.02 \text{ COGS} + ₹ 71,000)\}$$

$$\text{Or COGS} = 0.57 \text{ COGS} + ₹ 3,01,000$$

$$\text{Or COGS} = \frac{₹ 3,01,000}{0.43} = ₹ 7,00,000$$

Calculation of Cost of Sales (COS):

$$\text{COS} = \text{COGS} + (\text{S\&DOH} - 0.04 \text{ COS} + ₹ 68,000)$$

$$\text{Or COS} = ₹ 7,00,000 + (0.04 \text{ COS} + ₹ 68,000)$$

$$\text{Or COS} = \frac{₹ 7,68,000}{0.96} = ₹ 8,00,000$$

Calculation of total Fixed Costs:

Factory Overhead	₹ 2,30,000
General & Administration OH	₹ 71,000
Selling & Distribution OH	₹ 68,000
	₹ 3,69,000

RTP May 2024 – Q11

Calculation of Variable Costs:

Direct Material	(0.3 × ₹ 7,00,000)	₹ 2,10,000
Direct Labour	(0.15 × ₹ 7,00,000)	₹ 1,05,000
Factory Overhead	(0.10 × ₹ 7,00,000)	₹ 70,000
General & Administration OH	(0.02 × ₹ 7,00,000)	₹ 14,000
Selling & Distribution OH	(0.04 × ₹ 8,00,000)	₹ 32,000
		₹ 4,31,000

Calculation of P/V Ratio:

$$\begin{aligned}\text{P/V Ratio} &= \frac{\text{Contribution}}{\text{Sales}} \times 100 = \frac{\text{Sales} - \text{Variable Costs}}{\text{Sales}} \times 100 \\ &= \frac{(\text{₹}185 \times 5,000 \text{ units}) - \text{₹}4,31,000}{\text{₹}185 \times 5,000 \text{ units}} \times 100 = 53.41\%\end{aligned}$$

RTP May 2024 – Q11

- (i) Break-Even Sales = $\frac{\text{Fixed Costs}}{\text{P/V Ratio}} = \frac{₹ 3,69,000}{53.41\%} = ₹ 6,90,882$
- (ii) Profit earned during the last year
- $$\begin{aligned} &= (\text{Sales} - \text{Total Variable Costs}) - \text{Total Fixed Costs} \\ &= (₹ 9,25,000 - ₹ 4,31,000) - ₹ 3,69,000 \\ &= ₹ 1,25,000 \end{aligned}$$
- (iii) Margin of Safety (%) = $\frac{\text{Sales} - \text{Break-even sales}}{\text{Sales}} \times 100$
- $$= \frac{₹ 9,25,000 - ₹ 6,90,882}{₹ 9,25,000} \times 100 = 25.31\%$$
- (iv) Profit if the sales were 10% less than the actual sales:
- $$\begin{aligned} \text{Profit} &= 90\% (₹ 9,25,000 - ₹ 4,31,000) - ₹ 3,69,000 \\ &= ₹ 4,44,600 - ₹ 3,69,000 = ₹ 75,600 \end{aligned}$$

RTP May 2024 – Q11

- (i) Break-Even Sales = $\frac{\text{Fixed Costs}}{\text{P/V Ratio}} = \frac{₹ 3,69,000}{53.41\%} = ₹ 6,90,882$
- (ii) Profit earned during the last year
- $$= (\text{Sales} - \text{Total Variable Costs}) - \text{Total Fixed Costs}$$
- $$= (₹ 9,25,000 - ₹ 4,31,000) - ₹ 3,69,000$$
- $$= ₹ 1,25,000$$
- (iii) Margin of Safety (%) = $\frac{\text{Sales} - \text{Break even sales}}{\text{Sales}} \times 100$
- $$= \frac{₹ 9,25,000 - ₹ 6,90,882}{₹ 9,25,000} \times 100 = 25.31\%$$
- (iv) Profit if the sales were 10% less than the actual sales:
- $$\text{Profit} = 90\% (₹ 9,25,000 - ₹ 4,31,000) - ₹ 3,69,000$$
- $$= ₹ 4,44,600 - ₹ 3,69,000 = ₹ 75,600$$

RTP Nov 2023 – Q12

12. (a) A dairy product company manufacturing baby food with a shelf life of one year furnishes the following information:
- (i) On 1st April, 2023, the company has an opening stock of 20,000 packets whose variable cost is ₹ 180 per packet.
 - (ii) In 2022-23, production was 1,20,000 packets and the expected production in 2023-24 is 1,50,000 packets. Expected sales for 2023-24 is 1,60,000 packets.
 - (iii) In 2022-23, fixed cost per unit was ₹ 60 and it is expected to increase by 10% in 2023-24. The variable cost is expected to increase by 25%. Selling price for 2023-24 has been fixed at ₹ 300 per packet.

You are required to calculate the Break-even volume in units for 2023-24.

RTP Nov 2023 – Q12

- (b) The M-Tech Manufacturing Company is presently evaluating two possible processes for the manufacture of a toy. The following information is available:

Particulars	Process A (₹)	Process B (₹)
Variable cost per unit	12	14
Sales price per unit	20	20
Total fixed costs per year	30,00,000	21,00,000
Capacity (in units)	4,30,000	5,00,000
Anticipated sales (Next year, in units)	4,00,000	4,00,000

Suggest:

1. Identify the process which gives more profit.
2. Would you change your answer as given above, if you were informed that the capacities of the two processes are as follows:
A - 6,00,000 units; B - 5,00,000 units?

RTP Nov 2023 – Q12

12. (a) Working Notes:

Particulars	2022-23 (₹)	2023-24 (₹)
Fixed Cost	72,00,000 (₹ 60 × 1,20,000 units)	79,20,000 (110% of ₹ 72,00,000)
Variable Cost	180	225 (125% of ₹ 180)

Calculation of Break-even Point (in units):

Since, shelf life of the product is one year only, hence, opening stock is to be sold first.

	(₹)
Total Contribution required to recover total fixed cost in 2023-24 and to reach break-even volume.	79,20,000
Less: Contribution from opening stock {20,000 units × (₹ 300 – ₹ 180)}	24,00,000
Balance Contribution to be recovered	55,20,000

RTP Nov 2023 – Q12

Units to be produced to get balance contribution

$$= \frac{\text{₹ } 55,20,000}{\text{₹ } 300 - \text{₹ } 225} = 73,600 \text{ packets.}$$

Break-even volume in units for 2023-24

	Packets
From 2023-24 production	73,600
Add: Opening stock from 2022-23	20,000
	93,600

(b) (1) Comparative Profitability Statements

Particulars	Process- A (₹)	Process- B (₹)
Selling Price per unit	20.00	20.00
Less: Variable Cost per unit	12.00	14.00
Contribution per unit	8.00	6.00
Total Contribution	32,00,000 (₹ 8 × 4,00,000)	24,00,000 (₹ 6 × 4,00,000)
Less: Total fixed costs	30,00,000	21,00,000
Profit	2,00,000	3,00,000

Capacity (units)	4,30,000	5,00,000
Total Contribution at full capacity	34,40,000 (₹ 8 × 4,30,000)	30,00,000 (₹ 6 × 5,00,000)
Fixed Cost	30,00,000	21,00,000
Profit	4,40,000	9,00,000

Process - B gives more profit.

RTP Nov 2023 – Q12

(2)

Particulars	Process- A (₹)	Process- B (₹)
*Capacity (units)	6,00,000	5,00,000
Total contribution	48,00,000 (₹ 8 × 6,00,000)	30,00,000 (₹ 6 × 5,00,000)
Fixed Cost	30,00,000	21,00,000
Profit	18,00,000	9,00,000

Process-A be chosen.

***Note: It is assumed that capacity produced equals sales.**

RTP May 2023 – Q13

13. The following data are available from the budget records of Finesign Women's Handbag Company for the forthcoming budget period.

	₹
Selling Price per unit	1000
Variable cost per unit:	
Cost of Material used	750.00
Sales commission	50.00
Total Variable Cost	800.00
Annual fixed expenses:	
Rent	7,00,000
Salaries	11,00,000
Other fixed expenses	5,00,000
Total Fixed Cost	23,00,000

RTP May 2023 – Q13

Although the firm manufactures Bags with different styles, they have identical purchase costs and selling price.

Requirement:

- (a) What is the annual break-even point both in terms of units and value?
- (b) If the store manager is paid 1 per cent commission on sales, what would be the annual break-even point both in terms of units and value?
- (c) If the firm decides to pay a fixed salary of ₹ 9,00,000 in lieu of sales commission, what would be the annual break-even point in terms of units and value.

Considering break-even point in requirement (a), If the stores manager is paid 2 per cent commission on each bag sold in excess of the break-even point, what would be the profit if 20000 bags were sold.

RTP May 2023 – Q13

13. (a) P/V ratio: $\frac{\text{Sales per unit} - \text{Variable Cost per unit}}{\text{Selling price per unit}} \times 100$

$$= \frac{1000 - 800}{1000} \times 100$$

$$= \frac{200}{1000} \times 100 = 20\%$$

Annual BEP in units: $\frac{\text{Annual fixed cost}}{\text{Contribution per unit}}$

$$= \frac{\text{₹ } 23,00,000}{\text{₹ } 200} = 11,500 \text{ units}$$

Annual BEP in value: $\frac{\text{Annual fixed cost}}{\text{P/V ratio}}$

$$\frac{\text{₹ } 23,00,000}{20\%} = \text{₹ } 1,15,00,000$$

RTP May 2023 – Q13

(b) Revised P/V ratio and BEP :

commission on sales per unit= 1% of 1,000= ₹10

$$\text{So, P/V ratio : } \frac{1000 - (750 + 50 + 10)}{1000}$$

$$= \frac{190}{1000} \times 100 = 19\%$$

$$\text{BEP in terms of units: } \frac{\text{Annual fixed cost}}{\text{Contribution per unit}}$$

$$= \frac{23,00,000}{190} = 12,106 \text{ units}$$

$$\text{BEP in terms of value: } \frac{\text{Annual fixed cost}}{\text{P/V}}$$

$$= \frac{23,00,000}{19\%} = ₹1,21,05,263$$

RTP May 2023 – Q13

(c) Break-even point under fixed salary plan:

$$\text{P/V ratio} = \frac{\text{Contribution per unit}}{\text{Selling price per unit}} = \frac{1000 - 750}{1000} \times 100 = \frac{250}{1000} \times 100 = 25\%$$

Revised fixed cost :

Original fixed cost ₹ 23,00,000

Proposed fixed salary ₹ 9,00,000

Total ₹ 32,00,000

$$\text{BEP in terms of units: } \frac{\text{Annual fixed cost}}{\text{Contribution per unit}} = \frac{32,00,000}{250} = 12,800 \text{ units}$$

$$\text{BEP in terms of value: } \frac{\text{Annual fixed cost}}{\text{P / v ratio}} = \frac{32,00,000}{25\%} = 1,28,00,000$$

RTP May 2023 – Q13

(d) Annual break-even point under requirement (a) is 11,500 units.

Margin of safety at sales volume of 20,000 unit of bags $(20,000 - 11,500) = 8500$ units

Contribution on sales beyond break-even sales:

Revised contribution per unit: $200 - (2\% \text{ of } 1000) = 180$

Profit = Margin of safety (in units) $\times$ Contribution per unit
 $= 8500 \times 180 = ₹ 15,30,000$

- (b) The lab corner of Newlife Hospital Trust operates two types of specialist MRI scanning machine- MR10 and MR59. Following details are estimated for the next period:

Machine	MR10	MR59
Running hours	1,100	2,000
	(₹)	(₹)
Variable running costs excluding special technology	68,750	1,60,000
Fixed Costs	50,000	2,43,750

A brain scan is normally carried out on machine type MR10. This task uses special technology costing ₹ 100 each and takes four hours of machine time. Because of the nature of the process, around 10% of the scans produce blurred and therefore useless results.

RTP Nov 2022 – Q13

Required:

- (i) CALCULATE the total cost of a satisfactory brain scan on machine type MR10.
- (ii) Brain scans can also be done on machine type MR59 and would take only 1.8 hours per scan with a reduced reject rate of 6%. However, the cost of the special technology would be ₹ 137.50 per scan. ADVISE which type should be used, assuming sufficient capacity is available on both types of machines. Consider fixed costs will remain unchanged.

RTP Nov 2022 – Q13

(b) (i)

Particulars	(₹)
Variable cost per running hour of Machine MR10 (₹ 68,750/1100 hours)	62.50
Fixed cost (₹ 50,000/1100 hours)	45.46
Cost of brain scan on Machine MR10:	(₹)
Variable machine cost (4 hours × ₹ 62.50)	250.00
Special technology	100.00
Total variable cost	350.00
Fixed machine cost (4 hours × ₹ 45.46)	181.84
Total cost of a scan	531.84
Total cost of a satisfactory scan (₹ 531.84/0.9)	590.93

RTP Nov 2022 – Q13

- (ii) It is given that fixed cost will remain unchanged and thus they are not relevant for the decision. The relevant costs would be the incremental costs of an additional scan:

Machine MR10:	(₹)
Variable cost per scan	350.00
Variable cost per satisfactory scan (₹ 350/0.9)	388.89
Machine MR59:	(₹)
Variable machine cost per scan (₹ 1,60,000 / 2000 hours × 1.8 hours)	144.00
Special technology	137.50
Variable cost per scan	281.50
Variable cost per satisfactory scan (₹ 281.50/0.94)	299.47

The relevant costs per satisfactory scan are cheaper on Machine MR59 and therefore brain scans should be undertaken on said machine.

13. J Ltd. manufactures a Product-Y. Analysis of income statement indicated a profit of ₹ 250 lakhs on a sales volume of 5,00,000 units. Fixed costs are ₹1,000 lakhs which appears to be high. Existing selling price is ₹680 per unit. The company is considering revising the profit target to ₹ 700 lakhs. You are required to COMPUTE –
- (i) Break- even point at existing levels in units and in rupees.
 - (ii) The number of units required to be sold to earn the target profit.
 - (iii) Profit with 10% increase in selling price and drop in sales volume by 10%.
 - (iv) Volume to be achieved to earn target profit at the revised selling price as calculated in (ii) above, if a reduction of 10% in the variable costs and ₹ 170 lakhs in the fixed cost is envisaged.

RTP Nov 2020 – Q13

13. Sales Volume 5,00,000 Units

Computation of existing contribution

Particulars	Per unit (₹)	Total (₹ In lakhs)
Sales	680	3,400
Fixed Cost	200	1,000
Profit	50	250
Contribution	250	1,250
Variable Cost (Sales – Contribution)	430	2,150

(i) Break even sales in units = $\frac{\text{Fixed Cost}}{\text{Contribution per unit}} = \frac{\text{₹}10,00,00,000}{\text{₹}250} = 4,00,000 \text{ units}$

Break even sales in rupees = $4,00,000 \text{ units} \times \text{₹} 680 = \text{₹} 2,720 \text{ lakhs}$

OR

P/V Ratio = $\frac{250}{680} \times 100 = 36.76\%$

B.EP (Rupees) = $\frac{\text{Fixed Cost}}{\text{P / V Ratio}} = \frac{10,00,00,000}{36.76\%} = \text{₹} 2,720 \text{ lakhs (approx.)}$

RTP Nov 2020 – Q13

- (ii) Number of units sold to achieve a target profit of ₹700 lakhs:

$$\begin{aligned}\text{Desired Contribution} &= \text{Fixed Cost} + \text{Target Profit} \\ &= 1,000 \text{ L} + 700 \text{ L} = 1,700 \text{ L}\end{aligned}$$

$$\text{Number of units to be sold} = \frac{\text{Desired Contribution}}{\text{Contribution per unit}} = \frac{17,00,00,000}{250} = 6,80,000 \text{ units}$$

- (iii) Profit if selling price is increased by 10% and sales volume drops by 10%:

$$\text{Existing Selling Price per unit} = ₹ 680$$

$$\text{Revised selling price per unit} = ₹ 680 \times 110\% = ₹ 748$$

$$\text{Existing Sales Volume} = 5,00,000 \text{ units}$$

$$\text{Revised sales volume} = 5,00,000 \text{ units} - 10\% \text{ of } 5,00,000 = 4,50,000 \text{ units.}$$

Statement of profit at sales volume of 4,50,000 units @ ₹ 748 per unit

RTP Nov 2020 – Q13

Particulars	Per unit (₹)	Total (₹ In lakhs)
Sales	748	3,366
Less: Variable Costs	430	1,935
Contribution	318	1,431
Less: Fixed Cost		1,000
Profit		431

- (iv) Volume to be achieved to earn target profit of ₹700 lakhs with revised selling price and reduction of 10% in variable costs and ₹170 lakhs in fixed cost:

Revised selling price per unit = ₹748

Variable costs per unit existing = ₹430

RTP Nov 2020 – Q13

Revised Variable Costs

Reduction of 10% in variable costs = ₹ 430 – 10% of 430

$$= ₹ 430 - ₹ 43$$

$$= ₹ 387$$

Total Fixed Cost (existing) = ₹ 1,000 lakhs

Reduction in fixed cost = ₹ 170 lakhs

Revised fixed cost = ₹ 1,000 lakhs – ₹ 170 lakhs = ₹ 830 lakhs

Revised Contribution (unit) = Revised selling price per unit – Revised Variable Costs per units

Revised Contribution per unit = ₹ 748 – ₹ 387 = ₹ 361

Desired Contribution = Revised Fixed Cost + Target Profit

$$= ₹ 830 \text{ lakhs} + ₹ 700 \text{ lakhs} = ₹ 1,530 \text{ lakhs}$$

No. of units to be sold = $\frac{\text{Desired Contribution}}{\text{Contribution per unit}} = \frac{₹ 15,30,00,000}{₹ 361} = 4,23,823 \text{ units}$

RTP May 2020 – Q11

11. A Ltd. manufacture and sales its product R-9. The following figures have been collected from cost records of last year for the product R-9:

Elements of Cost	Variable Cost portion	Fixed Cost
Direct Material	30% of Cost of Goods Sold	--
Direct Labour	15% of Cost of Goods Sold	--
Factory Overhead	10% of Cost of Goods Sold	₹ 2,30,000
Administration Overhead	2% of Cost of Goods Sold	₹ 71,000
Selling & Distribution Overhead	4% of Cost of Sales	₹ 68,000

Last Year 5,000 units were sold at ₹185 per unit. From the given DETERMINE the followings:

- (i) Break-even Sales (in rupees)
- (ii) Profit earned during last year
- (iii) Margin of safety (in %)
- (iv) Profit if the sales were 10% less than the actual sales.

(Assume that Administration Overhead is related with production activity)

RTP May 2020 – Q11

11. Working Notes:

(1) Calculation of Cost of Goods Sold (COGS):

$$\text{COGS} = \text{DM} + \text{DL} + \text{FOH} + \text{AOH}$$

$$\text{COGS} = \{0.3 \text{ COGS} + 0.15 \text{ COGS} + (0.10 \text{ COGS} + ₹ 2,30,000) + (0.02 \text{ COGS} + ₹ 71,000)\}$$

$$\text{Or, COGS} = 0.57 \text{ COGS} + ₹ 3,01,000$$

$$\text{Or, COGS} = \frac{₹ 3,01,000}{0.43} = ₹ 7,00,000$$

(2) Calculation of Cost of Sales (COS):

$$\text{COS} = \text{COGS} + \text{S\&DOH}$$

$$\text{COS} = \text{COGS} + (0.04 \text{ COS} + ₹ 68,000)$$

$$\text{Or, COS} = ₹ 7,00,000 + (0.04 \text{ COS} + ₹ 68,000)$$

$$\text{Or, COS} = \frac{₹ 7,68,000}{0.96} = ₹ 8,00,000$$

(3) Calculation of Variable Costs:

Direct Material-	(0.30 × ₹ 7,00,000)	₹ 2,10,000
Direct Labour-	(0.15 × ₹ 7,00,000)	₹ 1,05,000
Factory Overhead-	(0.10 × ₹ 7,00,000)	₹ 70,000
Administration OH-	(0.02 × ₹ 7,00,000)	₹ 14,000
Selling & Distribution OH	(0.04 × ₹ 8,00,000)	₹ 32,000
		₹ 4,31,000

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(4) Calculation of total Fixed Costs:

Factory Overhead-	₹ 2,30,000
Administration OH-	₹ 71,000
Selling & Distribution OH	₹ 68,000
	₹ 3,69,000

(5) Calculation of P/V Ratio:

$$\begin{aligned} \text{P/V Ratio} &= \frac{\text{Contribution}}{\text{Sales}} \times 100 = \frac{\text{Sales} - \text{Variable Costs}}{\text{Sales}} \times 100 \\ &= \frac{(\text{₹}185 \times 5,000 \text{ units}) - \text{₹}4,31,000}{\text{₹}185 \times 5,000 \text{ units}} \times 100 = 53.41\% \end{aligned}$$

(i) Break-Even Sales

$$= \frac{\text{Fixed Costs}}{\text{P/V Ratio}} = \frac{\text{₹}3,69,000}{53.41\%} = \text{₹}6,90,882$$

(ii) Profit earned during the last year

$$\begin{aligned} &= (\text{Sales} - \text{Total Variable Costs}) - \text{Total Fixed Costs} \\ &= (\text{₹}9,25,000 - \text{₹}4,31,000) - \text{₹}3,69,000 \\ &= \text{₹}1,25,000 \end{aligned}$$

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(iii) Margin of Safety (%)

$$= \frac{\text{Sales} - \text{Breakeven sales}}{\text{Sales}} \times 100$$
$$= \frac{\text{₹ 9,25,000} - \text{₹ 6,90,882}}{\text{₹ 9,25,000}} \times 100 = 25.31\%$$

(iv) Profit if the sales were 10% less than the actual sales:

$$\begin{aligned} \text{Profit} &= 90\% (\text{₹9,25,000} - \text{₹4,31,000}) - \text{₹3,69,000} \\ &= \text{₹4,44,600} - \text{₹3,69,000} = \text{₹75,600} \end{aligned}$$

13. PVC Ltd sold 55,000 units of its product at ₹375 per unit. Variable costs are ₹175 per unit (manufacturing costs of ₹140 and selling cost ₹35 per unit). Fixed costs are incurred uniformly throughout the year and amount to ₹65,00,000 (including depreciation of ₹15,00,000). There is no beginning or ending inventories.

Required:

- (i) COMPUTE breakeven sales level quantity and cash breakeven sales level quantity.
- (ii) COMPUTE the P/V ratio.
- (iii) COMPUTE the number of units that must be sold to earn an income (EBIT) of ₹5,00,000.
- (iv) COMPUTE the sales level achieve an after-tax income (PAT) of ₹5,00,000, assume 40% corporate tax rate..

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13. (i) Contribution = ₹375 - ₹175 = ₹200 per unit.

$$\text{Break even Sales Quantity} = \frac{\text{Fixed cost}}{\text{Contribution margin per unit}} = \frac{\text{₹ } 65,00,000}{\text{₹ } 200} = 32,500 \text{ units}$$

$$\text{Cash Break even Sales Qty} = \frac{\text{Cash Fixed Cost}}{\text{Contribution margin per unit}} = \frac{\text{₹ } 50,00,000}{\text{₹ } 200} = 25,000 \text{ units.}$$

$$\text{(ii) P/V ratio} = \frac{\text{Contribution/unit}}{\text{Selling Price/unit}} \times 100 = \frac{\text{₹ } 200}{\text{₹ } 375} \times 100 = 53.33\%$$

(iii) No. of units that must be sold to earn an Income (EBIT) of ₹5,00,000

$$\frac{\text{Fixed cost} + \text{Desired EBIT level}}{\text{Contribution margin per unit}} = \frac{65,00,000 + 5,00,000}{200} = 35,000 \text{ units}$$

(iv) After Tax Income (PAT) = ₹5,00,000

Tax rate = 40%

$$\text{Desired level of Profit before tax} = \frac{\text{₹ } 5,00,000}{60} \times 100 = \text{₹ } 8,33,333$$

$$\text{Estimate Sales Level} = \frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{P/V ratio}}$$

$$\text{Or, } \left(\frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{Contribution per unit}} \times \text{Selling Price per unit} \right)$$

$$= \frac{\text{₹ } 65,00,000 + \text{₹ } 8,33,333}{53.33\%} = \text{₹ } 1,37,50,859$$

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13. A company manufactures two types of herbal product, A and B. Its budget shows profit figures after apportioning the fixed joint cost of ₹15 lacs in the proportion of the numbers of units sold. The budget for 2018, indicates:

	A	B
Profit (₹)	1,50,000	30,000
Selling Price / unit (₹)	200	120
P/V Ratio (%)	40	50

Required:

COMPUTE the best option among the following, if the company expects that the number of units to be sold would be equal.

- (i) Due to exchange in a manufacturing process, the joint fixed cost would be reduced by 15% and the variables would be increased by $7\frac{1}{2}\%$.
- (ii) Price of A could be increased by 20% as it is expected that the price elasticity of demand would be unity over the range of price.
- (iii) Simultaneous introduction of both the option, viz, (i) and (ii) above.

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Workings

1. Contribution per unit of each product:

	Product	
	A (₹)	B (₹)
Contribution <i>per unit</i> (Sales × P/V Ratio)	80 (₹200 × 40%)	60 (₹120 × 50%)

2. Number of units to be sold:

Total Contribution – Fixed Cost = Profit

Let x be the number of units of each product sold, therefore:

$$(80x + 60x) - ₹15,00,000 = ₹1,50,000 + ₹30,000$$

$$\text{Or } x = 12,000 \text{ units}$$

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13. Option (i)

Increase in profit when due to change in a manufacturing process there is reduction in joint fixed cost and increase in variable costs.

	(₹)
Revised Contribution from 12,000 units of A due to 7.5% increase in Variable Cost {12,000 units × (₹200 – ₹129)}	8,52,000
Revised Contribution from 12,000 units of B due to 7.5% increase in Variable Cost {12,000 units × (₹120 – ₹64.50)}	6,66,000
Total Revised Contribution	15,18,000
Less: Fixed Cost (₹15,00,000 – 15% × ₹15,00,000)	12,75,000
Revised Profit	2,43,000
Less: Existing Profit	1,80,000
Increase in Profit	63,000

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Option (ii)

Increase in profit when the price of product A increased by 20% and the price elasticity of its demand would be unity over the range of price.

	(₹)
Budgeted Revenue from Product A (12,000 units × ₹200)	24,00,000
Revised Demand (in units) (₹24,00,000 / ₹240)	10,000
Revised Contribution (in ₹) [10,000 units × (₹240 – ₹120)]	12,00,000
Less: Existing Contribution (12,000 units × ₹80)	9,60,000
Increase in Profit (Contribution)	2,40,000

***Note:** Since Price Elasticity of Demand is 1, therefore the Revenue in respect of Products will remain same.

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Option (iii)

Increase in profit on the simultaneous introduction of above two options.

	(₹)
Revised Contribution from Product A [10,000 units × (₹240 – ₹129)]	11,10,000
Revised Contribution from Product B [12,000 units × (₹120 – ₹64.50)]	6,66,000
Total Revised Contribution	17,76,000
Less: Revised Fixed Cost	12,75,000
Revised Profit	5,01,000
Less: Existing Profit	1,80,000
Increase in Profit	3,21,000

A comparison of increase in profit figures under above three options clearly indicates that the option (iii) is the best as it increases the profit of the concern by ₹3,21,000.