Accounting for Managerial Decisions

Syllabus.

Module - 01 :- Managerial Decision Making

Decision Making process, Database for decision-making, Cost-based Decision-making.

Module - 02 :- Cost behaviour and Profit analysis.

Marginal Costing and Short term Decisions and pricing, Application of Short term decision models: key factors, diversification of products, profit planning, Product mix decision, Contribution analysis, make or buy decisions, discontinuation of product, diversification of product line, accept or reject special order, break-even analysis, cost-volume profit analysis.

Module - 03 :- Responsibility accounting and divisional performance measurement.

Responsibility accounting : meaning & definition, process in implementation, responsibility reporting, centres for control, benefits of responsibility accounting, difficulties in the implementation of responsibility accounting, methods for measuring divisional performance, divisional performance reporting.

Module 04 :- Budgetary Control and Variance analysis.

Steps in Preparation of master budget, zero based budgeting (ZBB) : meaning, requisites for implementation, features, ZBB vs Traditional budgeting, benefits, criticism. Planning programming budgeting system (PPBS) : meaning, definition, PPBS vs Conventional budgeting, Stages in PPBS, advantages.
Performance Budgeting : meaning, reasons of performance budget, prerequisites, and Steps in implementation.
Monitoring results and control variances : planning and Operational variances, interpretation of variances (Theory only).

Module 05 :- Uniform Costing and inter firm Comparison.

Meaning, objectives, requisites for the installation of Uniform costing, Uniform Costing manual, advantages and disadvantages.
Inter-firm Comparison : meaning, requisites, Procedure involved under Inter-firm comparison, advantages and disadvantages.

4/08/18

Module - 01

Managerial Decision Making.

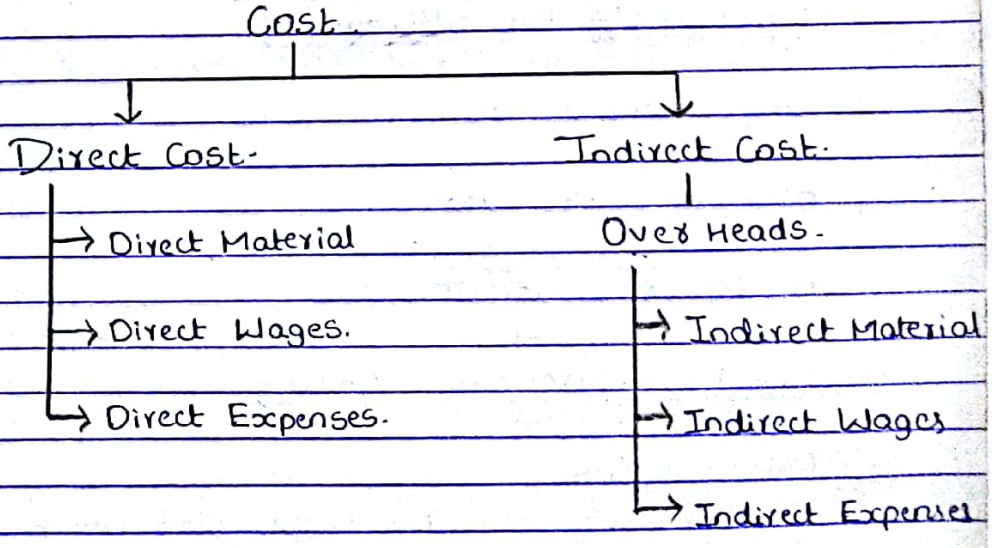
* **Cost :-** Expenditure incurred to produce a particular product.

* **Costing :-** Method used to determine the cost.

* **Cost Accounting :-** Transactions showing in the books of Accounts.

* **Cost Accountancy :-** Costing + Cost Accounting

* **Types of Cost.**



* Cost Centre :- It is a group of people or department to identify the estimated cost.

* Contribution Margin :- Sales − Variables = Cost

* Carrying Cost :- Transportation Cost.

* Ordering Cost :-

* Out of Stock Cost :-

* Process of Decision Making

01. Clarifying the Decision Problem.
↓
02. Specify the Criteria.
↓
03. Identify the alternatives.
↓
04. Develop a decision Model.
↓
05. Collect the data.
↓
06. Make a decision.

* Cost based decision Making

01. Relevant Cost.

Relevant Cost are those cost which are related to the decision making and which has to be considered for making the decisions. The business has to take decisions related to future. Hence, in such decisions estimation of future cost and revenues are worked out.

Thus, relevant cost are those cost which influence the decision and are directly related to the decisions to be made.

Example:- In a machinery replacement decision, the original cost and present depreciated book value of the old plant are not relevant. The Expected value of sale of old plant is relevant cost because it will reduce the amount of investment in the new Plant.

02. Irrelevant Cost.

03. Sunk Cost.

Sunk cost are the cost that have been created in the Past and that cannot be changed by any decision made in future.

For example, the WDV of the assets previously purchased are sunk cost.

04. Opportunity Cost

Opportunity Cost is the measure of the benefit of the Opportunity for gone when various alternatives are considered or it is the cost of Sacrifice made by alternative action chooser.

For Example, Opportunity Cost of funds invested in the business is the interest that could have been earned by investing the funds in the bank deposits.

05. Replacement Cost.

Replacement Cost is the cost at which there could be purchase of an asset or material identical to that which is being replaced or revalued.

06. Avoidable Cost.

Avoidable cost are those cost which can be eliminated if a particular product or department with which they are directly related is discontinued.

For Example :- Salary of the Supervisor of the particular dept.

07. Unavoidable Cost

It are those cost which cannot be eliminated with the discontinuation of a department or product.

For Example :- Factory Rent.

08. Differential Cost.

The change in cost due to change in the level of activity or pattern or method of production is known as Differential cost. If the change increases then it is called as Incremental Cost. If the change decreases then it is called as a Decremental cost.

09. Out of Packet Cost.

This is the portion of cost which involves payment to outsiders, that is it gives raise to cash Expenditure as opposed to such cost as depreciation which do not involve any cash expenditure. Such cost are relevant for price fixation during recession or make or buy decision is made.

10. Imputed Cost

Imputed Cost are those cost which are notional in character and do not involve any cash outlay. For Example, Interest on capital on which no interest is paid, Building rent charge in the business which is owned by the Propreitors.

* Decision Making Area.

01. Profit Planning
02. Product Pricing
03. Own or lease.
04. Sell or Process
05. Location of the Plant.
06. Marketing Decision.
07. Production Planning & Control.

Important Questions :-

Section - A

01. What are Relevant Costs, Expense Centre, Profit centre, Sunk Costs, Incremental Cost
02. What are Sunk Cost with reference to decision making

Section - B

01. Describe the steps in the decision making process in which steps does the management accountant play a major role.

21/08/18

Module - 02

Cost Behavior and Profit Analysis

* Marginal Costing

The term marginal cost is defined as the amount at any given volume of output by which agreegate cost are changed, if the volume of output is increased or decreased by one unit. It is a variable cost of one unit of a product or service.

* Product Cost (Variable Cost)

The cost which are charged to production is called Product cost.

* Period Cost (Fixed Cost)

In Marginal Costing period cost are fixed cost are charged directly to the profit and loss Account.

* Formula's.

- Contribution = Sales − Variable Cost.
- Contribution = Fixed cost ± Profit or loss.
- Total Marginal Cost = DM Cost + DL Cost + DE Cost + Variable OHs
- Marginal Cost per Unit = $\frac{\text{Total Marginal Cost}}{\text{No. of Units}}$

* Features of Marginal Costing

→ 01. Variable Cost and Fixed Cost.
→ 02. F.C is considered as a periodic cost and V.C is considered as a product cost.
→ 03. Stock W-I-P is valued based on the variable cost and Finished Goods valued at V.C.
→ 04. Price fixation is based on the V.C.
→ 05. Profit is considered based on Contribution.

Problems:-

01. Fixed Cost :- 1,20,000, Variable Cost Rs. 3 per unit, Selling price Rs. 7 per unit and output 50,000 units. Determine the profit under each of the following Situation :-
a) with a above data.
b) with a 10% increase in output.
c) with a 10% increase in Fixed Cost.
d) with a 10% increase in Variable Cost.
e) with a 10% increase in Selling price.

⇒ Solution :-

Working note

Particulars	I	II	III	IV	V
Output	50,000	55,000	50,000	50,000	50,000
Selling price	7 p.u	7	7	7	7+10%
					7+0.7
					7.7
Variable Cost	3 p.u	3	3	3+0.3 = 3.3	3
Fixed Cost	1,20,000	1,20,000	1,20,000+12000 = 1,32,000	1,20,000	1,20,000

Particulars	I	II	III	IV	V
Sales	3,50,000	3,85,000	3,50,000	3,50,000	3,85,000
(-) Variable Cost	1,50,000	1,65,000	1,50,000	1,65,000	1,50,000
Contribution	2,00,000	2,20,000	2,00,000	1,85,000	2,35,000
(-) F.C	1,20,000	1,20,000	1,32,000	1,20,000	1,20,000
Profit	80,000	1,00,000	68,000	65,000	1,15,000

Profit-Volume Ratio / P/V Ratio

Profit-Volume Ratio is popularly known as PV Ratio it expresses the relationship of contribution to sales. It is also call it as contribution to sales Ratio (or) marginal income ratio (or) Variable-to-profit ratio.

$$P/V\ Ratio = \frac{Contribution}{Sales}$$

(or)

$$= \frac{Sales - Variable\ Cost}{Sales}$$

(or)

$$= \frac{Fixed\ Cost + Profit}{Sales}$$

(or)

$$= 1 - \frac{Variable\ Cost}{Sales}$$

(or) $= \frac{change\ in\ Contribution}{change\ in\ Sales}$ (or) $= \frac{Change\ in\ Profit}{Change\ in\ sales}$

* Advantages of Marginal Costing

01. Effective Cost Control.
02. Treatement of Overhead Simplified.
03. Uniform and Realistic valuation
04. Helpful to management.
05. Helps in production plan
06. Fixation of Selling price.

* Disadvantages of Marginal Costing

01. Difficulty to analyse Overhead
02. Time element ignored.
03. Unrealistic assumption
04. Difficulty in fixation of selling price.
05. Significance cost
06. Unrealistic stock Valuation.

Break Even Analysis

Formula for Break Even Analysis.

Total Revenue = Total Cost

Selling Price x No. of output = T.V.C + F.C

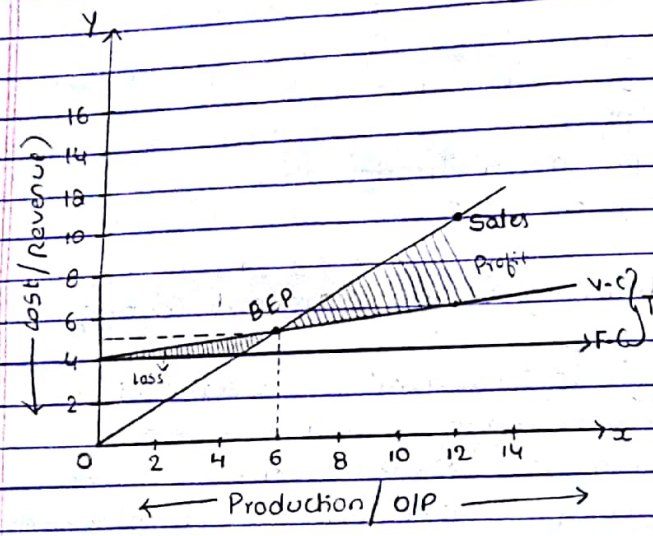
$S.P \times x = (V.C \times x) + F.C$

$SP = VC + F.C = (V.C\ per\ unit \times No.\ of\ o/p) + FC$

∴ Contribution per unit = F.C.

$$\therefore BEP = \frac{F.C}{Contribution\ per\ unit}$$

* Graphical representation showing B.E.P.



Prod^n = 12,000 unit
Sales = 10,000
V.C = 2,000
F.C = 4,000

T.C = VC + FC
= 2000 + 4000
= 6000

* Assumptions.

01. TC = V.C + F.C.
02. Price Remains Constant.
03. Volume of Sales = Volume of Production.
04. F.C remain constant rate of Increase in V.C
05. It assumes constant technology
06. No improvement in labour efficiency
07. No change in product mix.

* Limitations of BEP

01. Everything Remain constant.
02. Considered past information to project future date
03. Profit are function of not only Output.
04. Selling cost are specifically difficult to handle Break Even Analysis.

Advantages of PV Ratio

01. Determines the profitability of line product and also overall company's profit.
02. Compares the profitability of line product.
03. Estimates the profit, Sales and also Break Even Sales.
04. Margin of Safety = Actual Sales − Break Even Sales

Problems:-

01. Sales of product amounts to 800 units per month, at Rs.10 per unit. Fixed cost is Rs. 400 per month. Variable cost is Rs. 6 per unit. There is proposal to Reduce Prices by 10%. Calculate Present and Future Ratio.
a) How many units must be sold to earn the present total Profit.

⇒ Solution:-

1) Present PV ratio:

$$P/v\ Ratio = \frac{Sales - V.C}{Sales} \times 100$$

$$= \frac{10 - 6}{10} \times 100$$

$$= \frac{4}{10} \times 100$$

$$\therefore \boxed{P/v\ Ratio = 40\%}$$

ii) Future PV Ratio.

Selling Price	=	₹ 10
(-) Reduction (10 x 10%)	=	₹ 1
New Selling Price	=	₹ 9

$$P/V\ Ratio = \frac{SP - VC}{SP} \times 100$$

$$\therefore = \frac{9-6}{9} \times 100$$

$$= \frac{3}{9} \times 100$$

$\therefore$ **P/V Ratio = 33.33%**

iii) Calculation of Present Total Profit

Sales (200 x 10)	= 2,000
(-) V.C (200 x 6)	1,200
Contribution (c)	800
(-) F.C	400
Profit	400

PV ratio $\Rightarrow$ $\frac{F.C + Desired\ Profit}{Sales}$

$= Sales = \frac{F.C + Profit}{P/V\ Ratio}$	$\therefore$ No. of units should be sold
$= \frac{400 + 400}{33.33\%}$	$= \frac{2,400}{9}$
$= 2,400$	$= 267$ units

11/09/2

Q2 Sale of products amount to 200 units per month at Rs 10 per unit. Fixed cost is Rs. 400 pm, Variable cost is Rs. 6 per unit.

Calculate.

01. PV Ratio,
02. Break Even sales is Rs.
03. Break Even Sales in units.
04. Margin of Safety
05. Sales to earn a desire amt of profit of Rs. 600

$\Rightarrow$ Solution :-

S.P : ₹10
V.C = ₹6
F.C = 400
Sales (unit) = 200

Particulars	Rs	per unit
Sales (200 x 10)	2000	10
(-) V.C (200 x 6)	1.200	6
Contribution	800	4
(-) F.C	400	
Profit	400	

i) Calculation of P.V Ratio.

$$P/V\ Ratio = \frac{Contribution}{Sales} \times 100$$

$$= \frac{800}{2000} \times 100$$

$\therefore$ **P/V Ratio = 40 %**

ii) Calculation of BEP in Rupees.

$$\text{Break Even Sales (₹)} = \frac{\text{F.C}}{\text{P/V Ratio}}$$

$$= \frac{400}{(40/100)}$$

$$= \frac{40}{0.4}$$

∴ BES (in Rs) = 1000 Rs

iii) Calculation of BES in Units.

$$\text{BES (in units)} = \frac{\text{F.C}}{\text{Contribution per unit}}$$

$$= \frac{400}{4}$$

∴ BES (in units) = 100 units.

iv) Calculation of Margin of Safety.

Margin of Safety (in Rs) = Actual Sales − B.E.S.

= 2000 − 1000

= Rs. 1,000

(in units) = 200 units − 100 units

= 100 units

v) Calculation of Sales to earn a profit of Rs. 600

$$\text{P/V Ratio} = \frac{\text{F.C + Desired Profit}}{\text{Sales.}}$$

$$40\% = \frac{400 + 600}{\text{Sales.}}$$

$$\text{Sales} = \frac{1000}{40\%}$$

∴ Sales = ₹ 2,500.

03. From the following find out.

i) Profit Volume Ratio.
ii) Break Even Point.
iii) Sales for 40% P/V Ratio
iv) Margin of Safety from the sale of Rs. 300,000.
v) Net Profit from the sale of Rs. 3,00,000.
vi) Required Sales for the Net Profit of Rs. 70,000.
vii) Required Sales for the Net Profit of Rs. 70,000 after tax, the Corporate Income Tax Rate being 60%.
viii) Additional Sales required to covers an increase of Rs. 3,00,0[redacted] per annum in the Sales managers' salary.

Position of the Company of the Year 2017.

Particulars	Rs
Sales	2,00,000
Variable O/H	1,50,000
- Contribution	50,000
Fixed O/H	15,000
Net Profit	35,000

=> Solution :-

i) Calculation of P/V Ratio

$$P/V\ Ratio = \frac{Contribution}{Sales} = \frac{50,000}{2,00,000} \times 100$$

$\therefore$ P/V Ratio = 25%

ii) Calculation of Break Even Point

$$BEP = \frac{F.C}{P/V\ Ratio} = \frac{15,000}{25\%}$$

$\therefore$ BEP = Rs. 60,000

iii) Calculation of Sales for 40% P/V Ratio

$$P/V\ Ratio = \frac{Contribution}{Sales}$$

$$40\% = \frac{50,000}{Sales}$$

$$Sales = \frac{50,000}{40\%}$$

$\therefore$ Sales = Rs. 1,25,000

iv) Calculation of Margin of Safety (MOS)

MOS = Actual sales − Break Even Sales
= 3,00,000 − 60,000

$\therefore$ MOS = 2,40,000 Rs

v) Calculation of Net Profit from Sale of Rs. 3,00,000

$$P/V\ Ratio = \frac{F.C + Desired\ Profit}{Sales}$$

$$25\% = \frac{15,000 + Desired\ Profit}{3,00,000}$$

$3,00,000 \times 25\% = 15,000 + Desired\ Profit$

$75,000 = 15,000 + D.P$

$75,000 - 15,000 = DP$

$\therefore$ Desired Profit = 60,000 Rs.

vi) Calculation of Required Sales for the Net Profit of Rs. 70,000

$$P/V\ Ratio = \frac{F.C + Desired\ Profit}{Sales}$$

$$25\% = \frac{15,000 + 70,000}{Sales}$$

$$Sales = \frac{85,000}{25\%}$$

$\therefore$ Sales = Rs. 3,40,000

PBT ⇒ ?
(−) Tax (60%) = ____
PAT (40%) 70,000

∴ PBT = PAT / % = 70,000 / 40% = 1,75,000

PBT = 1,75,000
Tax = 1,05,000 @60%
PAT = 70,000

(vii) Calculation of Required Sales for Net profit of Rs. 70,000 after Tax

Tax rate : 60%

P/V Ratio = F.C + Desired Profit / Sales

25%) = 15,000 + 1,75,000 / Sales

Sales = 1,90,000 / 25%

∴ Sales = 7,60,000

(viii) Calculation of Additional Sales

Sales = Increased Amt / P/V Ratio

= 3,000 / 25%

∴ Sales = Rs. 12,000

04 A Company budgets for a production of Rs. 1,50,000 units. The variable cost per unit is Rs. 14 and Fixed Cost is Rs. 2 per unit. The Company fixes its Selling price to fetch a profit of 15% of Cost.

i) What is BEP?
ii) What is PV Ratio?
iii) If it reduces its Selling price by 5%, how does the revised Selling price affect the BEP and P/V Ratio.
iv) If a profit increase of 10% is desired more than the budget, what should be the Sales at the reduced price.

=> Solution:

Budgeted Prodn / o/p = 1,50,000
V.C = ₹ 14
F.C = ₹ 2 ∴ Total F.C = (2 × 1,50,000) = 3,00,000
S.P = ?

Total cost per unit = V.C + F.C
= 14 + 2
= 16 Rs.

Selling price = T.C + Profit
= 16 + 15% of T.C.
= 16 + 2.4
= 18.4

i) Calculation of BEP

BEP = Fixed cost / Cont^n per unit (or) F.C / S.P − V.C

= 3,00,000 / 18.4 − 14

= 3,00,000 / 4.4

∴ BEP = 68,182 units

BEP(₹) = BEP unit × S.P
= 68,182 × 18.4

∴ BEP(₹) = 12,54,549 Rs

ii) Calculation of P/v Ratio.

$$P/v\ Ratio = \frac{Contribution\ P.U}{Selling\ price} \times 100$$

$$= \frac{4.4}{18.4} \times 100$$

$$\therefore \boxed{P/v\ Ratio = 23.91\ \%}$$

iii) Calculation of New Selling price

$$New\ S.P = S.P - \%\ of\ Reduction\ in\ S.P$$
$$= 18.4 - 5\%\ of\ 18.4$$
$$= 18.4 - 0.92$$
$$= 17.48$$

$$New\ Cont^{n}\ P.U = S.P - V.C$$
$$= 17.48 - 14$$
$$= 8.48$$

$$BEP(in\ unit) = \frac{F.C}{Cont^{n}\ P.U}$$

$$= \frac{3,00,000}{3.48}$$

$$\therefore \boxed{BEP(in\ unit) = 86,207\ units}$$

$$BEP(in\ Rs) = BEP(in\ unit) \times New\ SP$$
$$= 86,207 \times 17.48$$
$$= 15,06,898\ Rs$$

$$P/v\ Ratio = \frac{Contribution\ P.U}{Selling\ price} \times 100$$

$$= \frac{3.48}{17.48} \times 100$$

$$\therefore \boxed{P/v\ Ratio = 19.90\%}$$

iv) Calculation of Sales in case of 10% increase in Profit

Budgeted o/p = 1,50,000

Profit per unit = Selling Price − T.C
= 18.4 − 16
= Rs. 2.4.

Budgeted profit = 1.50,000 × ₹ 2.4
= 3,60,000

(+) 10% increase in profit
(3,60,000 × 10%) = 36,000

Revised Profit = 3,96,000

$$Contribution\ per\ unit = \frac{F.C + Desired\ profit}{Sales\ in\ units}$$

$$3.48 = \frac{3,00,000 + 3,96,000}{Sales\ in\ units}$$

$$Sales\ in\ Units = \frac{6,96,000}{3.48}$$

$$= 2,00,000\ units$$

Sales in Rs = 2,00,000 × 17.48
= Rs. 34,96,000

Jan 2018.

05. The Sales turnovers and profit during 2 periods were as follows:-

Year	Sales (Rs)	Profit (Rs)
2015	20 lakh	2 lakh
2016	30 lakh	4 lakh

Calculate:-

i) P/v Ratio

ii) The sales required to earn a profit of Rs. 5 lakh.

iii) The profit when sales are Rs. 10 lakh.

⇒ Solution:-

Year	Sales	Profit
2016	30,00,000	4,00,000
2015	20,00,000	2,00,000
Increase in Sales & Profit	10,00,000	2,00,000

i) Calculation of P/v Ratio

$$P/v\ Ratio = \frac{Changes\ in\ Profit}{Changes\ in\ Sales}$$

$$= \frac{2,00,000}{10,00,000}$$

$$\therefore \boxed{P/v\ Ratio = 20\%}$$

ii) Sales to Earn a profit of ₹ 5,00,000

$$P/v\ Ratio = \frac{F.C + Desired\ Profit}{Sales}$$

Calculation of F.C

$$F.C = Contribution - Profit$$

$$= (Sales \times P/v\ Ratio) - Profit$$

* Cont^n = (Sales × P/v Ratio)

2015 = (20,00,000 × 20%) − 2,00,000

= 4,00,000 − 2,00,000

= 2,00,000 Rs

2016 = (30,00,000 × 20%) − 4,00,000

= 6,00,000 − 4,00,000

= 2,00,000 Rs

$$\therefore P/v\ Ratio = \frac{F.C + DP}{Sales}$$

$$20\% = \frac{2,00,000 + 5,00,000}{Sales}$$

$$Sales = \frac{7,00,000}{20\%} = Rs.\ 35,00,000$$

iii) Calculation of ~~Sales~~ Profits.

$$P/v\ Ratio = \frac{F.C + Desired\ Profit}{Sales}$$

$$20\% = \frac{2,00,000 + DP}{10,00,000}$$

$$10,00,000 \times 20\% = 2,00,000 + DP$$

$$2,00,000 = 2,00,000 + DP$$

$$\therefore DP = 2,00,000 - 2,00,000$$

$$\therefore DP = 0\ (BEP)$$

∴ BEP

10/09/18

06. The Sales Turnover and profits during 2 period were as follows

Period	Sales	Profit/loss.
1	10,000	(500)
2	14,000	1,500

a) Calculate P/V Ratio, Fixed Cost
b) The profit when Sales are Rs. 35,000.
c) The Sales required to earn a profit of Rs. 30,000.
d) The Sales required to incurr a loss of Rs. 1,000.

⇒ Solution:

Change in Sales & profit.

Period	Sales	Profit
2	14,000	1,500
1	10,000	(500)
Increase in Sales & Profit	4,000	2,000

i) Calculation of P/V Ratio.

$$P/V\ Ratio = \frac{Changes\ in\ Profit}{Changes\ in\ Sales}$$

$$= \frac{2,000}{4,000}$$

$$\therefore P/V\ Ratio = 50\%$$

ii) Calculation of Fixed Cost

$$F.C = Contribution - Profit$$
$$= (Sales \times P/V\ Ratio) - Profit$$

1 = (10,000 × 50%) − (−500)
= 5000 − (−500)
= 5000 + 500
= 5500 Rs

2 = (14,000 × 50%) − 1,500
= 7000 − 1500
= 5500 Rs

∴

ii) Calculation of Profit when Sales are ₹ 35,000

$$P/V\ Ratio = \frac{F.C + Desired\ Profit}{Sales}$$

$$= 50\% = \frac{5,500 + DP}{35,000}$$

= 35,000 × 50% = 5,500 + DP
= 17,500 = 5,500 + DP
∴ DP = 17,500 − 5,500.
∴ Desired Profit = 12,000

iii) Calculation of Sales required to earn profit of Rs 30,000

$$P/V\ Ratio = \frac{F.C + DP}{Sales}$$

$$60\% = \frac{5500 + 30,000}{Sales}$$

$$Sales = \frac{35,000}{50\%} = 17,000$$

iv) Calculation of Sales required to Earn a Loss of Rs. 1,000

$$P/v\ Ratio = \frac{FC + Loss}{Sales}$$

$$50\% = \frac{5500 - 1000}{Sales}$$

$$Sales = \frac{4500}{50\%}$$

∴ **Sales = Rs. 9,000**

Dec-2016

07 Sales = Rs. 2,00,000
Profit = Rs. 20,000
Variable cost = 70%
Find out:
a) P/v Ratio.
b) Fixed Cost
c) Sales volume to earn a profit of Rs. 40,000

⇒ Solution

Sales	2,00,000
(-) V.C (70%)	1,40,000
Cont^{n}.	60,000
(-) Fixed cost	40,000
Profit	20,000

i) Calculation of P/v Ratio.

$$P/v\ Ratio = \frac{Contribution}{Sales} = \frac{60,000}{2,00,000} \times 100$$

∴ **P/v Ratio = 30%.**

ii) Calculation of Fixed Cost.

∴ Fixed cost is Rs. 40,000

(or)

F.C = Contribution - Profit
= 60,000 - 20,000
= 40,000

iii) Calculation of Sales Volume to earn a profit of Rs. 40,000

$$P/v\ Ratio = \frac{F.C + D.P}{Sales}$$

$$30\% = \frac{40,000 + 40,000}{Sales}$$

$$Sales = \frac{80,000}{30\%}$$

∴ **Sales = 2,66,667 Rs**

Dec-2015

08 Data Extracted from the books of Zenith mills for the month of October 2015 are as follows:

Fixed Expenses = 40,000
Break Even Sales = Rs. 1,00,000

Calculate :-
a) P/v Ratio.
b) Profits when estimated Sales are Rs. 2,00,000.
c) Revised Break Even Point (BEP) in Rs. if Selling price is reduced by 20%.
d) Estimated Sales to earn a profit of Rs. 40,000 after Reduction in Selling price by 20%.

⇒ Solution :-

i) Calculation of P/v Ratio.

$$BEP\ (₹) = \frac{F.C}{P/v\ Ratio}$$

$$1,00,000 = \frac{40,000}{P/v\ Ratio}$$

$$P/v\ Ratio\ (1,00,000) = 40,000$$

$$P/v\ Ratio = \frac{40,000}{1,00,000}$$

$$\therefore \boxed{P/v\ Ratio = 40\%}$$

ii) Calculation of Profits when Sales = 2,00,000

$$P/v\ Ratio = \frac{F.C + D.P}{Sales.}$$

$$40\% = \frac{40,000 + D.P}{2,00,000}$$

$$2,00,000 \times 40\% = 40,000 + D.P$$

$$80,000 = 40,000 + DP$$

$$DP = 80,000 - 40,000$$

$$\therefore \boxed{Desired\ Profit = 40,000}$$

iii) Calculation of Revised Break Even Point if Selling price is reduced by 20%.

BEP = Total Revenue = Total cost
∴ Total Revenue / Sales = ₹ 1,00,000

New Selling price = Sales − Reduction in Sales
= 1,00,000 − (20% of 1,00,000)
= 1,00,000 − 20,000
= 80,000

V.C = T.C − F.C
= 1,00,000 − 40,000
= 60,000

Contibution = Sales − V.C
= 80,000 − 60,000
= 20,000

P/v Ratio = Contribution / Sales

= 20,000 / 80,000 × 100

= 25%

New BEP (₹) = F.C / P/v Ratio

= 40,000 / 25%

∴ New BEP (₹) = 1,60,000 Rs

iv) Calculation of Sales to earn a profit of Rs. 40,000 after reduction of S.P.

P/v Ratio = F.C + D.P / Sales

25% / 1 = 40,000 + 40,000 / Sales

∴ Sales = 80,000 / 25%

∴ Sales = Rs. 3,20,000

09. A Retailer in a Garment currently selling 24,000 Shirts annually. He Supplied the following data for the year ended 2015.

Selling price (Per unit) = Rs. 400

Variable Cost (Per unit) = Rs. 250

Fixed Cost :-

a) Salary for the year :- Rs. 12,00,000

b) Gnl Office cost for the yr :- Rs. 8,00,000

c) Advertising Cost for the yr :- Rs. 4,00,000

From the above details.

a) Calculate BEP and Margin of Sales Revenue and No. of Shirts Sold.

b) Assume that 20,000 Shirts were Sold in a year and findout the Net Profit of the firm.

c) If it decided to introduce Selling commission of Rs. 30 per Shirt, How many Shirts would required to be Sold in a year to earn a Net Income of Rs. 1,50,000.

d) Assume that for the year 2016, an addition Staff cost of Rs. 3,30,000 is anticipated and price of a Shirts is likely to be increased by 15%, what should be the BEP in No. of. Shirts and Sales Volume.

⇒ Solution :-

Sales (24,000 × 400)	=	96,00,000
V.C (24,000 × 250)	=	60,00,000
Contribution	=	36,00,000
F.C (12,00,000 + 8,00,000 + 4,00,000)	=	24,00,000
Profit		12,00,000

i) Calculation of BEP

$$BEP(\text{in units}) = \frac{F.C}{\text{Contribution per unit}}$$

$$= \frac{24,00,000}{\text{Selling Price} - V.C \text{ per unit}}$$

$$= \frac{24,00,000}{400 - 250}$$

$$= \frac{24,00,000}{150}$$

$$= 16,000 \text{ units}$$

$$BEP(\text{in Rs}) = BEP(\text{in units}) \times S.P$$

$$= 16,000 \times 400$$

$$= 64,00,000$$

Calculation of Margin of Sales. (MOS)

$$MOS(\text{in units}) = \text{Actual Sales}(\text{units}) - \text{Break Even Sales}(\text{units})$$

$$= 24,000 - 16,000$$

$$= 8,000 \text{ units}$$

$$MOS(\text{in Rs}) = \text{Actual Sales}(Rs) - BES(Rs)$$

$$= 96,00,000 - 64,00,000$$

$$= 32,00,000 \text{ Rs}$$

(or)

$$= MOS(\text{units}) \times \text{Selling price}$$

$$= 8,000 \times 400$$

$$= 32,00,000 \text{ Rs}$$

ii) Calculation of Net Profit if Sales were 20,000 units

(For Rs) $$P/V \text{ Ratio} = \frac{F.C + D.P}{\text{Sales}}$$

or

(For unit) $$\text{Contribution per unit} = \frac{F.C + D.P}{\text{Sales in units}}$$

$$\frac{150}{1} = \frac{24,00,000 + D.P}{20,000}$$

$$20,000 \times 150 = 24,00,000 + D.P$$

$$DP = 30,00,000 - 24,00,000$$

$$\therefore \boxed{\text{Net Profit} = 6,00,000}$$

(or)

$$P/V \text{ Ratio} = \frac{\text{Contribution}}{\text{Sales}}$$

$$= \frac{36,00,000}{96,00,000} \times 100$$

$$= 37.5\%$$

$$P/V \text{ Ratio} = \frac{F.C + D.P}{\text{Sales}}$$

$$37.5\% = \frac{24,00,000 + D.P}{(20,000 \times 400)}$$

$$37.5\% = \frac{24,00,000 + D.P}{80,00,000}$$

$$80,00,000 \times 37.5\% = 24,00,000 + DP$$

$$30,00,000 = 24,00,000 + DP$$

$$DP = 30,00,000 - 24,00,000$$

$$\therefore \boxed{\text{Net Profit} = 6,00,000}$$

iii) Calculation of Sales.

New Cont^{n} (P.U) = Selling Price − V.C
= 400 − (250 + 30)
= 400 − 280
= 120

P/V Ratio = F.C + D.P / Sales

(or)

Cont^{n} P.U = F.C + D.P / Sales.

120 = 24.00.000 + 1.50.000 / Sales

Sales (120) = 25,50,000

Sales = 25,50,000 / 120

∴ Sales = 21250 units

iv) Calculation of BEP if S.P and F.C increases

New F.C = Old F.C + Staff Cost
= 24.00.000 + 3,30,000
= 27,30,000

New S.P = S.P + 15% increase in S.P
= 400 + (15% of 400)
= 400 + 60
= 460

BEP (in units) = F.C / Cont^{n} per unit
= 27,30,000 / (S.P − V.C)
= 27,30,000 / (460 − 250)
= 27,30,000 / 210
= 13,000 units

BEP (in Rs) = BEP (in units) × S.P
= 13,000 × 460
= 59,80,000 Rs

19/09/18
Dec 2016
10 XYZ limited Supplies you the following data for the year ending 31/03/2016.
Production 1,100 units, Sales 1000 units.
There was no Opening Stock.

Particulars	RS.
Variable Manufacturing Cost per unit	7
Fixed Manufacturing Overhead (Total)	2,200
Variable Selling & Adm^{n} O/H (per unit)	0.50
Fixed Selling & Adm^{n} O/H	400
Selling price per unit	15

a) Prepare Income Statement under Marginal Costing.
b) Prepare Income Statement under absorption Costing.

=>Solution:-

Income Statement under Marginal Costing

Particulars	₹	₹
Sales (1000×16)		15,000
less:- Variable Cost		
i) Variable Manufacturing Cost (1,100 × 7)	7,700	
(+) Opening Stock	-	
(-) closing Stock (100×7)	700	
	7,000	
ii) Variable Sell^ & adm^ O/H (1000 × 0.50)	500	7,500
Contribution		7500
less:- Fixed Cost		
i) Fixed Manufacturing O/H	2,200	
ii) Sell^ & adm^ O/H	400	2,600
PROFIT		4,900

Income Statement under Absorption Costing

Particulars	₹	₹
Sales (1000×16)		15,000
less:-Variable Manu^ O/H (1,100×7)	7,700	
•Fixed Manuf^ O/H	2,200	
(+) Opening Stock	-	
(-) closing Stock $\frac{9,900}{1,100} \times 100$	900	
Cost of Production.	9,000	
Add:- Selling & adm^ O/H		
• Variable (1,000 × 0.50)	500	
• Fixed Sell^ & adm^ O/H	400	
Total Cost	9,900	9,900
Profit		5,100

* Short-Term Decision and Pricing

Decision making involves the act of selecting one course of action from amount various feasable alternative available. Short term decision are of a special nature. The type of information required for decision making depends on the decision situation under consideration.

Factors have been are Short term decision making:- can be either Qualitative and Quantitative in nature.

* Applications of Short-Term Decision Models

(or) Practical application is useful in Managing a decision making in the following situation.

01. Key or limiting factor Analysis.
02. Profit Planning
03. Optimising Product mix.
04. Contribution Analysis
05. Make or buy decision.

06. Price Fixation.
07. Dis-Continuous of Product
08. Diversification of Product Plan.
09. Accept or Reject Special Offer & Sub Contracting
10. Cost-Volume profit analysis (CVP Analysis).

01. Key Factor or Limiting Factor Analysis

A Key factor is that factor which puts a limit on production and profit of a business. Usually this limiting factor is Sales. A concern may not be able to sell as much as it can produce but sometimes a concern can sell all its production but cannot meet the Sales demand due to Shortage of Men, material, machines plant Capacity or Capital. In such case decision has to be taken regarding the choice of product whose production has to increase, decrease or Stock.

The limiting factor is often Sales demand itself, in which case the business should produce enough goods or Service to meet the demand in full.

When there is no limiting factor the choice of the product will be based on the highest P/v Ratio. When there is a limiting factor Selection of the product will be on the basis of Contribution per unit of Scare factor of production.

Steps to be taken while dealing with a limiting factor problem.

Step 1 :- Identify the Possibility that there may be a limiting factor other than Sales demand. There may be the minimum availability of one or more resources so that, Sales demand cannot be met. This is done quite Simple as follows :-

a) Calculate the Volume of Resources required to produce enough units to satisfy Sales demand.

b) Calculate the Volume of Resource available

c) Compare the two totals, if there is a excess then limiting factors exists. if there is only one Such limiting factor the next Step is to calculate the contribution earned by each product per unit of the Scrares resources

Problem :-

01. A Small firm has two production Sections namely manufacturing and packaging. The total available daily production time in these Sections is 400 minutes and 320 minutes respectively. A choice amount 3 products A, B and C in any possible combination is Opened for production planning. Raw materials, labour and other facilities required or available in Sufficient Quantities to meet any program that can be formulated within the plant Capacity. The Sales dept is also geared to Sell all that is produce. Product A needs 12 mins of manufacturing time per unit of output and

4 minutes of Packaging time, Product B requires 4 minutes eg: each of manufacturing and packaging per unit, and C needs 8 mins of manufacturing but 24 minutes of packaging per unit. The Contribution per unit of A, B and C are Rs. 12, Rs. 8, and Rs. 24 respectively. and the Total Fixed charges per day come to Rs. 500. Advise about the Best Possible Production program under the Circumstances.

⇒ Solution :-

	Manufacturing time	Packaging	Contribution
A	12 mins	4 mins	₹ 12
B	4 mins	4 mins	₹ 8
C	8 mins	24 mins	₹ 24
Daily limit	400 mins	320 mins	

Calculation of Contribution per minute.

$$A = \frac{\text{Contribution}}{\text{Total Time taken}}$$

$$A = \frac{12}{16} = 0.75 \text{ Cont}^{4} \text{ per minute}$$

$$B = \frac{8}{8} = 1.00 \quad \text{-}''\text{-} \quad \text{-}''\text{-}$$

$$C = \frac{24}{32} = 0.75 \quad \text{-}''\text{-} \quad \text{-}''\text{-}$$

Since, time is limiting factor, Product 'B' appears to be most profitable because its Contribution per min is the maximum. So if only product 'B' is produced the position will be as follows.

400/4 = 100
320/4 = 80

	Manufacturing	Packaging
Total time available	400 mins	320 mins
(-) Time Required to produce 80 units (max. prod^{n} possible is 80 units @ 4 mins bcz packaging time available is only 320 mins.	320 mins	320 mins
Idle Time.	80 mins	—

Calculation of Contribution of Product 'B'

= 8 × 80 units

= Rs. 640

To utilize the Idle time we should choose Either product 'A' or 'C' which required less packaging time that should be choose.

manufacturing time required to produce Product 'A'	= 12 minutes
(-) Manufacturing time saved by not producing product 'B'	= 4 minutes
Additional Time required to produce product 'A' than product 'B'	8 minutes

∴ No of units of Product 'A' = 80/8 = 10 units can produce

Optimal Production Arrangement

Product	PDN (output)	Manuf^{n} Time	Packaging Time	Total Contn.
A	10	10×12 = 120 mins	10×4 = 40 mins	10×12 = 120
B	70	70×4 = 280 mins	70×4 = 280 mins	70×8 = 560
		400 mins	320 mins	₹680

(OR)

	Manufacturing	Packaging
Total time available	400 mins	320 min
(-) Time required to produce product 'A' (10 units)	(10×12) 120 mins	(10×4) 40 mins
	280 mins	280 min
(-) Time required to produce product 'B' (70 units)	(70×4) 280 mins	(70×4) 280 mins
Idle time	—	—

Calculation of Contribution of Products

Product A = 10 × 12
= 120 Rs

Product B = 70 × 8
= 560 Rs

Total Contribution = Product A + Product B
= 120 Rs + 560 Rs
= 680 Rs

Q2. A Company manufactures and market 3 products A, B and C. All the 3 products are made from the same set of machines. Production is limited by machine capacity. From the data given below indicate priorities for product 'A', B and C with a due to maximising ~~product~~ profit

Particulars	Product A (Rs)	Product B (Rs)	Product C (Rs)
Raw material cost p.u	2.25	3.25	4.25
D.L cost p.u	0.50	0.50	0.50
Other Variable cost p.u	0.30	0.45	0.71
Selling price p.u	5.00	6.00	7.00
Standard mach. time required p.u	39 mins	20 mins	28 mins

In the following year the Company faces Extreme shortage of Raw materials. It is noted that 3 Kgs, 4 Kgs and 5 Kgs of Raw materials are required to produce One unit of A, B and C respectively. How would products prioritise change?

⇒ Solution :-

Comparative Statement of Profitability

Particulars	Product A	Product B	Product C
Selling price (S)	5	6	7
Variable Cost			
• Raw material	2.25	3.25	4.25
• Direct labour	0.50	0.50	0.50
• Other Variable Cost	0.30	0.45	0.71
Total Variable Cost (V)	3.05	4.20	5.46
Contribution p.u (S − V)	1.95	1.80	1.54

* Calculation of P/v Ratio

P/v Ratio = $\frac{\text{Contribution per unit}}{\text{Selling price p.u}}$

Product 'A' = $\frac{1.95}{5.00} \times 100 = 39\%$

Product 'B' = $\frac{1.80}{6.00} \times 100 = 30\%$

Product 'C' = $\frac{1.54}{7.00} \times 100 = 22\%$

* Calculation of Contribution Per minute

Cont^{n} p. minute = $\frac{\text{Cont}^{n} \text{ per unit}}{\text{Std. mach}^{l} \text{ time required p.u}}$

Product 'A' = $\frac{1.95}{39 \text{ min}} = 0.050$ III. Rank

Product 'B' = $\frac{1.80}{20 \text{ mins}} = 0.090$ I Rank

Product 'C' = $\frac{1.54}{28 \text{ mins}} = 0.055$ II Rank

* Calculation of Contribution per kg of Raw Materials

Cont^{n} Per kg of RM = $\frac{\text{Cont}^{n} \text{ per unit}}{\text{Raw materials Required.}}$

Product 'A' = $\frac{1.95}{3 \text{ kg}} = 0.65$ I Rank

Product 'B' = $\frac{1.8}{4 \text{ kg}} = 0.45$ II

Product 'C' = $\frac{1.54}{5 \text{ kg}} = 0.308$ III

Comparative Statement of Profitability

particulars	Product 'A'	Product 'B'	Product 'C'
Contribution p.u	1.95	1.80	1.54
P/v Ratio	39%	30%	22%
Contribution per minute	0.05	0.09	0.055
Ranking Based on minutes	III	I	II.
Contribution per kg of Raw materials	0.65	0.45	0.308
Ranking Based on Raw material	I	II	III

Conclusion :-

• If there is no limiting factor the Product "A" is profitable based on P/v Ratio. B and C comes respectively.

• If the machine capacity is limit the Contribution per min of Std machine time is to be consider, product B more profitable, product C comes next and product A at last.

• If the Raw material is limit contribution per kg of raw material is consider for decision making product A more profitable, product B comes next and product C at last.

03. Suchithra Ltd is manufacturing 3 products A, B and C and selling them in Competitive market. Details of current demand, selling price and cost structure are given below

Particulars	Product A	Product B	Product C
Expected demand (in unit)	10,000	12,000	20,000
Selling price per unit (Rs)	20	16	10
Variable cost per unit (Rs)			
– Direct Material (Rs 10 per kg)	6	4	2
– D.L (Rs 15/hr)	3	3	1.50
Variable O/H	2	1	1
Fixed O/H (per unit) (Rs)	5	4	2

The Company is frequently affected by scarcity of Raw materials and high labour turn over. During the Next period it is expected

$$\text{Cal}^n \text{ of Contribution per kg of RM} = \frac{\text{Contribution per unit}}{\text{R.M used per unit}}$$

$$\text{Cal}^n \text{ of Raw materials used per unit} = \frac{\text{D.M}}{\text{assumed Rs per kg}}$$

✲ V.C per unit always remain constant

✲ F.C is always remain constant.

to have one of the following situation:

1) Raw materials available will be 12,100 kg.
2) Direct labour hrs available will be only 5000 hrs.
3) It may be possible to increase the sale of any one product by 25% without any additional fixed cost but by spending Rs.20,000 on advertising. There will be no shortage of Raw material or labour.

Suggests the best production plan in each case and the profit of the Company would earn according to your suggestion.

⇒ Solution :-

Particulars	Product A	B	C
Selling price P.U	20	16	10
(–) Variable cost :-			
• DM	6	4	2
• DL	3	3	1.50
• Variable O/H	2	1	1
Contribution per unit	9	8	5.50
P/V Ratio = $\frac{\text{Cont}^n \text{ P.U}}{\text{S.P / P.U}}$	45%	50%	55%
Ranking for III Situation (or) Ranking without key limiting factor	III	II	I
Key factor or limiting factor			
Raw material used per unit	$\frac{6}{10}$ = 0.6 Kg	$\frac{4}{10}$ = 0.4	$\frac{2}{10}$ = 0.2
Contribution per Kg of R.M	$\frac{9}{0.6}$ = 15 Rs III	$\frac{8}{0.4}$ = 20 Rs II	$\frac{5.50}{0.2}$ = 27.5 Rs I

* There is no limiting factor → P/v Ratio
* There is a limiting or Key factor → Contribution per limiting factor

} Basis for Ranking

Contribution per unit / Labour hrs used per Unit

Contribution per hr = Contribution per unit / Labour hrs used per unit

	C	A	B
Labour hrs used/unit	$\frac{3}{15} = 0.2$ hrs	$\frac{3}{15} = 0.2$ hrs	$\frac{1.50}{15} = 0.1$ hr
Contribution per hr	$\frac{9}{0.2\text{hr}} = 45$ Rs	$\frac{8}{0.2\text{hr}} = 40$ Rs	$\frac{5.5}{0.1\text{hr}} = 55$ Rs
	II	III	I

Labour hrs used per unit will be calculated based on labour hrs

* Calculation of Total Fixed Cost:

Total Fixed Cost = (10,000×5) + (12,000×4) + (80,000×2)
= 50,000 + 48,000 + 40,000
= 1,38,000

Situation : I :- Raw material available only 12,100 kg

as per Ranking

Particulars	C	B	A	Total
Cont^n per kg of R.M	27.5	20	15	
Raw material Required	(20,000×0.2kg) = 4000 kg	(12000×0.4kg) = 4800 kg	$\frac{3300}{0.6} = 5500$ units = 3300 kg	
Total Contribution	1,10,000 (4000×27.5)	96,000 (4800×20)	49,500 (3300×15)	2,55,500
Less :- Fixed cost				1,38,000
Profit				1,17,500

12,100 − 4000 − 4800 = A 3,300

DEC - 2016
Q.No : 11

Situation : II :- Labour hr limiting by 5,000 hrs

5000 − 2000 − 2000 = B → 1000

Particulars	C	A	B	Total
Contribution per hr	₹ 55	₹ 45	₹ 40	
Labour hr required Per unit	0.1	0.2	0.2	
Total labour Required	(20,000×0.1) = 2,000 hrs	(10,000×0.2) = 2000 hrs	$\frac{1000}{0.2} = 5000$ units = 1000 hrs	
Total Contribution	1,10,000 (2000×55)	90,000 (2000×45)	40,000 (1000×40)	2,40,000
less : Fixed Cost				1,38,000
Profit				1,02,000

Situation III :- Increase of Sales.

based on high in P/v Ratio

Product C :- 20,000 + 25% on 20,000
= 20,000 + 5,000
= 25,000 units / Expected demand

Product	No. of. units	C^n per unit	Total
C	25,000	5.5	1,37,500
B	12,000	8	96,000
A	10,000	9	90,000
		Total Contribution	3,23,500
		Less :- Fixed Cost	1,38,000
		Less :- Additional Exp :- add^n	20,000
		Profit	1,65,500

2017 C

Dec 04. A Company manufactures a Single product with a capacity of 1,50,000 units per annum. The Summarized profitability statement for the year is as under:

Sales :- 1,00,000 units @ Rs. 15 per unit		15,00,000
less: Cost of Sales.	Rs:-	
Direct materials	3,00,000	
Direct labour	2,00,000	
Production o/H:		
• Variable	60,000	
• Fixed	3,00,000	
Administration o/H: (fixed)	1,50,000	
Selling & Distribution o/H		
Variable	90,000	
Fixed	1,50,000	12,50,000
Profit.		2,50,000

You are required to evaluate the following options:

i) What will be the amount of Sales required to earn a target profit of 25% on Sales, if the packing is improved at a cost of Re. 1 per unit?

ii) There is an offer from a large retailer for purchasing 30,000 units per annum, subject to providing a packing with a different brand name at a cost of Rs. 2 per unit. However, in this case there will be no selling and distribution expenses. Also this will not, in any way, affect the Company's existing business. What be the break-even price for this additional offer?

iii) If an expenditure of Rs. 3,00,000 is made on advertising the Sales would increase from the present level of 1,00,000 units to 1,20,000 units at a price of Rs. 18 per unit, will that expenditure be justified?

iv) If the selling price is reduced by Rs. 2 per unit, there will be 100% Capacity utilization. Will the reduction in selling price be justified?

2016 Set-C

05. Titanic Ltd. Seeks your advice on production mix in respect of the three product. Clever, Intelligent and Obedient. Gives you the following information.

Data for Standard cost per unit :-

(Rs)

Particulars	Clever	Intelligent	Obedient
Direct material	320	240	160
Variable O/H	16	40	24
Direct labour			
Dept:-	Rate per hour in (Rs)	Hours	Hours
A	8.00	6	10
B	16.00	6	15

From current budget, you have further details as below :-

	Clever	Intelligent	Obedient
Annual Production (Nos)	5,000	6,000	10,000
Selling price per unit (Rs)	624	800	480

Fixed overhead :- Rs - 160,000

Sales dept estimate of maximum possible.

Sales in the coming year (nos).	6000	8000	12,000

You are also to note that there is a constraint on supply of labour in Department Clever and its manpower cannot be increased beyond its Present level.

Suggest the best production and sales mix from the standpoint of maximum profitability.

Prepare statements setting out the profit resulting from the budgeted production and the best alternative suggested by you.

A+B
6+6 = 12
10+15 = 25
5+11 = 16

⇒ Solution :-

Particulars	Products		
	Clever	Intelligent	Obedient
Selling price (P.U)	624	800	480
(-) Variable Cost			
• DM	320	240	160
• Variable O/H	16	40	24
• D.L			
• Dept A	48	80	40
• Dept B	96	240	176
Contribution P/U	144	200	80
Cont^{n} per labour hr	$\frac{144}{12} = 12$	$\frac{200}{25} = 8$	$\frac{80}{16} = 5$
	I	II	III

Calculation of Current year profit

Particulars	Clever	Intelligent	Obedient	Total
O/P	5,000	6,000	10,000	
Cont^{n} · P.U	144	200	80	
Total Contribution	7,20,000	12,00,000	8,00,000	27,20,000
(-) Fixed cost				1,60,000
Profit				25,60,000

No. of. hrs used in clever = (5000×6)+(5000×6)
= 30,000 + 30,000
= 60,000 hrs

There is a restriction on labour hrs in dept. clever. In the next year the required labour hrs is 72.000 labour hrs but the available hrs is just 60.000 hrs. Beez we can't allot more than 60,000 hrs for clever due to restriction on labours hrs.. Therefore, we can produce only 5000 units. (60,000 ÷ 12 hrs) = 5000 units

Statement showing optimum mix for next year.

	C	I	O	Total
No. of. units	5,000	8,000	12,000	
Cn. p.u	144	200	80	
Total Contribution	7.20,000	16,00,000	9.60.000	33.80,000
(-) Fixed cost				1,60,000
Profit				31.20,000

06. Titanic Ltd. Seeks your advice on production mix in respect of the three product. Clever, Intelligent and Obedient. Gives you the following information.
Data for Standard cost per unit:

(Rs)

Particulars	Clever	Intelligent	Obedient
Direct material	320	240	160
Variable O/H	16	40	24
Direct labour			
Dept: Rate per hour(Rs)	Hours	Hours	Hours
A 8.00	6	10	5
B 16.00	6	15	11

From current budget, you have further details as below:

	Clever	Intelligent	Obedient
Annual Production (no's)	5,000	6,000	10,000
S/P per unit (Rs)	624	800	480

Fixed overhead : Rs. 1,60,000

Sales depts estimate of maximum possible.

Sales in the coming year (no's)	6,000	8,000	12,000

You are also note that there is a constrain on Supply of labour in Dept A and its manpower cannot be increased beyond its present level.

Suggest the best Production and Sales mix from the stand-point of maximum profitability.
Prepare Statements setting out the Profit resulting from the budgeted production and the best alternative suggested by you.

⇒ Solution :-

Calculation of Contribution P.U

	Clever	Intelligent	Obedient
Same as previous sum — Cont^{n} P.U	144	200	80
Cont^{n} for hrs	$= \frac{144}{6}$	$= \frac{200}{10}$	$= \frac{80}{5}$
	$= 24$ I	$= 20$ II	$= 16$ III

Total no. of hrs:

Clever → 5,000 × 6 = 30,000
Intelligent → 6,000 × 10 = 60,000
Obedient → 10,000 × 5 = 50,000
1,40,000

Total hrs available :- 1,40,000
(-) no. of hrs for clever (6,000 × 6) 36,000
1,04,000
(-) no of hrs for Intelligent (8,000 × 10) 80,000
no. of. hrs available for Obedit 24,000 hrs

no. of. units to production of obedient $= \frac{24,000}{5}$
$= 4,800$ units

PTO

Q2. Profit Planning.

The Behavioural Study of Cost in Marginal Costing Technique helps the management in profit planning excercise. Constant development in Science and Technology makes the long term Situation more uncertain and highly unpredictable.

Longrun consists of a Sexies of Short-run & one must aim at maximising contribution in each Short run which will lead to profit maximisation in the long run.

Formula:- $\text{Sales} = \frac{\text{F.C} + \text{D.P}}{\text{P/V Ratio}}$

$$\text{Sales(in unit)} = \frac{\text{F.C} + \text{D.P}}{\text{Contribution P.U}}$$

Problems:-

Q1. X Ltd manufactures a Standard product, the marginal cost of per unit which are as follows

Particulars	
Direct materials	160
Direct wages	120
Variable o/H	20
	300

The annual budget includes the following output :- 40,000/- unit.

Fixed overhead:	
Production	80,00,000
Administration	48,00,000
Marketing	40,00,000
Total	1,68,00,000
Contribution	2,00,00,000

Recently the Top management of the Org has started thinking in terms of revising its budget & Some alternatives in the form of proposals (Stated below) were discussed in the last meeting.

Proposal 1 :-

The Organisation expects there profit of Rs. 48,00,000 and want to known the Selling price for that purpose. It is estimated that.

- An Increasing in Advertising Expenditure of Rs. 9,44,000 would result in 10% increase in sales.
- Fixed production O/H and marketing O/H would increased by Rs. 2,00,000 and Rs. 1,36,000 respectively.

Proposal 2 :-

The Organisation expects that with an additional advertising Expenditure, Sales would go up by 20% and a profit margin of 15% would be obtained. Under the circumstances fixed production O/H and marketing O/H are expected to increased by Rs. 3,20,000 and Rs. 2,00,000 respectively. The Organisation want to know additional Expenditure on advertainment required with a view to achieving the result.

You are required to draw up forecast treatment for each alternative & determine S.P per unit to be quoted in Proposal I and the Additional expenditure on advertisement required in Proposal II.

⇒ Solution :-

V.C p.u = ₹ 300
Output → 40,000 units
F.C → 1,68,00,000
C^n → 2,00,00,000

C^n p.u = $\frac{2,00,00,000}{40,000}$ = 500 ₹

Sales − Variable Cost = $Cont^n$
S.P − V.C p.u = $Cont^n$ p.u
S.P − 300 = 500
S.P = 500 + 300 = 800
∴ **S.P = 800**

Proposal 1

* Profit :- 48,00,000
* S.P = ?
* Adv Exp = 9,44,000
* Sales (in units) = 40,000 + 10% of 40,000
  = 40,000 + 4,000
  = 44,000 units

* Production o/H : 80,00,000 + 2,00,000 = 82,00,000
* Marketing o/H = 40,00,000 + 1,36,000 = 41,36,000
* Variable cost p/u = 300
* Adm/. o/H = 48,00,000

Statement

Particulars	Amt.
Profit	48,00,000
Add :- Fixed cost	
· Adv Exp.	9,44,000
· $Prod^n$ o/H	82,00,000
· Mktng o/H	41,36,000
· Adm^n o/H	48,00,000
Contribution	2,28,80,000
Add :- Variable Cost (300 × 44,000)	1,32,00,000
SALES	3,60,80,000

Selling price = $\frac{Sales}{output}$
= $\frac{3,60,80,000}{44,000}$
= Rs. 820 p.u

(or)

Sales (in units) = $\frac{F.C + D.P}{Cont^n\ p.u}$

44,000 = $\frac{1,80,80,000 + 48,00,000}{Cont^n\ p.u}$

44,000 = $\frac{2,28,80,000}{Cont^n\ p.u}$

$Cont^n$ p.u = $\frac{2,28,80,000}{44,000}$
= 520 Rs

S.P − V.C = C^n p.u
S.P − 300 = 520
S.P = 520 + 300
∴ S.P = 820 Rs

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Proposal 2.

* Sales (in units) = 40,000 + 20% of 40,000
  = 40,000 + 8000
  = 48,000
* Profit = 15%
* Prodⁿ o/H = 80,00,000 + 3,20,000 = 83,20,000
* Mktng o/H = 40,00,000 + 2,00,000 = 42,00,000
* Adv. Exp = ?
* V.C p.u = 300 Rs
* Admin. o/H = 48,00,000
* Selling price = 800 Rs

Statement

Particulars	Amt
Sales (48,000 x 800)	3,84,00,000
less:- Variable cost (48,000 x 300)	1,44,00,000
Contribution	2,40,00,000
less:- Fixed Cost	
• Adv. Exp	9,20,000
• Prodⁿ o/H	83,20,000
• Mktng o/H	42,00,000
• Admⁿ o/H	48,00,000
Profit	57,60,000

∴ F.C = Prodⁿ o/H + Admⁿ o/H + Mktg o/H + Adv. Exp.
1,82,40,000 = 83,20,000 + 48,00,000 + 42,00,000 + x
1,82,40,000 = 1,73,20,000 + x
∴ x = 9,20,000

DP = (48,000 x 800) x 15%
= 3,84,00,000 x 15%
= 57,60,000

Sales = 3,84,00,000
(-) V.C = 1,44,
Contⁿ = (800 - 300) = 5

(or)

Sales (in unit) = (F.C + D.P) / Contⁿ p.u
48,000 = (F.C + 57,60,000) / 500
48,000 x 500 = F.C + 57,60,000
2,40,00,000 = F.C + 57,60,000
F.C = 2,40,00,000 - 57,60,000
∴ F.C = 1,82,40,000

F.C = Prodⁿ o/H + Admⁿ o/H + Mktg o/H + Adv Exp
1,82,40,000 = 83,20,000 + 48,00,000 + 42,00,000 + x
1,82,40,000 = 1,73,20,000 + x
x = 1,82,40,000 - 1,73,20,000
∴ x = 9,20,000

Q3. Contribution Analysis

1. Zen Products Ltd is selling 3 brands of his products in the brand name X, Y and Z. The detail regarding unit cost & selling price are as under.

Particulars	X	Y	Z
Direct Material	6	12	16
Direct Labour	8	8	20
Variable o/H	6	20	14
Selling price	36	50	96

The monthly fixed cost is Rs. 5,40,000. The Sales volume for the month of July & August are as follows:-

Particulars	X	Y	Z
July	20,000	20,000	20,000
August	40,000	26,000	10,000

Findout monthly Profits and if you were computation brings out that higher profit was earned in the month having lower Sales volume kindly Justify the findings with reason.

⇒ Solution:-

Statement of Profit for the month of July.

Particulars	X	Y	Z	Total
Output	20,000	20,000	20,000	
Selling price	36	50	96	
(-) V.C:- D.M	6	12	16	
D.L	8	8	20	
V.O/H	6	20	14	
Contribution /p.u.	16	10	46	
Total Contribution (Cont^{n} p.u x output)	3,20,000	2,00,000	9,20,000	14,40,000
(-) Fixed Cost				5,40,000
Profit				9,00,000

Statement of Profit for the month of August

Particulars	X	Y	Z	Total
Output	40,000	26,000	10,000	
Cont^{n} p.u	16	10	46	
Total Contribution	6,40,000	2,60,000	4,60,000	13,60,000
Less:- Fixed Cost				5,40,000
Profit				8,20,000

As per Contribution per unit analysis product Z has secured 1st place but the Company has produced only 10,000 units in the month of August. Therefore Profit has been reduced even though overall Company's output has increased.

04. Make or Buy Decision.

Qualitative Decision factors	Quantitative Decision factors
1) Regular Supply availability	1) Differential Cost (Saving cost)
2) Quality	a) Idle Capacity
3) Secrecy of the formula	b) Relevant cost of manufacture = V.C + F.C which are avoidable if the Component is not made.
4) Adverse effect on labour	2) Relevant Cost of Buying Component = purchase price + other cost related to purchasing component.

Sometimes, management has to take a decision with regards to choice b/w manufacturing the components of the product or buying them from outside. Such a problem will arise when the firm has the Idle Capacity and the Technical capacity of manufacturing the component parts. In such a decision Qualitative and Quantitative factor should be considered.

The Qualitative factors which should be considered are as follows:-

01. Quality of the goods supplied by the Supplier
02. Un Interpreted Supply.
03. If Secret is to be maintained & manufacturing know-how is not to be passed on to the Supplier of the Component, the decision will be manufacture the Component part even though manufacturing cost more than the purchasing price.
04. Any Adverse effect on labour relation if it is decided to buy from outside instead of making is also considered.

The Quantitative factors to be considered are the:- ① Differential Cost of the make & buy alternatives and also consequences of the alternative use of the Idle Capacity which exists in the firm.
② Fixed cost which are not expected to change would be ignored being irrelevant in the make or buy decision.

Conclusion should be taken on the basis of which is cheaper and it should also be seen that if a more profitable use of the Idle Capacity than manufacturing the component part is available, then the firm make use the Idle Capacity for the more profitable alternative and buy the Component part from outside.

Q1. A factory is producing 4 types of Articles and in Conditions of full Capacity working, A decision has to be made as to which article shall be bought out and which article shall be manufactured in the factory. The cost of manufactured and bought out prices of the four Articles are as follows:-

Particulars	A	B	C	D
Cost per Article				
• Marginal Cost	50	58	72	75
• Fixed Cost	10	20	25	70
• Total Cost	60	78	97	145
Bought out price	46	84	115	128

⇒ Solution:-

Calculation of differential cost

Particulars	A	B	C	D
Bought-out price	46	84	115	128
(-) marginal cost	50	58	72	75
Differential cost	-4	26	43	53

To take a decision whether to make or buy an article fixed cost should not be considered bcz, it will be incurred even if the article is not produced.

Conclusion :- Article 'A' should be bought from outside because its bought-out price is less than its marginal cost.

Make or Buy Decision when there is increased in Fixed Cost.

In some cases inspite of lower variable cost of production there may be an increase in Fixed cost. It becomes essential to findout the minimum requirement of volume in order to justify the making instead of Buying.

$$\text{Volume} = \frac{\text{Increase in F.C}}{\text{Contribution per unit}}$$

$$\text{Contribution per unit} = \text{Purchase price} - \text{Variable Cost of Prod}^{n}$$

01. A firm can purchase a separate part from an outside source @ ₹ 11 per unit. There is a proposal that the spare part be produced in the factory itself. For this purpose a machine costing ₹ 1,00,000 with annual capacity of 20,000 units and a life of 10 years will be required. A foreman with a monthly salary of ₹ 500 will have to be engaged. Materials required will be ₹ 4.00 per unit and wages ₹ 2.00 per unit. Variable overheads are 150% of direct labour. The firm can easily raise funds @ 10% p.a. Advise the firm whether the proposal should be accepted.

⇒ Solution :-

Given :-

Purchase price :- ₹ 11 per unit
Machine cost :- ₹ 1,00,000
Annual capacity :- 20,000 units
Life :- 10 yrs
Foreman salary :- ₹ 500 per month.
D.M :- ₹ 4. per unit
D.L :- ₹ 2. per unit
Variable o/H :- 150% of D.L :- 2 × 150% = 3
Interest :- 1,00,000 × 10% = 10,000

* Calculation of Depreciation.

$$= \frac{1,00,000}{10} = 10,000$$

* Calculation of Increase in Fixed Cost

Foreman Salary	6,000
Depreciation	10,000
Int. on. Capital	10,000
Increase in F.C =	26,000

* Calculation of Contribution per unit

Purchase price	11
less: V.C for make product	
• material	4
• wages	2
• Variable o/H	3
Contribution per unit	2.

*

$$\text{Volume} = \frac{\text{Increase in F.C}}{\text{Contribution per unit}}$$

$$= \frac{26,000}{2} = 13,000 \text{ units}$$

Conclusion :-

If the order has to be accepted it is essential that the volume should be atleast 13,000 units.

Make or Buy Decision when there is no Idle Capacity

If there is no Idle Capacity and making of the spare parts in the factory involves the loss of other work, the loss of contribution arising from displacement of work should be considered along with variable cost of prod? The loss of contribution is found with reference to key or limiting factor.

If the purchase price is higher than the Total variable cost of production (+) Traceable Fixed cost (+) loss of contribution of production, it will be more profitable to manufacture.

Problem :-

02. Product 'A' takes five hours to produce on a particular machine and it has a selling price of ₹50 and a marginal cost of ₹35.

On the same machine, another product 'B' can be made at two hours at marginal cost of ₹5 per unit. Supplier's price of product 'B' is ₹10 per unit.

Assuming that machine hour is the key factor, advise whether product 'B' could be bought out or manufactured.

(-) M.C	35
Cont^n p.u	15

$$\text{Cont}^n \text{ per limiting factor (hr)} = \frac{\text{Cont}^n \text{ p.u}}{\text{hrs}} = \frac{15}{5} = ₹3$$

1 unit of Product B = 2 hrs

If we are utilizing the two hours of Product 'B' to produce Product 'A' then the Contribution lost but not producing 'A' = ₹ 6

2 hrs x 3 Rs = 6 Rs.

* Calculation of Differential Cost

Purchase price of Product 'B'	=	10
(-) V.C for make product 'B'		5
Contribution on loss		6
Differential Cost		(1)

Conclusion :-

Since the Supplier price per unit of Product 'B' is Rs.10 and that of producing in the factory is Rs.11 (5+6). Therefore, it is recommended that it is better to buy Product 'B' from Outside.

03. A factory operates at full machine capacity to produce an assembly type product with 3 component parts. Data concerning one unit of the product are as follows :-

Items	Machine hours	Costs (Rs)		
Component parts		Variable	Fixed	Total
A	5	24	8	32
B	8	30	10	40
C	10	30	30	60
Assembly	–	50	20	70
Total		134	68	202
Sales price				250

There is a big demand of the product in the market but the factory is unable to expand due to machine capacity limitation. If any one component is purchased from outside and that capacity is diverted to other components (same machine can produce any component) the factory will be able to sell more assembled products.

If component parts A, B and C can be purchased at ₹ 50, ₹ 60 and ₹ 80 respectively, State which one is to be purchased.

04. A Company proposes to install a machine for the manufacture of a component which at present is being purchased at ₹ 24 each. There are two alternatives, namely (a) installation of an automatic machine and (b) installation of a semi automatic machine. The details of the two machines are as under:

	Automatic Machine	Semi-Automatic Machine
• Initial cost of machine (₹)	9,00,000	6,00,000
• Life	10 yrs	10 yrs
• Fixed o/H other than depl: on mach: (per annum) (₹)	1,62,000	84,000
• Variable expenses of the Component (₹)	12	15

The Company charges depl: on Straight line method. Scrap value of the machine at the end of life is nil.

The demand for the components at present is 20,000 units per annum. This demand is expected to increase to 40,000 units.

Required :-

a) For each of two volumes of output namely 20,000 and 40,000 units, State with Supporting calculations whether the Components should be purchased or manufactured by installation of machine, If your decision is in favour of installation of machine, which model will you advise?.

b) At what Volume of output should the company change over from purchase of components to manufacture by installation of (i) Semi-automatic machine and (ii) automatic machine ?

c) At what volume of manufacture of the Components will the Company switch over from installation of one type of machine to the other?

∴ for demand of 20,000 units if any Semi-automatic machine should be installed.

If the demand for Component is expected to be 40,000 units. cost of manufacture is less by automatic machine.

Hence, installation for automatic machine is recommended for requirement of 40,000 Compared

b) Calculation of Volume that decision can change from purchase to manufacture.

	AM	SM
Purchase Price	24	24
(-) Variable o/H	12	15
Contribution P/U	12	9
Increased in Fixed o/H		
Fixed o/H other than Depl:	1,62,000	84,000
Depl"	90,000	60,000
Increase in F.C	2,52,000	1,44,000

Volume = Increase in F.C / Cont" P.U — 21,000 units — 16,000 units

c) Calculation showing Switching of one machine to another machine.

	AM	SM	Differential cost
Variable o/H	12	15	3
F.C	2,52,000	1,44,000	1,08,000

Volume = Increase in F.C / Cont" P.U / Difference in V.C

= 1,08,000 / 3 = 36,000 units

Optimising Product Mix.

In case of multiple product and multilines of activity the problem arises as to which product are sales mix which yield maximum profit.

Such problems can be solved by marginal costing technique. It helps in discontinuous of non-profitable product & line of activity which will not even covers its variable cost.

The marginal costing technique limiting factor will be consider for marginal decision making which will limit the volume of output.

The limiting factor may consist of specified Raw material, a specific type of labour skill, a Tool, a service facility, floor space, cash resource etc.,

Limiting factor is expressed in financial term that is contribution per unit of the limiting factor and it serves as an indicator to select the best source of action to achieve optimum profitability in alternative method of manufacturing a product (or) Alternative is available. The marginal contribution analysis should be made to arive at the decision. The alternative yielding the highest contribution will be selected.

01. Sandanam Condiments bringout two Compon-ent. Suchi and Ruchi. which are popular in the market. The manufacturing has the Option tool alter the sales mix of Two products from out of the following combination.

Particulars	Suchi (units)	Ruchi (units)
1	800	600
2	1.600	–
3	–	1,300
4	1,100	500

The P/U Production cost or sales data are as follows:-

	Suchi	Ruchi
Direct Material	35	20
Direct labour	10	12
Selling price	75	90

Variable factory o/H are tools of direct labour cost for both Products.

Labour rate is ₹ per hour.

Common Fixed o/H for both product ₹ 10.000.

You are required to prepare.

1) Marginal cost statement for 2 products.
2) Evaluate the Options & identify the most profitable sales mix.

01. A Company produces three products. The cost ~~drivers~~ data are as under.

Particulars		Products A	B	C
Direct Materials	Rs.	64	152	117
Direct labour				
Department	Rate per hr	Hrs	Hrs	Hrs
1	5	18	10	20
2	6	5	4	7
3	4	10	5	20
Variable o/H	Rs.	16	9	21

Fixed overheads Rs 4,00,000 per annum. The budget was prepared at a time, when the market was sluggish. The budgeted quantities and selling price are as under.

Particulars	Budgeted quantity	Selling price
A	9,750	270
B	7,800	280
C	7,800	400

Later the market improved and sales quantities could be increased by 20% for product A and 25% each for product B and C. The sales manager confirmed that the increased quantities could be achieved at the price originally budgeted.

Expected Optimum Product mix

A	9750	+ 20%	=	11,700
B	7800	+ 25%	=	9,750
C	7800	+ 25%	=	9,750

Actual Optimum product mix. Quantity.

A	11,700 x 5hrs	= 58,500 hrs
B	9,750 x 4hrs	= 39,000 hrs
C	$\frac{37,050}{7hrs}$ x 5293 units	= 37,050 hrs
		1,34,550 hrs

Calculation of Optimal Profit

	A	B	C	Total
Optimal product mix (BY) (A)	11,700	9,750	5,293.	
Contribution per unit (B)	30	25	40	
Total Contribution (A x B)	3,51,000	2,43,750	2,11,720	8,06,470
Less: Fixed Cost				4,00,000
Profit				4,06,470

02. Following set of Information is presented to you by your client AB Ltd, producing two products X and Y.

	X	Y
Direct material per unit (Rs)	20	18
Direct wages per unit (Rs)	6	4
Sales price per unit (Rs)	40	30
Proposed sales mixes		
i) Units	100	200
ii) Units	150	150
iii) Units	200	100

Fixed expenses during the period are expected to be Rs. 1,600.

Variable expenses are allocated to product at the rate of 100% of direct wages.

As a cost and management accountant you are required to present to the management of AB Ltd, the following.

1. The unit marginal cost and unit contribution.
2. The total contribution and resultant profit from each of the above sales mix.
3. The proposed sales mix to earn a profit of Rs. 300 and Rs. 600 with the total sales of X and Y being 300 units.

Total

Total

2000

1.600

400

iii) Proposed mixes.

Particular	Case I	Case II
Required profit	300	600
(+) Fixed cost	1600	1600
Total contribution	1.900	2.200

Case I :-

Let assume 'P' be the no of units of product X.

$x + y = 300$ units

$P + y = 300$ units

$\therefore y = 300 - P$

Cont^{n} of x + Cont^{n} of Y : Total Cont^{n}

$8(P) + 4(300 - P) = 1900$

$8P + 1200 - 4P = 1900$

$8P - 4P = 1900 - 1200$

$4P = 700$

$P = \frac{700}{4} = 175$ units

$x = 175$

$y = 125$

300 unit

Case II :-

Let assume 'P' be the no of units of product X

$x + y = 300$ units

$P + y = 300$ units

$\therefore y = 300 - P$

$8(P) + 4(300 - P) = 2200$

$8P + 1200 - 4P = 2200$

$8P - 4P = 2200 - 1200$

$4P = 1000$

$P = \frac{1000}{4} = 250$ units

$x = 250$

$y = 50$

300 unit

Conclusion :-

Since, Sales mixture option 4 that is 1100 of such units and 500 units of P gives the maximum profit. Therefore the Co. Select the 4th Option it can earn more profits.

$$x + 4 = 300$$
$$250 + 4 = 300$$
$$4 = 300 - 250$$
$$4 = 50 \text{ unit}$$

Conclusion :-

If they Sold X units of 175 and Y units of 125 units they can earn a profit of ₹300

If they Sold 250 units of X and 50 unit of Y they can earn a profit of ₹600.

23/10/18

03. A Company engaged in plantation activities has 200 hectares of land which was never used but now that can be used for growing jointly or individually Tea, Coffee and Cardamom. The yield per hectare of the different Crops and their Selling price per kg. Are as under :

	Yield (kgs)	Selling price per kg
Tea	2,000	20
Coffee	500	40
Cardamom	100	250

The relevant cost data are given below :-

A) Variable Cost per kg.

	Tea (Rs)	Coffee (Rs)	Cardamom (Rs)
Labour charges	8	10	120
Packing charges	2	2	10
Other Costs	4	1	20

B) Fixed cost per annum.

Cultivation and growing cost	Rs. 10,00,000
Administration cost	Rs. 2,00,000
Land revenue	Rs. 50,000
Repairs and maintenance	Rs. 2,50,000
Other Costs	Rs. 3,00,000

The policy of the Company is to produce and sell all the three kinds of products and the maximum and minimum area to be cultivated per product is as follows:-

	Hectares.	
	Maximum	Minimum
Tea	160	120
Coffee	50	30
Cardamom	30	10

Calculate the most profitable mix & the maximum profit which can be achieved.

⇒ Solution:-

* Calculation of Contribution P.U

Particulars	Tea.	Coffee	Cardamom
Sales	4,0000 (200*20)	2,0000 (500×40)	25,000 (100×250)
(-) Variable cost.			
• labour charge	16,000 (8×2000)	5,000 (10×500)	12,000 (100×120)
• packing charges	4,000 (2×2000)	1,000 (2×500)	1,000 (10×100)
• Other charges	8,000 (4×2000)	500 (1×500)	2,000 (20×100)
Total Cont^{n}:-	12,000	13,500	10,000
Ranking.	II	I	III

Optimum Product Mix.

Product	Area	Yield	Total Prod^{n}
Coffee	50	500	25,000
Tea			
Cardamom	10	100	1,000
	200hectare		3,96,000

* Calculation of Maximum Profit.

Product	Production	Contribution	Total
Coffee	25,000	27	6,75,000
Tea	28,000	6	16,80,000
Cardamom	1,000	100	1,00,000
	Contribution		24,55,000
	(-) F.C		18,00,000
	Profit		6,55,000

DISCONTINUATION OF PRODUCT.

If any product performance is not impressive than such product should be discontinue only if there is no contribution margin from that product. In other words, any contribution from that product will reduce the burden if Total fixed cost of the firm & their will help in better profit than if such product is discontinue.

01. Gresman Remedies Ltd, has prepared the foll" budget estimates for 2017-18.

Particulars	Prod-A	Prod-B
Sales (units)	6,000	16,000
Selling price	40	64
Direct Material	12	22
Direct wages @ ₹ 1 per hr	8	12
Variable o/H	4	6
Fixed o/H	8	12

After the finalisation of the above manufacturing Program it is observed that 1/3 capacity of the Co. is still idle. In order to improve the working the following proposal are put up for the consideration.

Proposal-1 :-

Discontinue Prod-A and the capacity so released will be used on Prod-B. The selling price of Product-B however will be reduced by ₹ 2 P.U on the entire sales due to increased volume of sales.

Proposal-2 :-

Discontinue prod-B and divert the capacity so released to production of Prod-C whose units cost data are as under.

Particulars	Amt
Selling price	52
D.M	15
D.L	10
Variable o/H	5.

Proposal-3 :-

Utilize the idle capacity for meeting and Export demand for product 'C' whose units cost data are as under.

Particulars	Amt
Selling price	72
D.M	40
D.L	20
Variable o/H	10

Proposal - 4 :-

Hire the idle capacity hours by fixing a price in such a way that the same rate of profit per direct labour hour as obtained in the original budget estimates is achieved. Indicate the hire charges per direct labour hr.

Require :-

1) Prepare a statement showing the profitability in the original program.

2) Evaluate each of the above 4 proposals independently and statement showing overall profitability under each proposal.

⇒ Solution :-

Calculation of Profit under budgeted Estimates

Particulars	Prod-A	Prod-B	Total
Output (a)	6,000	16,000	
S.P	40	64	
(-) Variable cost			
· DM	12	22	
· DL	8	12	
· V. O/H	4	16	
Contribution (b)	16	24	
Total Contⁿ (a×b)	96,000	3,84,000	4,80,000
(-) F.C			2,40,000
Profit			2,40,000

Total Fixed Cost = (8 × 6,000) + (12 × 16,000)
= 48,000 + 1,92,000
= 2,40,000.

* Calculation of labour Hours utilised.

= labour hr of prod 'A' + labour hr of Prod 'B'
= (8 hr × 6000) + (12 hr × 16,000)
= 48,000 hr + 1,92,000 hrs
= 2,40,000 hrs

* Idle Capacity hrs = $\frac{2,40,000}{2/3} \times \frac{1}{3}$

= $2,40,000 \times \frac{3}{2} \times \frac{1}{3}$

= 1,20,000 hrs.

* Total hrs = 2,40,000 + 1,20,000
= 3,60,000 hrs

Proposal - I

Total capacity utilisation of Prod 'A' = 6,000 × 8 hrs
= 48,000 hrs

Capacity will used to produce Prod 'B' = $\frac{48000}{12 \text{ hrs}}$
= 4,000 Unit

Production for Prod 'A' = NIL
Production for Prod 'B' = 16,000 + 4000 = 20,000 units

Selling Price reduce by 2 = 64 - 2 = 62 Rs

Calculation of Profit in Proposal - 1

Particulars	Rs.
Output (a)	20,000
S.P	62
(-) V.C :- DM	22
DL	12
V.O/H	6
Cont^n P.U (b)	22
Total Cont^n (a×b)	4,40,000
(-) F.C	2,40,000
Profit	2,00,000

Proposal II

Total Capacity utilization of Prod B = 16,000 × 12 hrs
= 1,92,000 hrs

Capacity will be used to produce
product C = 1,92,000 / 10 hrs = 19,200 Units

Production of Prod-A = 6,000 units
Prod-B = NIL
Prod C = 19,200 units

Calculation of Profit in Proposal - 2

Particulars	Prod-A	Prod-C	Total
Output (a)	6000	19,200	
SP	40	52	
(-) V.C :- DM	12	15	
D.L	8	10	
V.O/H	4	5	
Cont^n P.U (b)	16	22	
Total Cont^n (a×b)	96,000	4,22,400	5,18,400
(-) F.C			2,40,000
Profit			2,78,000

Proposal III

Idle Capacity hrs = 1,20,000 hrs.

The idle capacity used to produce product - D
= 1,20,000 / 20 = 6000 units

Production of Prod A = 6,000 units
Prod B = 16,000 units
Prod D = 6000 units

Calculation of Profit in Proposal - 3

Particulars	Prod-A	Prod-B	Prod-D	Total
O/P (a)	6000	16,000	6,000	
S.P	40	64	72	
(-) V.C				
DM	12	22	40	
D.L	8	12	20	
V.O/H	4	6	10	
Cont^n P.U (b)	16	24	2	
Total Cont^n (a×b)	96,000	3,84,000	12,000	4,92,000
(-) F.C				2,40,000
Profit				2,52,000

Proposal IV

Profit as per budgeted Estimates = ₹ 2,40,000
Direct labour hr as per budgeted = 2,40,000 hrs

∴ Profit OL Per hr = $\frac{₹\ 2,40,000}{2,40,000\ hrs}$ = 1 Rs

Idle Capacity (D.L hrs) = 1,20,000 hr

∴ profit made out of hiring idle capacity
= 1,20,000 hrs × Rs 1
= 1,20,000 Rs

Calculation of Total Profit

Budgeted Profit	2,40,000
Profit from hiring out idle Capacity	1,20,000
Profit	3,60,000

Proposal I	=	2,00,000	IV
Proposal II	=	2,78,000	II
Proposal III	=	2,52,000	III
Proposal IV	=	3,60,000	I

Conclusion :-
Proposal 4 should be accepted because which gives the more profit as compare to all other proposals.

Q2. E Ltd engaged in the manufacturing of 3 products in each factory following Budget estimates are prepared for 2011-12.

Particulars	Prod A	Prod B	Prod C
Sales (units)	10,000	25,000	20,000
S/P per unit (Rs)	40	75	85
DM per unit (Rs)	10	14	18
DL per unit @ ₹2 per hr	8	12	10
Variable o/H per unit (Rs)	8	9	10
Fixed o/H per unit (Rs)	16	18	20
Profit/loss	-2	22	27

After the finalisation of the above manufacturing schedule, it is observed that presently only 80% Capacity being utilised by these three products The production activities are made at the same platform and it may be interchangeable among products according to requirement. In order to improve the profitability of the Company the following proposals are put for Consideration.

Proposal I :-
a) Discontinue product :- A and Capacity released may be used for either product B or C or equally shared. The fixed cost of product A is avoidable. Expected changes in material cost and Selling price subject to the utilisation of product A's Capacity are as under :

Prod-B :- Material Cost increased by 10% and Selling price reduced by 2%.
Prod C :- Material cost increased by 5% and Selling price reduced by 5%.

Proposal 2:-

Discontinue product A and divert the capacity so released and the idle capacity to produce a new product D for meeting export demand whose per unit cost data are as follows:-

Particulars	Rs
Selling Price	60
DM	28
DL @ ₹ 3 per hr	12
Variable O/H	6
Fixed Cost Total)	1,05,500

Proposal 3:-

Product A, B and C are continuously run and hire out the idle capacity fixing a price in such a way that the same rate of profit per direct labour hour is obtained in the Original budget estimates:-

Required:-

1) Prepare a statement of profitability of products A, B and C in existing situation.

2) Evaluate the above proposals independently and calculate the overall profitability of the company under each proposal.

3) What proposal should be accepted, if the company wants to maximise its Profit?

⇒ Solution:-

Calculation of Profitability

Particulars	Prod A	Prod B	Prod C
output	10,000	25,000	20,000
Selling price	40	75	85
(-) V. cost			
DM P/U	10	14	18
DL (2 Rs)	8	12	10
V.O/H	8	9	10
Cont^{n} P.U	4	40	47
Total Cont^{n}	40,000	10,00,000	9,40,000
(-) Fixed Cost	1,60,000 (16×10000)	4,50,000 (18×25,000)	4,00,000 (20×20000)
Total Profit	-2,0000	55,000	54,000

Total Profit = 10,90,000
(-) loss = - 20,000
Total Profit = 10,70,000

Total hours utilised = A + B + C
= (10,000 × 4hrs) + (25,000 × 6hrs) + (20,000 × 8 hrs)
= 2,90,000

Idle Capacity = $\frac{2,90,000}{80\%} \times 20\% = 72,500$

Idle Capacity = $\frac{2,90,000}{80\%} \times \frac{100\%}{} = 3,62,000$

Idle capacity = 3,62,000 − 2,90,000
= Rs. 25,000

Proposal-I

Capacity Released by discontinuation of Prod 'A'
= 10,000 x 4hrs = 40,000 hrs

Particulars	I B	II C	III B&C
no.of units can produce	= 40000 hrs / 6hrs = 6,667 unit	= 40,000 hrs / 5hrs = 8000 unit	B = 20,000 hrs / 6hrs = 3,333 hou C = 20,000 hrs / 5hrs = 4000 unit

F.C of A = 1,60,000
Total F.C = 10,70,000
Present T.F.C = Product B+C
= 8,50,000

~~Calculation of Profit under Option I.~~
~~: B = 25000 + 6667 = 31667 unit = [illegible] = 3709~~

Calculation of Contribution under new prices

	B	C
S.P : B (75 - (75 x 2%))	73.5	
C (85 - (85 x 5%))		80.75
(-) DM : B (14 + (14 x 10%))	15.4	
C (18 + (18 x 5%))		18.9
DL	12	10
V.O/H	9	10
	37.1	41.85

Option: III

	B	C	Total
O/P	28,333	24,000	
Cont^n PU	37.1	41.85	
Total Cont^n	1051154	10,04,900	20,55,554
F.C			~~20,55,554~~ 8,50,000
Profit			12,05,554

Calculation of Profit under.

Option: I

	B	C	Total
O/P	31,667	20,000	
Cont^n P.U	37.5	47	
Total Cont^n	1174846	9,40,000	21,14,846
(-) F.C			8,50,000
Profit			12,64,846

Option: II

	B	C	Total
O/P	25,000	28,000	
Cont^n P.U	40	41.85	
Total Cont^n	10,00,000	11,71,800	21,71,800
(-) F.C			8,50,000
Profit			13,21,800

Proposal - II.

Cal^n of Total capacity available for Prod 'D' = Prod 'A' capacity + Idle capacity
= 40,000 + 72,500
= 1,12,500 hrs

No.of units of product 'D' Prod^n = 1,12,500 / 4hrs = 28,125 units

× Units per hr = ₹12/3 = 4hrs

A → nil
B → 25,000
C → 20,000
D → 28,125

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Calculation of Profit

Particulars	Prod 'B'	Prod 'C'	Prod 'D'	Total
Output (a)	25,000	20,000	28,125	
S.P			60	
(−) D.M			28	
D.W			12	
V.O/H			6	
Contⁿ per unit (b)	40	47	14	
Total Contⁿ (axb)	10,00,000	9,40,000	3,93,750	23,33,750
(−) F.C				9,55,500
				13,78,250

B&C = 8,50,000 + 1,05,500 = 9,55,500 D

Proposal III.

Diversification of Product Plan

= When a firm intend to introduce a new product into the market, the major consideration in taking such decision is to see whether that particular product is able to recover atleast its variable cost and any contribution in excess of variable cost from such new product will improve the overall profitability of the firm.

Here the important point to remember is that all the present fixed cost of the firm are being borne by the existing product.

Problem:-

01. A Co. manufacturers a single product in its factory utilising 60% of its capacity. The selling price and cost details are given below.

Particulars	Amt
Sales (6,000 units)	5,40,000
Direct Material	96,000
Direct labour	1,20,000
Direct Expenses	18,000
Fixed overheads :-	
= factory	2,00,000
= Administration	21,000
= Selling & Distribution	25,000

An analysis of Fixed overheads reveals that 12.5% of factory overheads and 20% of Selling and distribution O/H are variable with Prodⁿ & Sales.

Administrative o/H are wholly fixed.

Since, Existing Product could not achieve budgeted level for two consequative years. The company decides to introduce a new product with marginal investment but largly using present plant and machinery.

The cost estimates of the new product are as follows:-

Cost elements	Rs. per unit
DM	16
DL	15
DE	1.50
Variable factory o/H	2
Variable S&D o/H	1.50

It is expected that 2,000 units of the new products can be sold at a price of Rs. 60 per unit. The fixed factory overheads are expected to increase by 10%, while, fixed Selling & Distribution Expenses will go up by Rs. 12,500 annually. Administrative overheads remain unchanged. However there will be an increase of working capital to the Extent of Rs. 75,000. which would take the Project cost to Rs. 8.75 lakhs.

The Company Considers that 20% pre-tax and interest return on investment is the minimum acceptable to justify any investment.

Required :-

1) Should the new product be introduced.
2) Given the data above and making any assumption that you consider appropriate, or there any further observations or recommendations you wish to make.

⇒ Solution :-

I Calculation of Profit.

Particulars	Existing (6.000)		New (2.000 unit)		Total
	Per unit	Amt	Per unit	Amt	Amt
Sales	90	5.40.000	60	1.20.000	6.60.000
(-) V.C :-					
DM	16	96.000	16	32.000	1.28.000
DL	20	1.20.000	15	30.000	1.50.000
DE	3	18.000	1.5	3.000	21.000
V.O/H					
· Factory V O/H	4.17	25.000 (200000×12.5%)	2	4.000	29.000
· S&D O/H	0.83	5.000 (25.000×20%)	1.5	3.000	8.000
			Fix		
Contribution	46	2.76,000	24	48.000	3.24.000
(-) Fixed o/H :-					
· Factory o/H		1,75,000 (200000×87.5%)		17.500	1.92,500
· Adm/. o/H		21.000		-	21.000
· S&D O/H		20,000 (20000×80%)		12.500	32.500
Profit		60,000		18,000	78.000

Profitability of New Product Introduction

$$= \frac{\text{New Product Profit}}{\text{New Product Investment}} \times 100$$

Exist = 8,00,000
W.C = 75,000
Total = 8,75,000

$$= \frac{18,000}{75,000} \times 100$$

$$= 24\%$$

Conclusion:

The rate of return on Incremental investment exceeds the minimum acceptable 20% pre-tax and interest return on investment to justify new investment. Hence, new product is Suggested for Introduction.

II. Further Observation and Recommendation.

	With the Existing Product	With the new & Existing Product
↓ 1) Contribution to Sales	2,76,000 / 5,40,000 ×100 = 51.1%	3,24,000 / 6,60,000 ×100 = 49.09%
↑ 2) Capacity Utilisation	(6,000) = 60%	(8,000) = 80%
Investment	8,00,000	8,75,000
Profit	60,000	78,000
↑ 3) Return on Investment = Profit ÷ Inv.	7.5%	8.9%

Observation:

It is observed from the above that Pre-determined rate of return on investment is 20% whereas, the company is Presently earning only 7.5% on investment of Rs. 8,00,000 with the existing product. With the introduction of new product the Return on Investment (ROI) has Slightly increased from 7.5% to 8.9% but it is still far below the Expected rate of return. The Present Contribution of 51.1% has fallen to 49.09% with the introduction of new product even though Capacity utilization has increased by 20% (60% to 80%).

It is observed from the data available that direct labour cost and factory o/H's of Rs. 1,20,000 and Rs. 2,00,000 respectively are the major cost to be investigated into and Control.

The Profitability of the Company can also be increased by utilising the remaining 20% of Idle capacity.

Profitability of New Product Introduction.

$$= \frac{\text{New Product Profit}}{\text{New Product Investment}} \times 100$$

Exist = 8,00,000
W.C = 75,000
Total = 8,75,000

$$= \frac{18,000}{75,000} \times 100$$

$$= 24\%$$

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The Profitability of the Company can also be increased by utilising the remaining 20% of Idle capacity.

09/4/18

ACCEPT or REJECT SPECIAL ORDER

01 ABC Engineering Company has received an once off Export order for its Sole product that would require the use of half of the factories total capacity which is estimated at 4,00,000 units per anum. The condition of the Export order is that it has to be accepted in full and Acceptance of part quantity is not allowed.

The factory is currently operating at 60% level to meet the demand of its domestic customers. As against the current price of Rs.6 per unit, the Export offer is Rs.4.70/unit, which is less than the total cost of current production.

The Cost breakdown is given below	Rs. per unit
• Direct Material	2.50
• Direct Labour	1.00
• Variable Expenses	0.50
• Fixed overhead	1.00
Total Cost	5.00

(4,00,000 x 60%) = 2,40,000

The Company has the following options.

1) Accept the Export Order and cut back domestic sales as necessary.
2) Remove the Capacity Constrain by installing necessary balancing equipment and also buy working over time to meet both domestic and Export demand. This will increase fixed o/hs by Rs 15,000 annually, and Additional Cost of over time work will amount to Rs.40,000 for the year.
3) Appoint a Sub-Contractor to manufacture the additional Requirement and meet the domestic and Export requirement in full by Supplying Raw materials, paying a Conversion charge at Rs.2 per unit and appointing a Supervisor at a Salary of Rs.3,000 per month for checking the quality of the Product and Controlling Operations at the manufacturing unit.
4) Refuse the Order.

Required :-

1) A Statement of Cost and Profit under Each of the above four options.
2) You are recommendation, with reasons has to which of these options that the Company should decide upon.

=> Solution :-

Calculation of Total Fixed Cost.

= 2,40,000 units x ₹1
= 2,40,000

Calculation of Variable Cost per unit

Direct Material	2.50
Direct labour	1.00
Variable Exp.	0.50
Variable Cost per unit :	4.00

F. 3,00,000
D: 8,00,000 - 12,00,000
F: 7,20,000

F: 7,20,000
D: 12,32,000

4,00,000

Option - I

- Export Qty → 4,00,000 × 50% = 2,00,000 units
- Domestic Qty → 4,00,000 - 2,00,000 = 2,00,000 units

Calculation of Profit

Particulars	Domestic :- 2,00,000 unit		Export :- 2,00,000 unit		Total
	P.U (1)	Amt (2)	P.U (3)	Amt (4)	(5) = (2) + (4)
Sales	6	12,00,000	4.70	9,40,000	21,40,000
Less :- V.C	4	8,00,000	4	8,00,000	16,00,000
Contribution	2	4,00,000	0.70	1,40,000	5,40,000
Less :- Fixed cost					2,40,000
Profit					3,00,000

Option - II

- Export Qty → 2,00,000 units
- Domestic Qty → 2,40,000 units

Calculation of Profit

Particulars	Domestic :- 2,40,000		Export :- 2,00,000		Total
	P.U	Amt	P.U	Amt	
Sales	6	14,40,000	4.70	9,40,000	23,80,000
Less :- V.C	4	9,60,000	4	8,00,000	17,60,000
• add :- V.C					40,000
Contribution					5,80,000
Less :- F.C					2,40,000
• Increase FC					15,000
					2,25,000

Option - III

- Internally Manufacturing :- 2,00,000 + 2,00,000
  = 4,00,000 units
- Sub - Contracting : 40,000 units
  Total Sales : 4,40,000 units

Export	Domestic
2,00,000	2,40,000

Calculation of Profit

Particulars	Amt
Sales :- E → 2,00,000 × 4.70	9,40,000
D → 2,40,000 × 6	14,40,000
Total Sales	23,80,000
Less :- Variable Cost (4,00,000 × 4)	16,00,000
• Sub-Contracting V.C	
DM : 40,000 × 2.50	1,00,000
Conversion : 40,000 × 2.00	80,000
Contribution	6,00,000
Less :- • Fixed Cost	2,40,000
• Supervisor Salary (3000 × 12)	36,000
PROFIT	3,24,000

Option - IV

• Domestic Qty :- 2,40,000 units.

Particulars	Amt
Sales (2,40,000 x 6)	14,40,000
less: Variable Cost (2,40,000 x 4)	9,60,000
Contribution	4,80,000
less: Fixed Cost	2,40,000
PROFIT	2,40,000

Conclusion :-

From the analysis of the above, it is observed that the Profit is maximum in Option II, that is installation of Equipment and work overtime to meet both Domestic and Export Demand.

Module - 03

Responsibility Accounting and Divisional Performance Measurement.

Q2. The Sales manager of XYZ Ltd is judged by the total Sales. Exceeding the Sales budget is considered good performance. The Sales budget and cost data for the current year are shown below (000's)

Particular	Silk	Cotton	Wool	Total
Sales budget	450	900	1.650	3000
Variable cost	225			

⇒ Solution :-

Performance Evaluation Report

(₹ in 000's)

	Silk	Cotton	Wool	Total
Budgeted Performance				
Sales	450	900	1650	3000
(-) V.C	225	405	495	1.125
Contribution	225	495	1.155	1.875
P/v Ratio = $\frac{C}{S} \times 100$	$\frac{225}{450} \times 100$	$\frac{495}{900} \times 100$	$\frac{1.155}{1650} \times 100$	$\frac{1875}{3000} \times 100$
	= 50%	= 55%	= 70%	= 62.5%
V.C to Sales % $= \frac{V.C}{Sales} \times 100$	$\frac{225}{450} \times 100$	$\frac{405}{900} \times 100$	$\frac{495}{1650} \times 100$	
(or) 100 - P/v Ratio	(or) 100 - 50%	(or) 100 - 55%	(or) 100 - 70%	
	= 50%	= 45%	= 30%	

Actual Performance				
Sales	1500	1200	600	3300
(-) V.C	× 50%	× 45%	× 30%	
(Sales × V.C %)	= 750	= 540	= 180	1470
Contribution	750	660	420	1830
p/v Ratio = $\frac{C}{S} \times 100$	$\frac{750}{1500} \times 100$	$\frac{660}{1200} \times 100$	$\frac{420}{600} \times 100$	$\frac{1830}{3300} \times 100$
	= 50%	= 55%	= 70%	= 55.45%

Conclusion :-

1. Apparently, the Sales manager seems to have perform well as the actual total sales of Rs. 3,300 (₹ in 000's) exceeds the budgeted Sale of Rs. 3000 (₹ in 000's) by 300 (₹ in 000's) but the actual contribution has gone down by Rs. 45 (that is budgeted Contribution to Rs. 1875 less actual contribution Rs. 1830).

This is because of unfavourable change in the Sales mix (that is the most profitable product wool ~~Sock~~ has the minimum Sales volume). Because of unfavourable Sales mix Total contribution margin has decreased from 62.5% to 55.45%. therefore, in real terms the Sales manager did not perform better.

2. Better performance measurement is profitability of Sales of different product rather the total Sales. A better measures of Sales manager performance would be contribution of Sales of different margin. The Sales manager should concentrate on Sale of those products which give maximum ~~pp~~ contribution.

03.

⇒ Solution :-

Calculation of Profit or loss

Particulars	Basis of Allocation	Products. A	B	C	D	Total
Sales		3,00,000	5,00,000	2,50,000	4,50,000	15,00,000
(-) V.C						
· Cost of Sales		2,00,000	4,50,000	2,10,000	2,25,000	10,85,000
· Packing, wages & materials	No. of Parcel (0.20 paise)	20,000 (1,00,000 × 0.20)	30,000	15,000	35,000	1,00,000
· Commission	4% on Sales	12,000 (3,00,000 × 4%)	20,000	10,000	18,000	60,000
· Stationery	No. of Invoice (0.10 paise)	8,000 (80,000 × 0.10)	14,000	6,000	12,000	40,000
Contribution		60,000	(14,000)	9,000	1,60,000	2,15,000
(-) F.C						
· Rent & Insurance	Sq. ft (5:4:8:3)	$\frac{50000}{2,00,000} \times 30,000$ = 7,500	6,000	12,000	4,500	30,000
· Depreciation	Parcel (4:6:3:7)	$\frac{1,00,000}{5,00,000} \times 10,000$ = 2,000	3,000	1,500	3,500	10,000
· Salesman's Salaries & Exp.	Sales value (6:10:5:9)	$\frac{3,00,000}{15,00,000} \times 60,000$ = 12,000	20,000	10,000	18,000	60,000
· Adm/: wages & Salaries	No. of invoice (4:7:3:6)	$\frac{80,000}{4,00,000} \times 50,000$ = 10,000	17,500	7,500	15,000	50,000
Profit/loss		28,500	(60,500)	(22,000)	1,19,000	65,000
% of P&L on sales	$\frac{P\&L}{Sales} \times 100$	9.5 % $\frac{28,500}{3,00,000} \times 100$	-12.1 % $\frac{-60,500}{3,00,000} \times 100$	-8.8 % $\frac{-22,000}{3,00,000} \times 100$	26.4 % $\frac{1,19,000}{3,00,000} \times 100$	4.33 % $\frac{65,000}{15,00,000} \times 100$

Calculation of Profit

a) If Product 'B' Discontinues & If Prod 'C' discontinues

	If Product 'B' discontinues	If Product 'C' discontinue
Contribution :- Prod 'A'	60,000	60,000
'B'	-	(14,000)
'C'	9,000	-
'D'	1,60,000	1,60,000
Total Contribution	2,29,000	2,06,000
Less :- Fixed Cost		
· Rent & Insurance	30,000	30,000
· Depreciation	10,000	10,000
· Salesman's Salaries	60,000	60,000
· Adm/: wages & Salaries	50,000	50,000
Profit	79,000	56,000

Conclusion :-

Since, Contribution in case of Product 'B' is negative, it is better to discontinue Product 'B' only there by the profit will be maximum. By discontinuing Product 'B', profit will be Rs. 79,000 as compare to the Existing profit of Rs 65,000.

Return on Capital Employed or Return on Investment

Formula :-

$$ROI = \frac{\text{Net Profit}}{\text{Investment}} \times 100.$$

(or)

$$ROI = \frac{\text{Operating Profit}}{\text{Capital Employed}} \times 100$$

(or)

$$ROI = \frac{\text{Operating Profit}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Capital Employed}} \times 100$$

= Return on Investment (ROI) is considered to be the most important ratio because it reflects the overall efficiency with which capital is used. This ratio is a helpful tool for making Investment decision. A project yeild in higher ROI is favoured.

ROI can be ~~improved~~ include by any of the following factors, all other factors being held Constant.

1. A decrease in Operating Cost.
2. An Increase in Selling price
3. An Increase in Sales volume
4. A Reduction in amount of Capital Employed.

Operating Profit = Profit before Interest on long term Borrowings and Tax (PBIT).

Capital Employed = Equity Share Capital +
+ Preference Share Capital
+ Undistributed Profit
+ Reserves & Surplus
+ long term liabilities
− fictitious assets
− Non-busines Assets.

(or)

Capital Employed = Tangible fixed Assets
+ Intangible Assets
+ Current Assets
− Current liabilities.

Residual Income (RI)

The General Electric Company of US developed the Concept of Residual Income has an alternative to return on Investment.

Residual Income (RI) is defined as Income remaining out of profit before taxes after making provision for the Expected return on Investment.

The Expected Return is considered as the Capital charged (imputed interest).

Formula :-

RI = Profit − Capital charged*

* Capital charged = Required rate of return x Investment

Q4

⇒ Solution :-

Calculation of ROI

$$ROI = \frac{\text{Profit}}{\text{Capital Employed}} \times 100$$

$$= \frac{4,80,000}{20,00,000} \times 100$$

$$= 24\%$$

* Profit = Sales x 4%
= 1,20,00,000 x 4%
= 4,80,000

* Turnover of Total Assets $= \frac{\text{Sales}}{\text{Total Assets}}$

$$6 = \frac{1,20,00,000}{\text{Total Assets}}$$

$$\text{Total Assets} = \frac{1,20,00,000}{6}$$

$$\therefore \text{Total Assets} = 20,00,000$$

Q5

⇒ Solution :-

Calculation of ROI

$$ROI = \frac{\text{net Return}}{\text{Investment}} \times 100$$

$$\text{Division A} = \frac{8,00,000}{50,00,000} \times 100 = 16\%$$

$$\text{Division B} = \frac{7,00,000}{50,00,000} \times 100 = 14\%$$

Conclusion :-

Division 'A' should accept the new investment as its ROI of 16% is higher than Targeted ROI of 15%.

Division 'B' should reject the new investment because its ROI of 14% on new investment is lower than targeted ROI of 15%.

06

⇒ Solution :-

I Calculation of ROI

$$ROI = \frac{\text{Profit}}{\text{Capital Employed}} \times 100$$

$$= \frac{10,00,000}{75,00,000} \times 100$$

$$\therefore \boxed{ROI = 13.33\%}$$

II Calculation of RI

RI = Profit − Capital charged

= 10,00,000 − [75,00,000 × 15%]

= 10,00,000 − 11,25,000

$$\therefore \boxed{RI = (1,25,000)}$$

Conclusion :-

Desired rate of return is 15% but profit centre P1 gives ROI 13.33%, residual Income in Negative figure of Rs. 1,25,000 because cost of capital of Rs. 11,25,000 is more than profit of Rs. 10,00,000. Hence, performance of Profit centre P1 is not satisfactory at all.

07

⇒ Solution :-

I. Calculation of ROI

$$ROI = \frac{\text{Profit}}{\text{Investment}} \times 100$$

Division X = $\frac{2,00,000}{6,00,000} \times 100 = 33.33\%$ II

Division Y = $\frac{4,00,000}{10,00,000} \times 100 = 40\%$ I

Division Z = $\frac{8,00,000}{30,00,000} \times 100 = 26.66\%$ III

II. Calculation of RI

RI = Profit − Capital charged

III Division X = 2,00,000 − (6,00,000 × 15%)
= 2,00,000 − 90,000
= 1,10,000

II Division Y = 4,00,000 − (10,00,000 × 15%)
= 4,00,000 − 1,50,000
= 2,50,000

I Division Z = 8,00,000 − (30,00,000 × 15%)
= 8,00,000 − 4,50,000
= 3,50,000

⇒ Solution:-

Calculation of ROI

$$ROI = \frac{\text{Profit}}{\text{Investment}} \times 100$$

		Current ROI
Division A →	$\frac{2,80,000}{20,00,000} \times 100 = 14\%$	15%
Division B →	$\frac{2,60,000}{20,00,000} \times 100 = 13\%$	16%
Division C →	$\frac{3,40,000}{20,00,000} \times 100 = 17\%$	14%

Conclusion:-

ROI in Division 'C' on additional investment is higher at 17% as against its current ROI of 14%, So the investment should be made in this division as regards other division as concerned ROI on Addition investment is less than there Current ROI. Therefore, additional investment in A and B divisions should not be made.

Calculation of RI

	Division A	Division B	Division C
RI = Profit − Capital charge	2,80,000	2,60,000	3,40,000
	2,40,000	2,40,000	2,40,000
	(20,00,000 × 12%)	(20,00,000 × 12%)	(20,00,000 × 12%)
RI	40,000	20,000	1,00,000

Conclusion
: Additional Investment should be made in Division 'C' as it gives higher residual income as compared to other divisions.

09

⇒ Solution :-

Calculation of ROI

$$ROI = \frac{\text{Net Return}}{\text{Investment}} \times 100$$

Current ROI

Division A = $\frac{16,000}{1,00,000} \times 100 = 16\%$ — 18%

Division B = $\frac{11,000}{1,00,000} \times 100 = 11\%$ — 11%

Calculation of RI

RI = Profit − Capital charged

Division A = 16,000 − (1,00,000 × 18%)
= 16,000 − 18,000
= (2,000)

Division B = 11,000 − (1,00,000 × 11%)
= 11,000 − 11,000
= 0

10

⇒ Solution :-

Calculation of ROI

$$ROI = \frac{\text{Net Profit}}{\text{Investment}} \times 100$$
$$= \frac{200}{800} \times 100$$
$$= 25\%$$

Calculation of RI

RI = Profit − Capital charged
= 200 − (800 × 15%)
= 200 − 120
= 80

Comment :-

The ROI is 25% which indicates that the Company can take back its investment soon. So, it is a beneficiary to the ~~divis~~ Company to invest in the particular division.

Thus the division has achieved an earnings of Rs. 80,00,000 in Excess of the Cost of financing the division.

11

⇒ Solution :-

Calculation of ROI

	Before new Investment	After new Investment
ROI = Profit / Investment x100		

a) Calculation of ROI

	Before new Investment	After new Investment
Profit	18,000	19,600
Investment	1,00,000	1,10,000
ROI = Profit / Investment x100	18% (18000/1,00,000 x100)	17.81% (19600/1,10,000 x100)

Comment

= With the new investment division 'Y' performance as judged by ROI has declined because ROI has decreased to 17.81% from 18%.

Calculation of RI

	Before new Investment	After new Investment
Profit	18,000	19,600
Capital charge	15,000 (1,00,000 x 15%)	16,500 (1,10,000 x 15%)
RI = Profit - capital charge	3,000	3,100

Comment

= On the basis of Residual Income new investment is justified because RI has increased from Rs. 3000 to Rs. 3100. Cost of Capital of additional investment is Rs. 1,500 (10,000 x 15%). where as additional profit is Rs. 1,600.

b) Calculation of NPV

Profit after Depn: → 1,600
Life = 10 years
Investment = 10,000

PAIBD = 1,600 + 1000* = 2,600

$$\text{Depreciation} = \frac{\text{Investment} - \text{RI}}{\text{Life}}$$

$$= \frac{10,000 - 0}{10}$$

= 1000*

Calculation of NPV

Cash in flow	: 2,600
(x)→ Annuity factor @ 15% for 10 yrs	= 5.019
Present value of cash inflow	= 13,049
(-) Initial Investment	10,000
NPV	3,049

Conclusion:-
Since, the NPV