

## Group - 'A'

1. Wealth Maximization goal is the long term and modern business goal.

According to the wealth maximization goal, The manager should take the decision of maximize the net present value (NPV) of the wealth Shareholder's wealth.

2. The major limitation of ratio analysis are:-
- i) Requires basis of comparison
  - ii) change in price level
  - iii) Short-term change
  - iv) No indication of the future

3. A zero-coupon bond is a bond that does not pay periodic interest. It is issued at a discount and pays its face value (par value) at maturity.
- The value of a zero-coupon bond is calculated by discounting its maturity value to the present.

4. Solution:

Required rate of return ( $k_s$ ) = 12%

Beta ( $\beta_s$ ) = 1.5

Expected Market return ( $R_m$ ) = 10%

Risk-free rate ( $R_f$ ) = ?

Now,

$$k_s = R_f + \beta_s (R_m - R_f)$$

$$\text{Or, } 12\% = R_f + 1.5 (10 - R_f)$$

$$\text{Or, } 12\% = R_f + 15 - 1.5 R_f$$

$$\text{Or, } 12 = 15 - 0.5 R_f$$

$$\text{Or, } 0.5 R_f = 15 - 12$$

$$\text{Or, } R_f = \frac{3}{0.5}$$

$$R_f = 6\%$$

$$\therefore \text{The risk return rate must be 6\%}$$

5. Solution:

$$\frac{\text{Future value (FV)}}{\text{Present value (PV)}} = \text{Rs. } 1,00,000$$

$$\text{No. of yrs (n)} = 6 \text{ yrs}$$

$$\text{Interest (i)} = 12\%$$

Now,

$$PV = \frac{FV}{(1+i)^n}$$

$$= \frac{100000}{(1+0.12)^6}$$

$$= \frac{100000}{1.9738}$$

$$= 50663$$

$$\therefore \text{Present value} = \text{Rs. } 50663 \text{ (approximately)}$$

6. Profitability index is the ratio of the present value of future cash inflows to the initial investment.

$$PI = \frac{PV \text{ of Cash Inflows}}{\text{Initial investment}}$$



### Investment Decision

- $PI > 1$ : Accept the project
- $PI < 1$ : Reject the project
- $PI = 1$ : Indifferent (break-even)

Thus, a project is accepted when its profitability index is greater than 1.

### 7. Solution:

Fixed operating cost = Rs. 8,00,000

Variable cost per unit (VCPU) = 30 per unit

Sales price per unit (SPPU) = Rs. 70

Now,

$$TBEU = \frac{FC}{SPPU - VCPU}$$

$$= \frac{8,00,000}{70 - 30}$$

$$= \frac{8,00,000}{40}$$

$$= 20,000 \text{ units}$$

∴ The company's operating Break-even point is 20,000 units.

8. Capital Structure refers to the mix of different sources of long-term funds used by a company to finance its assets and operations.

It mainly consists of equity capital, preference share capital, retained earnings and long-term debt.

9. Economic Order Quantity (EOQ) is the order size that minimizes total ordering and carrying costs. EOQ is determined by the following equations:

$$EOQ = \sqrt{\frac{2DS}{C}}$$

Where,

D = Annual Demand

S = Ordering cost per order

C = Carrying cost per unit per year

Illustration: If  $D = 10,000$ ,  $S = \text{Rs. } 50$ , and  $C = \text{Rs. } 2$

$$EOQ = \sqrt{\frac{2DS}{C}} = \sqrt{\frac{2 \times 10,000 \times 50}{2}} = \sqrt{5,00,000} = 707 \text{ units}$$

∴ Thus,  $EOQ = 707$  units approximately

### 10. Solution:

Current Market Price (CMP) = Rs. 300

Stock dividend = 20%

Now,

$$\begin{aligned} \text{Adjusted Market Price} &= \frac{\text{Current Market Price} \times 100}{100 + \text{Stock Dividend}} \\ &= \frac{300 \times 100}{100 + 20} = \frac{30,000}{120} = 250 \end{aligned}$$

∴ adjusted Market Price per share after stock dividend is Rs. 250



13. Solution:

$$\text{Loan (PVA)} = 300,000$$

$$\text{No. of yrs (n)} = 3 \text{ yrs}$$

$$\text{Interest (i)} = 10\%$$

$$\text{Amount of annual payment (PMT)} = ?$$

Now,

$$a) \text{ PVA} = \text{PMT} \times \text{PVIFA}_{10\%, 3 \text{ yrs}}$$

$$\text{Or, } 300,000 = \text{PMT} \times \text{PVIFA}_{10\%, 3 \text{ yrs}}$$

$$\text{Or, } 300,000 = \text{PMT} \times 2.4869$$

$$\text{Or, } 300,000 = \text{PMT}$$

$$2.4869$$

$$\text{PMT} = 120632.1123$$

$\therefore$  Amount of annual payment is 120632 approximately

b) ~~Re~~ Preparing the loan amortization schedule

| Year | Remaining <del>loan</del> | Payment     | Interest   | Principle   | Ending loan |
|------|---------------------------|-------------|------------|-------------|-------------|
| 1    | 300000                    | 120632.1123 | 30000      | 90632.1123  | 209367.8877 |
| 2    | 209367.8877               | 120632      | 20936.7887 | 99695.2113  | 109672.6764 |
| 3    | 109672.6764               | 120632      | 10967.2676 | 109664.7324 | 7.944       |

$\therefore$  Hence, last Ending loan Rs. 7.944 Occured due to rounding error.

14. Solution:

Given:

|                                    | Stock A | Stock B |
|------------------------------------|---------|---------|
| Return                             | 16%     | 12%     |
| Standard deviation                 | 10%     | 6%      |
| Covariance between $R_A$ and $R_B$ | -60     |         |

Now,

a) Stock A is more profitable

b) Stock A is more risky

c) Solution:

$$\text{Weight of stock (W}_A\text{)} = \frac{60}{100} = 0.60$$

$$\text{Weight of stock (W}_B\text{)} = \frac{40}{100} = 0.40$$

Now,

$$\text{ERP} = W_A \times \text{ER}_A + W_B \times \text{ER}_B$$

$$= 0.60 \times 16 + 0.40 \times 12$$

$$= 9.6 + 4.8$$

$$= 14.4\%$$

$\therefore$  The risk and return of portfolio is 14.4%.

$$\text{GP} = \sqrt{W_A^2 \cdot \sigma_A^2 + W_B^2 \cdot \sigma_B^2 + 2 \text{Cov}_{AB} \cdot W_A \cdot W_B}$$

$$= \sqrt{(0.60^2 \times 10^2) + (0.40^2 \times 6^2) + 2 \cdot (-60) \times 0.60 \times 0.40}$$

$$= \sqrt{36 + 5.76 - 28.8}$$

$$= \sqrt{12.96} = 3.6\%$$



d.

15. Solution:

Given information

$$\text{Weight of debt } (w_d) = \frac{6}{16} = 0.375$$

$$\text{Weight of preferred stock } (w_{ps}) = \frac{2}{16} = 0.125$$

$$\text{Common stock } (w_e) = \frac{8}{16} = 0.5$$

Selling price of common stock ( $P_0$ ) = Rs. 300

Expected Dividend ( $D_1$ ) = Rs. 15

Growth rate ( $g$ ) = 8%

Tax rate ( $t$ ) = 40%

Now,

Cost of debt after tax = ?

$$k_{dt} = k_d (1 - t)$$

$$= 9 (1 - 0.40)$$

$$= 9 \times 0.6$$

$$= 5.4\%$$

Cost of preferred stock = ?

$$k_{ps} = \frac{DPS}{NP}$$

$$= 10\%$$

Cost of common equity = ?

Cost of retained earning

$$(k_e) = \frac{D_1}{P_0} + g$$

Cost of common equity

$$k_e = \frac{D_1}{NP} + g \text{ (Not given)}$$

$$= \frac{15}{300} + 0.08$$

$$= 0.13 \text{ or } 13\%$$

Then,

Weighted average cost of capital (WACC) = ?

$$WACC = w_d \times k_{dt} + w_{ps} \times k_{ps} + w_e \times k_e$$

$$= 0.375 \times 5.4 + 0.125 \times 10 + 0.5 \times 13$$

$$= 2.025 + 1.25 + 6.5$$

$$= 9.775\%$$

∴ Mahakali Agro company has 9.775% weighted Average cost of capital among the total cost of each capital.



18. Solution:

Given Information:

For Bond

Par value (m) = Rs. 1000

Coupon rate (c) = 8.5%

Total Maturity (M) = 15 yrs - 5 yrs = 10 yrs

Interest (I) =  $C \times m$ 

$$= 8.5 \times 1000$$

$$= 85$$

For Stock

Par value (m) = Rs. 100

Current dividend (d<sub>0</sub>) = 20 per shareExpected dividend (d<sub>1</sub>) growth rate of year (g<sub>1</sub>) = 10%" " " Year<sub>2</sub> (g<sub>2</sub>) = 10%" " " Year<sub>3</sub> (g<sub>3</sub>) = 10%growth rate for forever (g<sub>4</sub>) = 5%

Now,

a) For Bond

Required rate of return (k<sub>d</sub>) = 10%Value of bond at present (V<sub>0</sub>) = ?

Now,

$$V_0 = I \times PVIFA_{k, n \text{ yrs}} + m \times PVIF_{k, n \text{ yrs}}$$

$$= 85 \times PVIFA_{10\%, 10 \text{ yrs}} + 1000 \times PVIF_{10\%, 10 \text{ yrs}}$$

$$= 85 \times 6.1446 + 1000 \times 0.3855$$

$$= 522.291 + 385.5$$

$$= 907.791$$

b. Relationship between required rate of return and value of bonds

i) Rate of return and value of bond relationships

ii) Coupon rate (c) = required return, V<sub>0</sub> = par valueiii) Coupon rate > k<sub>d</sub>: Bond sell at premiumiv) Coupon rate < k<sub>d</sub>: Bond sell at discount

c. Solution:

For Stock

Required rate (k<sub>s</sub>) = 15%Value of Stock (P<sub>0</sub>) = ?

Now,

$$P_0 = \frac{D_1}{(1+k_s)^1} + \frac{D_2}{(1+k_s)^2} + \frac{D_3}{(1+k_s)^3} + \frac{P_3}{(1+k_s)^3}$$

$$= \frac{22}{(1+0.15)^1} + \frac{24.2}{(1+0.15)^2} + \frac{26.62}{(1+0.15)^3} + \frac{279.5}{(1+0.15)^3}$$

$$= \frac{22}{1.15} + \frac{24.2}{1.3225} + \frac{26.62}{1.5208} + \frac{279.5}{1.5208}$$

$$= 19.1304 + 18.2986 + 17.5039 + 183.2848$$

Where,  $P_3 = \frac{D_4}{k_s - g_4}$ 

$$D_1 = D_0(1+g_1) = 20(1+0.10) = 22$$

$$D_2 = D_1(1+g_2) = 22(1+0.10) = 24.2$$

$$D_3 = D_2(1+g_3) = 24.2(1+0.10) = 26.62$$

$$D_4 = D_3(1+g_4) = 26.62(1+0.05) = 27.951$$

$$P_3 = \frac{D_4}{k_s - g_4}$$

$$= \frac{27.951}{0.15 - 0.05}$$

$$= \frac{27.951}{0.10}$$

$$= 279.51$$

$$= 279.51$$



19. Solution,

| Year | Cash Flow | UM. CF   |
|------|-----------|----------|
| 0    | (600000)  | (600000) |
| 1    | 2,50,000  | (350000) |
| 2    | 2,50,000  | (100000) |
| 3    | 1,50,000  | 50000    |
| 4    | 2,00,000  | 250000   |
| 5    | 2,00,000  | 450000   |

Now,

PBP for unequal cash flow

$$PBP = \text{minimum Year} + \frac{\text{Amt. to be recovered}}{\text{Next Year Cash Flow}}$$

$$PBP = 2 + \frac{100000}{150000}$$

$$PBP = 2.67 \text{ yrs}$$

$\therefore$  Hence, PBP is 2.67 yrs > 3yrs. So, NMC Company must purchased truck, if it's maximum recovery period is 3yrs.

Calculation of NPV of the project

| Year | Cash Flow | PVIF @ 10% | PV           |
|------|-----------|------------|--------------|
| 0    | (600000)  | 1          | (600000)     |
| 1    | 250000    | 0.9091     | 227275       |
| 2    | 250000    | 0.8264     | 206600       |
| 3    | 150000    | 0.7513     | 112695       |
| 4    | 200000    | 0.6830     | 136600       |
| 5    | 200000    | 0.6209     | 124180       |
|      |           |            | NPV = 207350 |

$\therefore$  Hence, Net present value is positive. So, NMC Company must purchase the truck.

c) Calculation of IRR for unequal cash flow

$$\text{Step (i) Fake annuity} = \frac{\text{Total Cash Flow}}{\text{No. of yrs}}$$

$$= \frac{250000 + 250000 + 150000 + 200000 + 200000}{5}$$

$$= 210000$$

$$\text{Step (ii) Fake Factor} = \frac{\text{Initial Cost}}{\text{Fake annuity}}$$

$$= \frac{600000}{210000}$$

$$= 2.8571$$

$\therefore$  Referring to the PVIFA table, the Fake Factor lies between in 5yrs 22% and 23%.



### Step (iv) Calculation of NPV +ve and -ve

| Year | C.F       | PVIF @ 22% | PV           | PVIF 26%       | PV        |
|------|-----------|------------|--------------|----------------|-----------|
| 0    | (6000000) | 1          | (6000000)    | 1              | (6000000) |
| 1    | 2500000   | 0.8197     | 2049250      | 0.7937         | 1984250   |
| 2    | 2500000   | 0.6719     | 1679750      | 0.6299         | 1574750   |
| 3    | 1500000   | 0.5507     | 826050       | 0.4999         | 749850    |
| 4    | 2000000   | 0.4514     | 902800       | 0.3869         | 773800    |
| 5    | 2000000   | 0.3700     | 740000       | 0.3149         | 629800    |
|      |           |            | NPV - 197850 | NPV - (267750) |           |
|      |           |            | IR           | HR             |           |

### Step (v)

#### Calculation of IRR

$$IRR = LR + \frac{LR \text{ Factor} \times NPV_{LR}}{NPV_{LR} - NPV_{HR}} \times (HR - LR\%)$$

$$= 22 + \frac{197850}{197850 - 267750} \times (26 - 22)$$

$$= 22 + 0.4249 \times 4$$

$$= 22 + 1.6996$$

$$= 23.69$$

d. NPV Method is superior rather than IRR because Net present value shows the Actual financial value and company.



1. Profit Maximization Value is the short term and traditional business goal. According to the profit Maximization Value, the manager should take decision or maximize profit and avoid all those activities which decreasing profit.
2. Annual Rate is the simple interest rate quoted per year without considering compounding inside the year.  
Effective Rate is the real rate earned after considering compounding. If compounding is more than once, EAR is always greater than APR.
3. Three Main Financial Statements:
  - i) Income Statement: Shows Profit/Loss for a period (Revenue - Expenses)
  - ii) Balance Sheet: Shows financial position (Assets = Liabilities + Equity) at a point of time.
  - iii) Cash Flow Statement: Shows cash inflows and outflows from operating, investing and financing activities.
4. Financial assets are intangible assets that represents a claims on the income or wealth of other party. They do not have physical form.  
Examples: Common Stock, Preferred Stock, Corporate Bonds, Government Treasury Bills, Bank Deposits.

5. Stock repurchases means company buying back its own outstanding shares from the market. In dividend Policy, it is an alternative way to distribute excess cash to shareholders instead of paying cash dividend. It reduces number of shares, increases EPS and generally increases market price per share.
6. Capital Structure refers to the combination or mix of long-term sources of financing used by a firm, i.e. Debt & Equity. Ideal capital structure maximizes value and minimizes WACC.  
Factors affecting Capital Structure:
  - i) Cost of Capital: Debt is cheaper due to tax benefit.
  - ii) Risk: High debt increases financial risk.
7. Credit policy is the guideline for granting credit to customers. It's three elements are:
  - i) Credit Standards: Minimum criteria for granting credit to customer.
  - ii) Credit Terms: length of credit period and discount offered.  
eg: 2/10 net 30 days
  - iii) Collection Policy: Procedure for collecting dues from slow-paying customers.
8. Solution:
 

Coupon bonds (c) = 10%

Maturity (n) = 15 yrs

Par value (m) = Rs. 1000

Current sell (V<sub>0</sub>) = Rs. 900

Interest (I) =  $C \times m$

=  $10\% \times 1000$

= 100

Current Yield (Y) = ?



Now,

$$C.Y. = \frac{I}{V_0}$$

$$= \frac{100}{900}$$

$$= 0.1111 \text{ Or } 11.11\%$$

∴ Current Yield (C.Y) of city bank is 11.11%.

9. Solution;

DOL = 1.2 times

DFL = 2.5 times

DTL = ?

Now,

$$DTL = DOL \times DFL$$

$$= 1.2 \times 2.5$$

$$= 3 \text{ times}$$

If Sales increase by 10%.

Net income increase % = ?

Then % change in Net income =  $DTL \times \text{Sales}$

$$= 3 \times 10$$

$$= 30\%$$

∴ Net income will increase by 30%.



10. Solution;

Inventory Conversion Period (ICP) = 25 days

Average collection period (ACP) = 50 days

Payable Deferrable period (PDP) = 35 days

Operating cycle = ?

Cash Conversion cycle (CCC) = ?

Now,

Operating cycle = ICP + ACP

$$= 25 + 50$$

$$= 75 \text{ days}$$

Cash Conversion cycle (CCC) = Operating cycle - PDP

$$= 75 - 35$$

$$= 40 \text{ days}$$

∴ It means firm needs cash for 40 days.

Group 'B'

14. Solution;

Recently Dividend ( $D_0$ ) = Rs. 40

growth rate for 1<sup>st</sup> year ( $g_1$ ) = 10%

2<sup>nd</sup> year ( $g_2$ ) = 10%

3<sup>rd</sup> year ( $g_3$ ) = 10%

Constant rate ( $g_4$ ) = 8%

Cost of equity ( $k_s$ ) = 18%

Stock intrinsic value today ( $P_0$ ) = ?

Now,

$$P_0 = \frac{D_1}{(1+k_s)^1} + \frac{D_2}{(1+k_s)^2} + \frac{D_3}{(1+k_s)^3} + \frac{P_3}{(1+k_s)^3}$$



$$= \frac{44}{(1+0.18)^1} + \frac{48.4}{(1+0.18)^2} + \frac{53.24}{(1+0.18)^3} + \frac{574.99}{(1+0.18)^3}$$

$$= \frac{44}{1.18} + \frac{48.4}{1.3924} + \frac{53.24}{1.6436} + \frac{574.99}{1.8181}$$

$$= 37.288 + 34.760 + 32.403 + 349.956$$

$$= \text{Rs. } 454.41$$

$\therefore$  Hence Price of Stock of Mega Company is Rs. 454.41

Where,

$$D_1 = D_0(1+g_1) = 40(1+0.10) = 40 \times 1.10 = \text{Rs. } 44$$

$$D_2 = D_1(1+g_2) = 44(1+0.10) = 44 \times 1.10 = \text{Rs. } 48.4$$

$$D_3 = D_2(1+g_3) = 48.4(1+0.10) = 48.4 \times 1.10 = \text{Rs. } 53.24$$

$$D_4 = D_3(1+g_4) = 53.24(1+0.08) = 53.24 \times 1.08 = \text{Rs. } 57.4992$$

$$P_3 = \frac{D_4}{K_s - g_4} = \frac{57.4992}{0.18 - 0.08} = \frac{57.4992}{0.1} = \text{Rs. } 574.99$$

b. Dividend Yield (D.Y) =  $\frac{D_1}{P_0} = \frac{44}{454.41} = 0.0968$  OR, 9.68 %

Capital Gain Yield (CGY) =  $\frac{P_1 - P_0}{P_0} = \frac{492.2018 - 454.41}{454.41} = 0.0832$  OR, 8.32 %

Where,

$$P_1 = \frac{D_2}{(1+K_s)^1} + \frac{D_3}{(1+K_s)^2} + \frac{P_2}{(1+K_s)^2}$$

$$= \frac{48.4}{(1+0.18)^1} + \frac{53.24}{(1+0.18)^2} + \frac{574.99}{(1+0.18)^2}$$

$$= 41.0169 + 38.2361 + 412.9488$$

$$= 492.2018$$

15. Solution;

Weight of Debt ( $W_d$ ) =  $\frac{40}{100} = 0.40$

Weight of Preferred Stock ( $W_s$ ) =  $\frac{10}{100} = 0.10$

Weight of Common Equity ( $W_{ce}$ ) =  $\frac{50}{100} = 0.50$

Current dividend ( $D_0$ ) = Rs. 30

growth rate ( $g$ ) = 5%

Current Sell ( $P_0$ ) = Rs. 300

New common stock ( $NP$ ) = Rs. 250

Dividend preferred stock ( $DPS$ ) = Rs. 12

New price of dividend preferred stock ( $NP$ ) = Rs. 92

Cost of debt before tax ( $k_d$ ) = 10%

Tax rate ( $t$ ) = 30%

Now,

a. Cost of debt after tax ( $k_d$ ) = ?

Now,

$$k_d = k_d(1-t)$$

$$= 10(1-0.30)$$

$$= 7\%$$

Cost of preferred stock ( $KPS$ ) = ?

Now,

$$KPS = \frac{DPS}{NP}$$

$$= \frac{12}{92}$$

$$= 0.1304 \text{ OR } 13.04\%$$



Cost of Common equity

Cost of Common equity ( $k_c$ )

Cost of retained earning ( $k_e$ )

$$k_c = \frac{D_1}{NP} + g$$

$$k_e = \frac{D_1}{P_0} + g$$

$$= \frac{D_0(1+g)}{NP} + 0.05 = \frac{D_0(1+g)}{300} + 0.05$$

$$= \frac{30(1+0.05)}{250} + 0.05 = \frac{30(1+0.05)}{300} + 0.05$$

$$= \frac{31.5}{250} + 0.05 = \frac{31.5}{300} + 0.05$$

$$= 0.126 + 0.05 = 0.176$$

$$= 17.6\%$$

$$= 17.6\%$$

b.  $WACC = W_d \times k_d + W_s \times k_P + W_{ec} \times k_e$

$$= 0.40 \times 7 + 0.10 \times 13.04 + 0.50 \times 15.5$$

$$= 2.8 + 1.304 + 7.75$$

$$= 11.854\%$$



11 Financial Management is used to refer the Management of fund in the context of business firm. Thus, broadly finance as discipline is categorized into three domains, Public finance, Financial Management and personal.

In other words, we can define Financial Management as the decision making process relating to financing, investment, dividend and current assets Management of a co-operation.

Similarly, Financial Management means to planning, controlling and analysis of the company finance. Finance graduates may sought career opportunities in Banking and financial sector, investment sector, International sector, public (govt.) sector, private sector and teaching sector, etc. The main objective of Financial Management is "Maximization of Shareholder's wealth".

The Major function of Financial Management are:-

1) Investment Decision

It involves deciding where the firm's fund should be invested.

It includes:

- Capital budgeting
- Selection of profitable investment project
- Management of current assets

The objective is to invest funds in projects that provide maximum return at acceptable risk.



### 11) Financial Decision

It involves determining how the required funds should be raised.

The firm may raise funds through:

- Equity shares
- Preference shares
- Debenture
- loan
- Retained earnings

The financial manager decides the appropriate mix of debt and equity, known as capital structure.

### 12) Dividend Decision

It involves deciding how much profit should be:

- Distributed to shareholders as dividend, and
- Retained in the business

The firm should maintain a balance between shareholders expectations and the firm's future financing requirements.

### 14) Working Capital Management

It involves managing short-term assets and liabilities such as:-

- Cash
- Inventory
- Account receivable
- Account payable

The objective is to maintain sufficient liquidity while avoiding unnecessary investment in current assets.

### 13. Solution:

Given:

loan (PVA) = Rs. 100000

No. of years = 3 yrs

Annual Interest (i) = 10%

Now,

$$PVA = PMT \times PVIFA_{i, n \text{ yrs}}$$

$$\text{Or } 100000 = PMT \times PVIFA_{10\%, 3 \text{ yrs}}$$

$$\text{Or } 100000 = PMT \times 2.4869$$

$$\text{Or } \frac{100000}{2.4869} = PMT$$

$\therefore$  Annual payment (PMT) is 40210.70

### b. Preparing loan amortization payment

| Year | Remaining loan | Payment  | Interest | Principle | Ending loan |
|------|----------------|----------|----------|-----------|-------------|
| 1    | 100000         | 40210.70 | 10000    | 30210.7   | 69789.3     |
| 2    | 69789.3        | 40210.70 | 6978.93  | 33231.77  | 36557.53    |
| 3    | 36557.53       | 40210.70 | 3655.753 | 36554.947 |             |

### c) Monthly equal installment (EMI) = ?

$$PVA = EMI \times \left[ \frac{1 - \left(1 + \frac{i}{12}\right)^{n \times 12}}{i/12} \right]$$



3<sup>rd</sup> Step:

$$\begin{aligned} \text{Interpolation} &= LR + \frac{V_{LR} - V_0}{V_{LR} - V_{HR}} (HR - LR) \\ &= 11\% + \frac{941.12 - 900}{941.12 - 887.02} (12 - 11) \\ &= 11 + \frac{41.12}{54.1} \\ &= 11.76 \end{aligned}$$

(array Group 1c)

17. Solution;

| State of Economy | Probability | Stock A | Stock B | R <sub>A</sub> xP  | R <sub>B</sub> xP  | (R <sub>A</sub> -E <sub>R</sub> A) <sup>2</sup>  | (R <sub>B</sub> -E <sub>R</sub> B) <sup>2</sup>  | (R <sub>A</sub> -E <sub>R</sub> A)(R <sub>B</sub> -E <sub>R</sub> B)xP  |
|------------------|-------------|---------|---------|--------------------|--------------------|--------------------------------------------------|--------------------------------------------------|-------------------------------------------------------------------------|
| 1                | 0.3         | 01      | 35%     | 0                  | 10.5               | 30                                               | 120                                              | -60                                                                     |
| 2                | 0.4         | 10      | 15%     | 4                  | 6                  | 0                                                | 0                                                | 0                                                                       |
| 3                | 0.3         | 20      | -5      | 6                  | -10.5              | 30                                               | 120                                              | -60                                                                     |
|                  |             |         |         | E <sub>R</sub> AxP | E <sub>R</sub> BxP | Σ(R <sub>A</sub> -E <sub>R</sub> A) <sup>2</sup> | Σ(R <sub>B</sub> -E <sub>R</sub> B) <sup>2</sup> | Σ(R <sub>A</sub> -E <sub>R</sub> A)(R <sub>B</sub> -E <sub>R</sub> B)xP |
|                  |             |         |         | = 10%              | = 15%              | xP = 60                                          | xP = 240                                         | (R <sub>B</sub> -E <sub>R</sub> B)xP = -120                             |

Now,

a)

Expected return of Stock A (E<sub>RA</sub>) = E<sub>R</sub>AxP

Expected return of Stock B (E<sub>RB</sub>) = E<sub>R</sub>BxP  
= 15%

$$\begin{aligned} \text{Standard deviation of Stock A (G}_A) &= \sqrt{\Sigma(R_A - E_{RA})^2 \times P} \\ &= \sqrt{60} \\ &= 7.75\% \end{aligned}$$

$$\begin{aligned} \text{Standard deviation of Stock B (G}_B) &= \sqrt{\Sigma(R_B - E_{RB})^2 \times P} \\ &= \sqrt{240} \\ &= 15.49\% \end{aligned}$$

$$\begin{aligned} \text{b) COV}_{A,B} &= \Sigma(R_A - E_{RA})(R_B - E_{RB}) \times P \\ &= -120 \end{aligned}$$

$$\text{Correlation Coefficient (r}_{A,B}) = \frac{\text{COV}_{A,B}}{G_A \cdot G_B}$$

$$\begin{aligned} &= \frac{-120}{7.75 \times 15.49} \\ &= \frac{-120}{120.0415} \\ &= -0.99 \end{aligned}$$

$$\text{c) Weight of Stock (A)} = 70\% = \frac{30}{100} = 0.7$$

$$\text{Weight of Stock (B)} = 30\% = \frac{30}{100} = 0.3$$



Calculation of standard deviation on portfolio (6P)

$$\sigma_P = \sqrt{w_A^2 \cdot \sigma_A^2 + w_B^2 \cdot \sigma_B^2 + 2(w_A \cdot w_B \cdot \text{cov.A.B})}$$

$$= \sqrt{(0.7^2 \times 15^2) + (0.3^2 \times 15^2) + 2(-120 \times 0.7 \times 0.3)}$$

$$= \sqrt{29.43 + 21.59 - 50.4}$$

$$= \sqrt{0.62}$$

$$= 0.79$$

Expected return of portfolio (ERP) =  $w_A \times E(R_A) + w_B \times E(R_B)$

$$= 0.7 \times 10 + 0.3 \times 15$$

$$= 11.5\%$$

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Solution:

Calculation of Payback Period - PBP

For Project 'A'

$$PBP_A = \frac{\text{Initial Investment}}{\text{Annual Cash Flow}}$$

Initial Investment = 100000

Annual Cash Flow = 40,000

$$= 2.5 \text{ yrs}$$

For Project 'B'

| Year | Cash flow | Cum. C.F |
|------|-----------|----------|
| 0    | (100000)  | (100000) |
| 1    | 50,000    | (50000)  |
| 2    | 60,000    | 10000    |
| 3    | 40,000    | 50000    |
| 4    | 18,000    | 68000    |

$$PBP_B = \frac{\text{Minimum Year} + \text{Amount to be recovered}}{\text{Cash flow for next year}}$$

$$= 1 + \frac{50000}{60000}$$

$$= 1.833 \text{ yrs}$$



b) Calculation of Net present value (NPV)

For project 'A'

| Year | Cash flow | PVIFA 10% | PV          |
|------|-----------|-----------|-------------|
| 0    | (100000)  | 1         | (100000)    |
| 1-4  | 40,000    | 3.1699    | 126796      |
|      |           |           | NPV = 26796 |

For

For project 'B'

| Years | Cash flow | PVIFA 10% | PV          |
|-------|-----------|-----------|-------------|
| 0     | (100000)  | 1         | (100000)    |
| 1     | 50,000    | 0.9091    | 45455       |
| 2     | 60,000    | 0.8264    | 49584       |
| 3     | 40,000    | 0.7513    | 30052       |
| 4     | 18,000    | 0.6830    | 12294       |
|       |           |           | NPV = 37385 |

c) Calculation of IRR

For project 'A'

Step (I) Annuity = 40,000

Step (II) Factors =  $\frac{\text{Initial Cost}}{\text{Annuity}} = \frac{100000}{40000} = 2.5$

Step (III) Referring to PVIFA table the factor 2.5 lies between 2.5404 and 2.4936 which corresponding rate 21% and 22%.

IRR =  $LR + \frac{LR \text{ factor} - HR \text{ factor}}{HR \text{ factor} - LR \text{ factor}} (HR - LR)$

$$= 21\% + \frac{2.5404 - 2.5}{2.5404 - 2.4936} (22 - 21)$$

$$= 21 + 0.8632 \times 1$$

$$= 21.86\%$$

For project 'B'

Step (I) Fake annuity =  $50000 + 60000 + 40000 + 18000$

$$= \frac{168000}{4}$$

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$$= 42000$$

Step (II) Fake factors =  $\frac{\text{Initial Cost}}{\text{fake annuity}} = \frac{100000}{42000} = 2.3803$

Step (III) Referring to PVIFA table the factor 2.3803 lies between 2.3997 and 2.3452 which corresponding rate 31% and 32%. But cash flow is increasing level so first we try at 27%.



Step (iv)

| Year | Cash flow | PVIF 27% | PV           | PVIF @ 30% | PV                           |
|------|-----------|----------|--------------|------------|------------------------------|
| 0    | (100000)  | 1        | (100000)     | 1          | (100000)                     |
| 1    | 50000     | 0.7874   | 39370        | 0.7692     | 38460                        |
| 2    | 60000     | 0.6200   | 37200        | 0.5917     | 35502                        |
| 3    | 40000     | 0.4882   | 19528        | 0.4552     | 18208                        |
| 4    | 18000     | 0.3844   | 6919.2       | 0.3501     | 6301.8                       |
|      |           |          | NPV = 3017.2 |            | NPV <sub>30%</sub> = (15280) |

Step (v)

Calculation of IRR

$$IRR = LRV + \frac{NPV_{LR}}{NPV_{LR} - NPV_{HR}} \times (HR - LR)$$

$$= 27\% + \frac{3017.2}{3017.2 + 15280} \times (30 - 27)$$

$$= 27 + \frac{3017.2}{18297.2} \times 3$$

$$= 27 + 1.99$$

$$= 28.99\%$$