

Problem 10 (Price mix and key factor)

A company producing products PIE and SIGMA using a single production process has the following cost data:

	PIE	SIGMA
Selling price per unit (₹)	20	30
Variable cost per unit (₹)	11	16
Machine hours required per unit of production (hrs.)	1	2
Market limitation (units)	1 lakh	2.5 lakhs
Total machine hours available — 4 lakhs		
Fixed cost per annum — ₹ 26 lakhs		

Considering the limiting factors of machine hours and market limitations, you are required to:

(a) indicate the best combination of products to give optimum contribution;

(b) show the additional machinery requirement to be augmented on rental basis at an annual rent of ₹ 1.5 lakhs per machine to provide additional capacity of 30,000 hours per machine;

(c) change in number of machines to be rented if the annual rental charges reduce to ₹ 1,25,000 per machine.

(I.C.W.A. Inter)

Solution

Marginal Cost Statement

	Per unit of	
	PIE	SIGMA
Selling price ₹	20	30
Less: Variable cost ₹	11	16
Contribution	9	14
Machine hours	1	2
Contribution per machine hour ₹	9 ÷ 1 = 9	14 ÷ 2 = 7
Product priorities	I	II

Machine time being the key factor, product PIE is more profitable because it gives a higher contribution per machine hour.

**Product Mix** — Taking into account market limitation, maximum of 1,00,000 units of PIE should be sold which will utilise 1,00,000 hours. Balance hours available for Sigma = 4 lakhs - 1 lakh = 3,00,000 hrs.

No. of units of Sigma that may be produced =  $3,00,000 \div 2 = 1,50,000$  units

(a) Contribution from the best product mix

PIE	1,00,000 units @ ₹ 9 per unit	= ₹ 9,00,000
SIGMA	1,50,000 units @ ₹ 14 per unit	= ₹ 21,00,000
	Total Contribution	<u>30,00,000</u>

(b) Additional machines on rental basis.

Units of Sigma yet to be produced	1,00,000 units.
Machine hours required	2,00,000 hours.
No. of machines @ 30,000 hours per machine	6 + 1 = 7 machines

Of the seven machines, 6 machines can be fully utilised to provide 1,80,000 hrs giving a contribution of ₹ 2,10,000 per machine against its rent of ₹ 1,50,000. But the 7th machine will give a contribution of only ₹ 1,40,000 because it can be utilised only to the extent of 20,000 hours due to market limitation. This will leave an idle capacity of 10,000 hours. Thus this 7th machine will give a contribution of only ₹ 1,40,000 against machine rental of ₹ 1,50,000 resulting in a loss of ₹ 10,000. Thus only 6 machines should be taken on rent.

(c) When rent per machine is ₹ 1,25,000 per annum, the 7th machine could also be rented out because it will result in a net margin of ₹ 15,000 (i.e., 1,40,000 - 1,25,000).

Fixed cost has not been taken into account because it does not change under different alternatives and thus is not relevant in this case.

Problem 6.29 (Changes in Price and Volume)