2082 (Partial)

Group 'A'

1. Financial decision refers to the decision made by a financial manager regarding the procurement, allocation and utilization of funds in a business organization. It determines how much money the firms needs, where to obtain it, and how to use it effectively to achieve the objectives of the firm.

2. Any four ratios used to measure profitability of a firm are-,
   i) Gross profit
   ii) Net profit
   iii) Operating Profit Ratio
   iv) Return on Investment (ROI)

3. Discounting is the process of converting the future cash flows into their present value by using a suitable discount rate. It is based on the concept of time value of money.

4. Financial risk refers to the risk of loss to shareholder's due to the use of debt and other fixed-cost sources of finance. It arises because interest and other fixed financial obligation must be paid.

5. The liquidity position of a firm has a direct effect on it's dividend policy. A firm having adequate cash and strong liquidity can pay higher dividends. On the other hand, a firm with poor liquidity may retain more profit and pay lower dividends.

6. Optimal Capital structure is the combination of debt and equity capital that provides the minimum cost of capital and maximizes the value of the firm. It reprents the most suitable mix of different sources of finance.

7. Account receivable management is important for:-
- Maintain adequate liquidity
- Reduce bad debts
- Control the investment in receivables
- Increases profitability

8. Solution,

$$EAR = \left[1 + \frac{APR}{m}\right]^m - 1$$

$$= \left[1 + \frac{0.06}{4}\right]^4 - 1$$

$$= [1.015]^4 - 1$$

$$= 0.06136$$

$$= 6.14\%$$

∴ Effective interest rate = 6.14% approximately

9. Solution,

Capital budget = Rs. 5,000,000

Debt = 60%

Equity = 40%

Net income = Rs. 4,000,000

Now,

Dividend = Net income - Portion of equity financing

= 4,000,000 - 2000000 (i.e. 40% of 5000000)

= 2000000

10. Solution:

Inventory conversion period = 40 days

Receivable collection period = 50 days

Payable deferral period = 30 days

Now,

Cash Conversion cycle = Inventory period + Receivable period - payable

= 40 + 50 - 30

= 60 days

∴ Cash conversion cycle is 60 days.

Group 'B'

11. Financial Management is used to refer the management of funds in the context of business firm. Thus, broadly finance as discipline is categorize into three domains; Public finance, financial management and personal.

In other words, we can define financial Management as a 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. It may graduates sought carrier opportunities. In Banking and financial sector, investment sector, International sector, public (Govt) sector, private sector and teaching sector, etc.

Thus, the main purpose of financial management is to ensure the effective utilization of financial resources and maximize the value of the firm.

Shareholder's wealth maximizations means maximizing the market value of shares held by the shareholders. It is considered the major goal of financial management because the value of shareholder's investment increases when the market price of shares increases.

The firms aims to make financial decisions that increase the present value of future cash flows and consequently increases the market price of it's shares.

Features / importance of Wealth Maximization;

i) Considers time value of Money

It recognizes that money received today is more valuable than money received in the future.

ii) Considers risk

It takes into account the risk associated with expected future returns. Higher-risk investments require higher returns

iii) Focuses on Market value

The goal is to increase the market price of the company's shares, which directly benefits shareholders.

iv) Considers long-term benefits

It emphasizes sustainable growth and long-term profitability rather than only short-term profit.

v) Considers Cash flow

Wealth maximization focuses on the actual cash flows generated by investment decisions.

vi) Helps in financial decision-making

Investment, financing and dividend decisions are evaluated according to their effect on shareholder's wealth.

Therefore, Shareholder's wealth maximization is regarded as the primary goal of financial management because it considers profitability, risk, time value of money and cash flow while focusing on increasing the market value of shareholder's investment.

13a. Solution;

Given information;

Annual deposit (PMT) = Rs. 10,000

Interest rate (I) = 10%.

No. of yrs (n) = 4yrs

Now,

FVn = PMT x FVIFAi, nyrs

= 10,000 x FVIFA10%. 4yrs

= 10,000 x 4.6410

= 46410

b. Solution;

Loan (P_{VA}) = Rs. 3,00,000.

Amual Interest (I) = 10%.

Period (n) = 3yrs

Amount of annual payment (PMT) = ?

Now,

$$PVA = PMT \times \left[\frac{(1+I)^n - 1}{I}\right]$$

Or, $300000 = PMT \times \left[\frac{(1+0.10)^3 - 1}{0.10}\right]$

Or, $300000 = PMT \times 3.31$

Or, $\frac{300000}{3.31} = PMT$

P_{VA} = PMT x PVIFA$_{i, n yrs}$

Or, 300000 = PMT x PVIFA$_{10\%, 3yrs}$

Or, 300000 = PMT x 2.4869

Or, $\frac{300000}{2.4869} = PMT$

$\therefore$ Annual payment is 120632 (approximately)

14a. Solution;

Par value (m) = ~~30000~~ 1000

Coupon rate (r) = 10%

Maturity (n) = 10 yrs

Market interest rate (Ikd) = 8%

Interest (I) = c x m

= 0.10 x 1000

= 100

value of bond at present (V_0) = ?

Now,

V_0 = I x PVIFA$_{kd, n yrs}$ + m x PVIF$_{kd, n yrs}$

= 100 x PVIFA$_{8\%, 10yrs}$ + 1000 x PVIF$_{8\%, 10yrs}$

= 100 x 6.7101 + 1000 x 0.4632

= 671.01 + 463.2

= 1134.21

$\therefore$ Value of bond at present is Rs 1134.22

b) Solution;

Current dividend (D_0) = Rs. 18

Growth rate (g) = 6%

Required rate of return (ks) = 16%.

Value of stock at present (P_0) = ?

Now,

Calculation of next year Dividend.

$D_1 = D_0(1+g)$

$= 18(1+0.06)$

$= 19.08$

Calculation of value of stock at present (P_0)

$$P_0 = \frac{D_1}{k_s - g}$$

$$= \frac{19.08}{0.16 - 0.06}$$

$$= \frac{19.08}{0.1}$$

$$= 190.8$$

∴ The present value of the stock Rs. 190.8 per share.

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15 Soution;

Given Information;

Weight of Debt (w_d) = $\frac{20}{50}$ = 0.4 million

Weight of common equity (w_e) = $\frac{30}{50}$ = 0.6 million

Tax rate (t) = 30%.

Current divident (D_0) = 10 per share

grow rate (g) = 5%.

Current market price (P_0) = Rs. 105

Before tax cost of debt (k_d) = 10%.

Also,

Cost of debt before tax (k_{dt}) = $k_d (1 - t)$

$= 10 (1 - 0.30)$

$= 7\%$.

Cost of common equity (k_e) = $\frac{D_1}{P_0} + g$

$= \frac{D_0(1+g)}{105} + 0.05$

$= \frac{10(1+0.05)}{105} + 0.05$

$= \frac{10(1.05)}{105} + 0.05$

$= 0.1 + 0.05$

$= 0.15$

$= 15\%$.

WACC = $W_d \times k_{dt} + W_e \times k_e$

$= 0.4 \times 7 + 0.6 \times 15$

$= 11.8\%$

uses of cost of capital are:

- Investment making Decision
- Financial making Decison
- Capital Budgeting
- Performance management
- Risk and Return

Group 'c'

18. Solution;

State of economy	Probability	Stock A	Stock B	RA x P	RB x P	(RA-ERA)² xP	(RB-ERB)² xP	(RA-ERA)(RB-ERB) xP
Recession	0.3	5%	30%	1.5	9	7.5	58.8	-21
Normal	0.4	10	10	4	4	0	14.4	0
Tsoom	0.3	15	10	4.5	3	7.5	10.8	-9
				ERAxP = 10	ERBxP = 16	E(RA-ERA)² xP = 15	E(RB-ERB)² xP = 84	E(RA-ERA)(RB-ERB) xP = -30

Now,

a) Expected Return (ERA) = ERAxP
= 10%

Expected Return of stock B (ERB) = ERBxP
= 16%

Standard deviation of Stock A (σ_A) = $\sqrt{E(R_A - ER_A)^2 \times P}$
= $\sqrt{15}$
= 3.87%

Standard deviation of Stock B (σ_B) = $\sqrt{E(R_B - ER_B)^2 \times P}$
= $\sqrt{84}$
= 9.16%

b. Weight of stock A (W_A) = 60% = $\frac{60}{100}$ = 0.60

Weight of stock B (W_B) = 40% = $\frac{40}{100}$ = 0.40

Now,

Standard deviation on portfolio (σ_P)

$\sigma_P = \sqrt{W_A^2 \cdot \sigma_A^2 + W_B^2 \cdot \sigma_B^2 + 2 COV_{A,B} \times W_A \times W_B}$

$= \sqrt{(0.60^2 \times 3.87^2) + (0.40^2 \times 9.16^2) + 2(-30 \times 0.60 \times 0.40)}$

$= \sqrt{5.391 + 13.424 - 144}$

$= \sqrt{4.415}$

$= 2.10$

Expected return of portfolio (ER_P) = $W_A \times ER_A + W_B \times ER_B$
= 0.60 x 10 + 0.40 x 16
= 12.4%

c. Solution;

Correlation between return of Stock A and Stock B

$\rho_{A,B} = \frac{COV_{A,B}}{\sigma_A \cdot \sigma_B}$

$= \frac{-30}{3.87 \times 9.16}$

$= \frac{-30}{35.4492}$

$= -0.84$

Q. The Coefficient of correlation shows the relationship between the returns of two securities. It ranges from -1 to +1.

- Positive correlation (+1): Increase portfolio risk and gives less diversification benefit
- Zero correlation (0): Helps to reduce portfolio risk through diversification.
- Negative correlation (-1): Provides maximum diversification and can reduces risk significantly.

Thus, lower correlation reduces portfolio risk, while it has little direct effect on portfolio return.

19. Solution;

Year	Cash flow	Cum. CF
0	(5000000)	(5000000)
1	1000000	(4000000)
2	3000000	(1000000)
3	2000000	1000000
4	2000000	3000000

Now,

PBP = minimum Year + $\frac{\text{Amt to be recovered}}{\text{Cash flow for next year}}$

= 2 + $\frac{1000000}{2000000}$

= 2.5 yrs.

∴ Hence, PBP is 2.5 < 3 yrs. So, the company should run tourist bus from Kathmandu to Muktinath, as it's maximum cost recovery period is 3 yrs

b) Calculation of NPV of the project

Year	Cashflow	PVIF@10%	PV
0	(5000000)	1	(5000000)
1	1000000	0.9091	909100
2	3000000	0.8264	2479200
3	2000000	0.7513	1502600
4	2000000	0.6830	1366000
			NPV = 1256900

∴ Yes, Net present value is positive, the company must run tourist bus service

c) IRR (Internal Rate of Return) is the discount rate at which the Net present value (NPV) of an investment becomes zero.

Calculation of IRR for unequal cash flow

Step (I) Fake annuity = $\frac{\text{Total cash flow}}{\text{No. of yrs}}$

= $\frac{8000000}{4}$

= 2000000

Step (II) Fake factor = $\frac{\text{initial cost}}{\text{Fake annuity}}$

= $\frac{5000000}{2000000}$

= 2.5

Step(iv) Calculation OF NPV +ve and -ve

Year	Cash flow	PVIF @ 24%	PV	PVIF@21%	PV
0	(5000000)	1	(5000000)	1	(5000000)
1	1000000	0.8065	806500	0.8264	826400
2	3000000	0.6504	1951200	0.6830	2049000
3	2000000	0.5245	1049000	0.5645	1129000
4	2000000	0.4230	846000	0.4665	933000
			NPV LR = (347300)		NPV HR = (62600)

PVIF @ 18	PV	PVIF 20%	PV
1	(5000000)	1	(5000000)
0.8475	847500	0.8333	833300
0.7182	2154600	0.6944	2083200
0.6086	1217200	0.5787	1157400
0.5158	1031600	0.4823	964600
	NPV LR 250900		NPV = 38500

Setp Step(v)

Calculation of IRR

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

$$= 18 + \frac{250900}{250900 + 62600} (21 - 18) \qquad 20 + \frac{38500}{38500 + 62600} (21 - 20)$$

$$= 18 + 187803 \qquad = 20 + 0.3808$$

$$= 187821 \qquad = 2038$$

Calculation of IRR

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

$$= 20\% + \frac{38500}{38500 + 62600} (21 - 20)$$

$$= 20 + 0.38$$

$$= 20.38$$

d. Payback Period

Merits

i) Simple and easy to understand and calculate

ii) Helps assess the liquidity and risk of a project

iii) Gives importance to early cash flow.

iv) Useful where technology changes rapidly or investment decisions need quick recovery

Demerits

i) Ignores the time value of money in its traditional form

ii) Ignores cash flows after the payback period

iii) Does not directly measures the profitability of a project

iv) The choice of an acceptable payback period can be arbitrary.

2081 (Partial)

GROUP 'A'

1. Financial Management is used to refer to the management of funds in the context of a business firm. Thus, broadly, finance as a discipline is categorized into three domains: pubic finance, financial management and personal finance.

In other words, we can define financial Management as the decision making process relating to investment, financing, dividend and current assets management of a corporation.

2. Present value of perpetuity is calculated by the :-

$$Pv = \frac{fv}{(1+i)^n}$$

3.

Basis	Discounting	Compounding
Meaning	It converts future value into present value	It converts present value into fure value
Direction	future → present	Present → future
Purpose	To find the current worth of future cash flows	To find the future worth of present cash flow
formula	$Pv = \frac{Fv}{(1+i)^n}$	$Fv = Pv(1+i)^n$.

4. The major non-discounted capital budgeting techniques are:-

i) Payback period (PBP)

ii) Accounting Rate of Return (ARR)

These techniques do not consider the time value of money

5. The major motives of holding cash are:-

i) Transaction motive: Cash is held to meet regular business transaction.

ii) Precautionary motive: Cash is held to meet unexpected needs or emergencies.

iii) Speculative motive: Cash is held to take advantage of profitable opportunities.

6. The cost of equity is generally higher than the cost of debt because equity Shareholder's bear greater risk than debt holders. Debt holders have a fixed claim on interest and principle, while equity Shareholders receive dividends only after payment of interest and other obligations. Moreover, interest on debt is tax deductible, which reduces the effective cost of debt. Therefore, the cost of equity is normally higher than the cost of debt.

7. Solution;

Given information;

EOQ = 1000 units

Ordering cost = Rs. 100

Carrying cost = 10% of unit cost

Unit cost = Rs. 20

Now,

Carrying cost per unit (c) = 10% × 20 = Rs. 2

EOQ formula;

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

$$1000 = \sqrt{\frac{2 \times D \times 100}{2}}$$

Squaring both sides, we get

$$1000 = \sqrt{\frac{2 \times D \times 100}{2}} \qquad 1000^2 = \frac{2 \times D \times 100}{2}$$

Or, $1000 = \frac{200D}{2}$ Or, $1000000 = 100D$

Or, $2000 = 200D$ Or, $\frac{1000000}{100} = D$

Or, $\frac{2000}{200} = D$ D = 10000 units

D = ∴ Annual requirement = 10,000 units

8. Solution;

Operating profit = Rs. 50,000

Interest expenses = Rs. 10,000

Preferred dividend = Rs. 8000

Tax = 40%

Financial BEP = ?

Now,

$$\text{Financial BEP} = \frac{\text{Interest} + \frac{\text{Preferred Dividend}}{1 - \text{tax rate}}}{}$$

$$= 10,000 + \frac{8000}{1 - 0.40}$$

$$= 10,000 + \frac{8000}{0.60}$$

$$= 10,000 + 13333.33$$

$$= 23333.33$$

∴ Financial BEP = Rs. 23333.33

9. Solution:

Beta (β) = 1.20

Expected return E(R) = 20%.

Risk-free rate (R_f) = 5%.

Market risk (R_m) = 8%.

Required rate of return (K_S) = ?

Now,

$K_S = R_f + (R_m - R_f)\beta$

$= 5\% + (8\% - 5\%)\ 1.20$

$= 5\% + 3.6$

$= 8.6$

Compare:

Expected Return (20%) > Required Return (8.6)

Stock is not correctly priced. It is undervalued / underpriced. It is giving higher return that it should for it's risk level. Investor should buy it.

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10. Solution:

Given:

EPS = Rs. 13

EPS$_5$ = Rs. 8.82

No. of yrs(n) = 5yrs

Now,

$FV = PV(1+g)^n$

Or, $13 = 8.82\ (1+g)^5$

Or, $\frac{13}{8.82} = (1+g)^5$

Or, $1.4739 = (1+g)^5$

Or, $(1.4739)^{1/5} = 1+g$

Or, ~~Earning~~ $1.0807 = 1+g$

Or, $1.0807 - 1 = g$

Or, $0.0807 = g$

$8.07\% = g$

∴ ~~Earn~~ Earning grew at 8.07% pa compounded

Group "B"

11. ~~Wealth~~ Profit Maximization and Stock Price maximization are two different goals of financial management. Traditional approach says profit maximization, modern approach says wealth / stock price maximization.

Wealth / stock price 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 shareholder's wealth.

Profit maximization value is the short term and traditional business goal.

According to the profit maximization value, the manager should take the decision of maximize profit and avoid all those activities which decreasing profit.

Basis	Profit Maximization goal	Wealth Maximization goal
Meaning	Maximize accounting profit	Maximize market value of firm.
Nature	It is short term business goal	It is long-term business goal
Approach	Traditional and outdated business goal.	Modern business goal.
Risk factor	Ignores risk and uncertainty	Consider risk. Higher risk requires higher return.
Time value	Ignores time value of money	Considers time value. Uses discounted cash flows.
Quality	It ignores quality of goods and services.	It considers quality of goods and services.
Clarity	It is unclear goal.	It is clear to understand
Dividend policy	Ignores dividend policy	Considers dividend and it's effect on market price
Social Responsibility	Ignores social and ethical issues.	Considers interest of all stakeholders.

So, profit maximization is naive, short-term and ignores risk and time value. That is why modern financial management considers Stock Price Maximization as the operational and ultimate goal of the firm.

13. Solution;

a) Given Information;

Present value (PV) = Rs. 10,000

No. of yrs (n) = 2yrs

Interest (I) = 6%

Future value (Fv) = ?

Now,

$$Fv = Pv(1+i)^n$$

$$= 10,000(1+0.06)^2$$

$$= 10,000 \times 1.1236$$

$$= 11236$$

b. Given information;

Annuity (PMT) = Rs. 5,000

No. of yrs (n) = 5yrs

Interest rate (i) = 10%

Future value (FVA) = ?

Now,

$$FVA = PMT\left[\frac{(1+i)^n - 1}{i}\right] \quad PMT \times FVIFA_{i,n\,yrs}$$

$$= 5,000 \times FVIVA_{10\%,\,5yrs}$$

$$= 5,000 \times 6.1051$$

$$= Rs.\ 30\,525.5$$

c. Given information,

Annuity (PMT) = Rs 4000
Interest rate (I) = 10%
No. of yrs (n) = 3yrs
Future value (FVA) = ?

NOW,

FVA = PMT x FVIFA, n yrs
= 4000 x FVIFA 10% 3yrs
= 4000 x 3.3100
=

c. Given information,

Cash flow (CF_1) = Rs 5000
Cash flow (CF_2) = Rs. 6000
Cash flow (CF_3) = Rs. 4000
Interest rate (I) = 10%
~~NOW~~ No. of yrs (n) = 3yrs
Future value (FV_3) = ?

NOW,

$$FV_3 = CF_1(1+i)^{n-1} + CF_2(1+i)^{n-2} + CF(1+i)^{n-3}$$
$$= 5000(1+0.10)^{3-1} + 6000(1+0.10)^{3-2} + 4000(1+0.10)^{3-3}$$
$$= 5000 \times 1.21 + 6000 \times 1.1 + 4000 \times 1$$
$$= 6050 + 6600 + 4000$$
$$= 16650$$

14. Solution:

Given information;

Annual coupon bond (C) = 12%
Par value (m) = Rs. 1000
Bond sell (V_0) = Rs. 1100
No. of yrs (n) = 10yrs.
Interest (I) = C x m = 0.12 x 1000 = 120

NOW,

a) YTM = ?

1st step

$$\text{Approximate YTM} = \left[\frac{I + \frac{m - V_0}{n}}{\frac{m + 2V_0}{3}}\right]$$
$$= \left[\frac{120 + \frac{1000 - 1100}{10}}{\frac{1000 + 2 \times 1100}{3}}\right]$$
$$= \left[\frac{1200 - 10}{1066.67}\right]$$
$$= 0.10312 \text{ OR } 10.312$$

2nd Step: Trying to Higher 11% and lower 10%

$$V_{HR} = I \times PVIFA_{n\text{yrs}} + m \times PVIF_{n\text{yrs}}$$
$$= 120 \times PVIFA_{11\%, 10\text{yrs}} + 1000 \times PVIF_{11\%, 10\text{yrs}}$$
$$= 120 \times 5.8892 + 1000 \times 0.3522$$
$$= 706.704 + 352.2$$
$$= 1058.904$$

V_{LR} = I x PVIFA kd%, nyrs + m x PVIF kd%, nyrs

= 120 x PVIFA 10%, 10yrs + 1000 x PVIF 10%, 10yrs

= 120 x 6.1446 + 1000 x 0.3855

= 737.352 + 385.5

= 1122.852

Step:3

Interpollation = $LR + \frac{V_{LR} - V_O}{V_{LR} - V_{HR}} (H_{12} - LR)$

= $10\% + \frac{1122.852 - 1100}{1122.852 - 1058.904} (11 - 10)$

= $10 + \frac{22.852}{63.948}$

= 10 + 0.3573

= 10.36%

b) Current Yield (CY) = $\frac{I}{V_O}$

= $\frac{120}{1100}$

= 0.1091 or 10.91

c) Capital gain Yield = YTM - CY

= 10.36 - 10.91

= -0.55%

15 Solution;

Given Information;

Weight of Debt (w_d) = $\frac{12}{32}$ = 0.375

Weight of Preferred Stock (w_p) = $\frac{4}{32}$ = 0.125

Weight of Common Stock (w_c) = $\frac{16}{32}$ = 0.5

Tax rate (T) = 40%

Required rate on equity (k_e) = 17%

Common Stock (P_0) = Rs. 25

Now

Cost of debt after tax (k_{dt}) = ?

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

= 15 (1 - 0.40)

= 15 x 0.6

= 9%

Cost of Preferred Stock (K_{PS}) = ?

Now,

$K_{PS} = \frac{DPS}{NPS}$

= 13%

Now,

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

= 0.375 x 9 + 0.125 x 13 + 0.5 x 17

= 3.375 + 1.625 + 8.5

= 13.5

16. Solution;

Given information;

DOL = 2

Sales = 10,000 bottle

EBIT (operating Income) = Rs 10,000

a) If Sales Increased by 10%

Now,

$$DOL = \frac{\%\text{ Change in EBIT}}{\%\text{ Change in Sales}}$$

$$2 = \frac{\%\text{ change in EBIT}}{10\%}$$

∴ % chage in EBIT is 20%

Then Change in EBIT = Rs. 10,000 × 20%

$$= \text{Rs. } 10000 \times \frac{20}{100}$$

= Rs. 2000

New operating profit figure (EBIT) = 10,000 + 2000

= 12000

If new Sales position at 11,000 bottles

Note:-

$$\text{New DOL} = \frac{\text{New CM}}{\text{New EBIT}}$$

$$= \frac{22000}{12000}$$

$$= 1.83$$

$$CM = 20000 + 20000 \times 10\%$$

$$= 20000 + 2000$$

$$= 22000$$

Group 'c'

18. Solution;

State of economy	Probability	Stock X	Stock Y	RY × P	RX × P	$(R_X - \bar{E}R_X)^2$ × P	$(R_Y - \bar{E}R_Y)^2$ × P	$(R_X - ER_X)(R_Y - ER_Y) \times P$
	0.1	-10%	-35%	-3.5	-1	48.4 1440	240.1	107.8
	0.2	2	0	0	0.4	20.0 115.2	39.2	28
	0.4	12	20	8	4.8	0 3294.4	14.4	0
	0.2	20	25	5	4	12.8 14520	24.2	17.6
	0.1	38	45	4.5	5.8	67.6 20793.6	96.1	80.6
				$ER_Y \times P$ = 14	$ER_X \times P$ = 12	$E(R_X - \bar{E}R_X)^2 \times P$ = 148.8	$E(R_Y - ER_Y)^2 \times P$ = 414	$E(R_X - ER_X)(R_Y - ER_Y) \times P$ = 234

Now,

a) Expected Rate of Y (ERY) = $ER_Y \times P$

= 14%

Standard deviation on both side

Stock 'x'

$$\sigma_X = \sqrt{E(R_X - \bar{E}R_X)^2 \times P}$$

$$= \sqrt{148.8}$$

= 12.20

Stock 'y'

$$\sigma_Y = \sqrt{E(R_Y - \bar{E}R_Y)^2 \times P}$$

$$= \sqrt{414}$$

= 20.35

b) Coefficient of Variation on both side

$$CV_X = \frac{\sigma_X}{ER_X}$$

$$= \frac{12.20}{12}$$

= 1.016

$$CV_Y = \frac{\sigma_Y}{ER_Y}$$

$$= \frac{20.35}{14}$$

= 1.453

Stock Y has higher SD and higher CV, so stock Y is more risky. Most investors will not consider Y as less risky.

c. Weight of stock X = $\frac{60}{100}$ = 0.60

Weight of stock Y = $\frac{40}{100}$ = 0.40

Now,

Standard deviation on portfolio

~~$\sigma_p = \sqrt{w_A^2 \times \sigma_A^2 + w_1}$~~

$\sigma_p = \sqrt{w_x^2 \times \sigma_x^2 + w_y^2 \times \sigma_y^2 + 2\,Cov_{x,y} \times w_x \times w_y}$

$= \sqrt{(0.60^2 \times 12.20^2) + (0.40^2 \times 1.45^2) + 2 \times 234 \times 0.60 \times 0.40}$

$= \sqrt{53.58 + 0.3364 + 112.32}$

$= \sqrt{166.2388}$

=

Expected return of portfolio = $w_x \times ER_x + w_y \times ER_y$

= 0.60 × 12 + 0.40 × 14

= 12.8%.

19. Solution;

Calculation of payback Period (PBP)

For project X

PBP_x = Initial investment / annual cash flow

= 15000 / 5100

= 2.94 yrs

For project Y

Year	Cash flow	Cum. C.F
0	(20,000)	(20,000)
1	6500	(13500)
2	8500	(5000)
3	7500	2500
4	8500	11000

PBPY = Minimum year + Amount to be recovered / Cash flow for next year

= 2 + 5000 / 7500

= 2 + 0.67

= 2.67 yrs

On the basis of PBP Project Y is selected because PBP of Project Y is lower than Project X

b. Calculation of Net present value (NPV)

For X

Year	Cash flow	PVIFA 14%	PV
0	(15000)	1	(15000)
1-4	5100	2.9137	14859.87
			NPVx = (140.13)

For ~~profe~~ Y

Year	Cash flow	PVIF 14%	PV
0	(20,000)	1	(20,000)
1	6500	0.8772	5701.8
2	8500	0.7685	6540.75
3	7500	0.6750	5062.5
4	8500	0.5921	5032.85
			NPVy = 2337.90

On the basis of NPV Y is selected because NPV of Y is higher than X.

c. Calculation of IRR

Step (i) Annuity = ~~15000~~ 5100

Step (ii) Factors = $\frac{\text{initial cost}}{\text{annuity}} = \frac{15000}{5100} = 2.9411$

Step (ii) Reffering to the PVIFA table the factors 2.9411 lies between 2.9745 and 2.9137 which corresponding rate is 13% and 14%.

Step (iv) Interpolation

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

$$= 13\% + \frac{2.9745 - 2.9411}{2.9745 - 2.9137} (14 - 13)$$

$$= 13 + \frac{0.0334}{0.8608}$$

$$= 13 + 0.55$$

$$= 13.55$$

For project Y

Step (i) Fake annuity = $\frac{6500 + 8500 + 7500 + 8500}{4}$

$= 7750$

Step (ii) Faeke factors = $\frac{\text{initial cost}}{\text{Fake annuity}}$

$= \frac{20,000}{7750}$

$= 2.5806$

Step (iii) Reffering to the PVIFA table the factor 2.5806 lies between 2.5887 and 2.5404 which ~~corresp~~ corresponding rate is 20% and 21%.

Year	Cash flow	PVIF @ 21%	PV	PVIF 17%
0	(20,000)	1	(20000)	1
1	6500	0.8264	5371.6	
2	8500	1.5095	12830.75	
3	7500	2.0739	15554.25	
4	8500	2.5404	21593.4	
			NPV = 35350	

Step(iv)

Year	Cash flow	PVIF @ 17%	PV	PVIF @ 21%	PV
0	(20000)	1	(20000)	1	(20000)
1	6500	0.8547	5555.55	0.8264	5371.6
2	8500	0.7305	6209.25	0.6830	5805.5
3	7500	0.6244	4683	0.5645	4233.75
4	8500	0.5337	4536.45	0.4665	3965.25
			NPV_{LR} = 984.25		NPV_{HR} = (623.9)

Step(v) Interpolation

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

$$= 17\% + \frac{984.25}{984.25 + 623.9} (21 - 17)$$

$$= 17\% + 2.44$$

$$= 19.44\%$$

On the basis of IRR Project Y is selected because IRR of Project Y is higher than project X

d. Payback Period (PBP)

Merits:

i) Simple to understand and easy to calculate
ii) It measures risk - Shorter payback means lower risk.

Demerits:

i) Ignores Time Value of Money
ii) Ignores cash flows after the payback period

Net present Value (NPV)

Merits:

i) Considers all cash flows of the project
ii) Most realistic and consistent with wealth maximization goal.

Demerits:

i) Difficult to compare projects of different sizes.
ii) Difficult to understand for non-technical managers.

Internal Rate of Return (IRR)

Merits:

i) Consider Time value of Money
ii) Consider all cash flows

Demerits:

i) Complex calculations with trial and error method
ii) May give multiple IRRs for non-conventional cash flows.