

Shares $\begin{cases} \rightarrow \text{Equity shares} \Rightarrow \text{higher risks (probs) higher returns} \\ \rightarrow \text{Preference shares} \Rightarrow \text{constant returns} \end{cases}$

Finance

Financial Services

Advisory services

Designing Financial Products

Investment, Real Estate

Financial Mgmt

? Mgt of Finance

? Financial / Non-Financial

? Budgeting / Forecasting

? Investment Analysis

working capital \rightarrow Day to Day capital expenses

Financial mgt \rightarrow Utilization of Resources efficiently

Diversification of Investments : Making a single amt
in diff investments like Gold,
Debentures, shares, etc.

Types of Investments :

$\begin{cases} > \text{Shares} \\ & \quad \begin{cases} \text{equity} \\ \text{preference} \end{cases} \end{cases}$

$\begin{cases} > \text{Debentures} \end{cases}$

$\begin{cases} > \text{Insurance} \end{cases}$

$\begin{cases} > \text{Bond / Scripts} \end{cases}$

$\begin{cases} > \text{Gold} \end{cases}$

$\begin{cases} > \text{Deposits} \end{cases}$

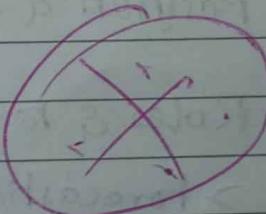
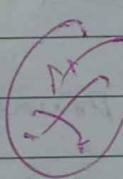
$\begin{cases} > \text{Mutual Funds} \end{cases}$

OBJECTIVES OF

FINANCIAL MGMT

(\times) 4 Main

(\times) 4 other

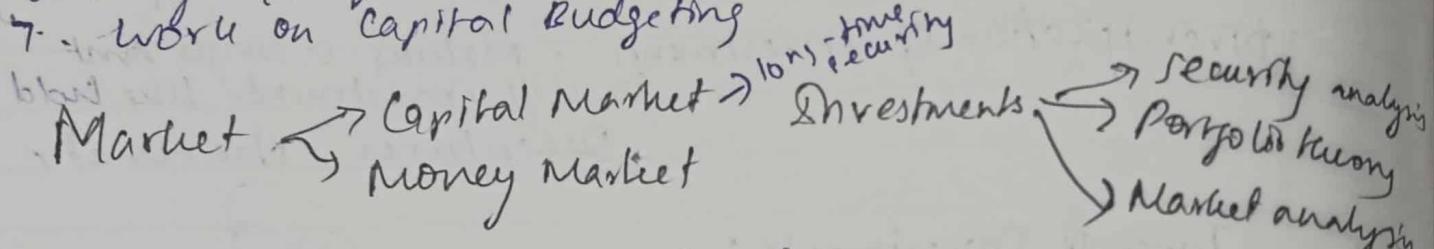


~~Scopes of Financial Mgmt~~: ~~15m~~

- ↳ Traditional Approach - raising funds not utilization
- ↳ Modern Approach - overcomes limitation of Traditional approach

Functions of Financial Mgmt:

1. Determine Capital Reg - size of org
preference share cap
2. Establish Cap struct
 equity share cap
3. Determine funding srs - preference, shares, debentures
4. Fund Investment \rightarrow risk & return
5. Implement financial controls \rightarrow Ratio analysis, financial forecasting
6. Mergers & Acquisitions
7. Work on Capital Budgeting



Factors affecting Financial Decision:

\rightarrow Cost \rightarrow Risk \rightarrow flotation fees \rightarrow market condition \rightarrow Tax rates

Position & Role of Financial Manager:

Roles & Responsibilities of Financial Manager:

- \rightarrow Forecasting & planning \rightarrow coordination & control
- \rightarrow Raising of funds \rightarrow Allocation of funds \rightarrow Planning for the profit

Time value of money: \rightarrow Based on time, value of money changes

Reasons for Time value of money:

Page No. : 43

Expt. No. :

Inflation

2) Risk 3) Personal consumption preference 27) Investment opportunities

\$ Bird in the Hand - today / bird tomorrow & maybe 2 or 3

Methods of Analysis

compounding / Future value

Discounting / present value

Compound value of lumpsum:

Compounding of interest over 'n' years

$$(Future\ value)\ FV = P(1+r)^n$$

P → Principal amt r → rate of interest
n → no. of yrs

Prblm:

1) Murugan makes an initial deposit of Rs. 2,00,000 in CUB Ltd. Interest is compounded at 10% per annum for 6 years. Calculate the amount of maturity (FV).

Soln:

$$P = 2,00,000 \quad r = 10\% \quad n = 6$$

$$FV = 2,00,000 \left(1 + \frac{10}{100}\right)^6 = 2,00,000 (1.1)^6 = 2,00,000 \times 1.7716$$

$$FV = 3,54,320$$

Type 2)

Multiple compounding period:

$$FV = P \left(1 + \frac{r}{m}\right)^{mn}$$

m → frequency of comp int

Prblm:

17)

Mr. Ragav invests Rs. 25,000 in a Bank at 10% for 5 yrs. Calculate the maturity value if interest is compounded annually. Will he get more if interest is compounded half yearly.

Teacher's Signature:

Soln:

$$P = 25,000 \quad r = 10\% \quad n = 5 \text{ yrs}$$

case i) : $m = \frac{12}{12} = 1 \Rightarrow FV = 25000(1.1)^{5 \times 1}$
 (annually) $\boxed{m=1}$ $= 40262.50$

case ii) : $m = \frac{12}{6} = 2 \Rightarrow \boxed{m=2} \text{ times}$
 half yearly $FV = 25000(1.1)^{5 \times 2} = 64,843.54$

\therefore C² half yearly is more by around 24000 than annually.

Effective Rate of Interest : (ERI or Nominal Rate of Interest)

$$\text{ERI} = \left(1 + \frac{i}{m}\right)^m - 1 \quad i \rightarrow \text{interest rate}$$

$m \rightarrow \text{frequency of compounding}$

sums:

Alex Industries Ltd offer 14% interest on Fixed Deposit
 what is the Effective Rate of Interest if compounding is done
 a) half-yearly b) quarterly c) monthly.

a) For half-yearly $m = \frac{12}{6} = 2 \text{ times}$

$$\therefore \text{ERI} = \left(1 + \frac{14}{100} \times \frac{1}{2}\right)^2 - 1 = 1.1449 - 1$$

$$\therefore \text{ERI} = 0.1449 \times 100 \% = \boxed{14.49} \%.$$

b) Quarterly $m = \frac{12}{3} = 4 \text{ times}$

$$\text{ERI} = \left(1 + \frac{0.14}{4}\right)^4 - 1 = 0.1475 \times 100 = \boxed{14.75} \%.$$

c) $m = \frac{12}{1} = 12$ times

$$ERI = \left(1 + \frac{0.14}{12}\right)^{12} - 1 = 0.1493 \times 100 = 14.93\%$$

Doubling Period : (Doubling period refers the time needed for getting double the invested amount)

→ Rule of 72 :- Doubling Period = $\frac{72}{\text{Rate of Interest}}$

→ Rule of 69 :- Doubling Period = $0.35 + \frac{69}{\text{Rate of Interest}}$
(Rule of 69 is more accurate)

Sums:

1) calculate the doubling period using the rule of 72 & rule of 69 if rate of interest is i) 6% ii) 9% iii) 12%.

Sol'n:

	rule of 72	rule of 69
i) 6%	$DP = \frac{72}{6} = 12$ yrs	$0.35 + \frac{69}{6} = 11.85$ yrs
ii) 9%	$DP = \frac{72}{9} = 8$ yrs	$0.35 + \frac{69}{8} = 8.01$ yrs
iii) 12%	$DP = \frac{72}{12} = 6$ yrs	$0.35 + \frac{69}{12} = 6.1$ yrs

2) ~~(+)~~ calculate the rate of interest if the period of doubling of an investment is a) 4 yrs b) 6 yrs (using rule 72)

a) $\frac{72}{i} = 4$

$i = 18\%$

b) $\frac{72}{i} = 6$

$i = 12\%$

Teacher's Signature:

Compound value of series of payments

: $P \rightarrow$ principal amount

$$\text{Compound value (FV)} = P * (1+i)^n$$

$i \rightarrow$ rate of int

$n \rightarrow$ no. of yrs

- 1) calculate the future value of the following series of payments at the end of 4 yrs, rate of interest is 9% where
 $P_1 = \text{Rs. } 1500$ at end of 1st yr, $P_2 = \text{Rs. } 3000$ at end of 2nd yr
 $P_3 = \text{Rs. } 4500$ at end of 3rd yr, $P_4 = \text{Rs. } 6000$ at end of 4th yr

(Since given end of yr is invested so $n-1$ instead of n)

$$1^{\text{st}} \text{ yr} = 1500 * (1 + 0.09)^3 \quad \text{where } n = 4 - 1 = 3 \text{ yrs}$$

$$2^{\text{nd}} \text{ yr} = 3000 * (1 + 0.09)^2 \quad \text{where } n = 4 - 2 = 2 \text{ yrs}$$

$$= 3564.3$$

$$3^{\text{rd}} \text{ yr} = 4500 * (1.09)^1 \quad \text{where } n = 4 - 3 = 1 \text{ yr}$$

$$= 4905$$

$$4^{\text{th}} \text{ yr} = 6000 * (1.09)^0 \quad \text{where } n = 4 - 4 = 0 \text{ yrs}$$

$$= 6000$$

$$\text{Total} = 1942.5 + 3564.3 + 4905 + 6000 = 16411.8$$

Compound value of an annuity : equal cash flows made at regular intervals

$$\text{Fv of annuity} = A \times \left(\frac{(1+R)^n - 1}{R} \right)$$

$A \rightarrow$ constant periodic flow (or) Annuity amt

$R \rightarrow$ Rate of int

$n \rightarrow$ No. of yrs or Duration of the annuity.

- 1) calculate the maturity of an annuity if Rs. 20000 is paid annually for 7 yrs at 12% compounded annually.

$$FV = 20000 \times \left(\frac{(1+0.12)^7 - 1}{0.12} \right) = 2,01,780$$

- 2) Baby's Father wants to give her Rs. 2,50,000 on her 24th bday. Today is her 14th bday. He wants to know how much annual payments is to be made by him into a fund. The fund earns an interest of 8% which is compounded annually. (Rs. 1 for 10 yrs at 8% = 14.4866)

Given in ques annuity table value

Soln:

$$\text{Target amt} = 250000$$

$$\text{Dmt period} = 24 - 14 = 10 \text{ yrs}, \text{Rate of interest} = 8\%$$

$$\text{Annual payment} = 250000 \times \frac{1}{14.4866} = 17257$$

- 3) Anitha has deposited Rs. 150000 in fixed deposit for 6 yrs at 6%. compound rate of mt. How much can she withdraw each year to her no balance in the account at the end of 6th yr.

Given in ques C-V table \Rightarrow F-V of Rs. 1 for 6 yrs at 6% = 1.4185
 \hookrightarrow C-V of annuity of Rs. 1 for 6 yrs at 6%
 $= 6.9753$

$$\begin{aligned} \text{Compound value} &= 150000 \times 1.4185 \\ &= 212775 \end{aligned}$$

$$\text{Annual withdrawal} = 212775 \times \frac{1}{6.9753} = 30504$$

Teacher's Signature:

(X)

(8M)

(12M)

(X)

(X)

Present Value of cash flow

P.V technique / Discounting

Exams:

Year	Cash inflow	PVF (Present value factor) 16%.	PV
1	3000	0.862	2586
2	4500	0.743	3344
3	4000	0.641	3846
4	8000	0.552	4416
5	10000	0.476	4760
			<u>18952</u> → Total P.V of cash inflows

Find out the P.V of cash inflow

$$P.V = \text{Cash inflow} \times P.V.F$$

of cash inflow

Present value of annuity

Shalini has entered into an agreement ~~Rs. 60000 per annum~~
 for that will fetch her Rs. 60000 for next 4 yrs. She
 wants to know the present value of the future cash inflow
 at 20% discount rate. P.V of an annuity of Rs. 1 for
 4 yrs at the rate of 20% = 2.5887 → Given or not
 use $P.V \text{ of annuity} = \text{cash inflow} \times \frac{1}{(1+R)^n}$

For 4 each yr we have like $P.V \text{ of annuity} = 60000 \times \frac{1}{(1+0.2)^n}$
 for 1st yr

Then add amount : $n=4$

If given already
 to ques , P.V of annuity
 $= 60000 \times 2.5887 = 155322$

UNIT - 2

Page No. :
Expt. No. :

Assets
Real or Physical \rightarrow Plant & machinery
Financial \rightarrow shares, bonds, debentures

Diff form of security valuation: \times

- > Book value or historical value
- > Replacement value

> Intrinsic/Market value \Rightarrow Earning per share = $\frac{\text{Total amt of profit available for equity shareholders}}{\text{no. of equity shareholders}}$

Bond:
Corporate bonds \rightarrow debentures \rightarrow private company issuing debt instrument
Government bonds \rightarrow bonds

Features of a bond: \times 6M or 8M

- > long term debt instrument or security
- > rate of int is fixed \rightarrow redeemable bond \rightarrow payable after a period called maturity period.

Main features of bond \times 6M or 8M

> Face value \rightarrow par value 100 or 1000

e.g.: Company issues 90 instead of 100 discount 10% where 110M premium 10%

> Interest rate \rightarrow Coupon rate

> Maturity \rightarrow Redemption value

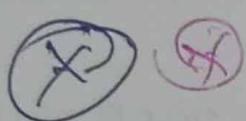
> Market value

Teacher's Signature:

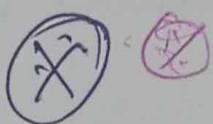
- Bond values & Yields :-
- Market value ↑ → sell or else
↑
buy debentures or bonds
1. Bonds with maturity → bond compared with PV of market whether is under or over valued
 2. Pure discount bonds
 3. Perpetual bonds

Terms in bonds:

Par value, Discount, Premium



CIA-F



Qno 2, 7, 9, 15, 17, 18, 19, 23 → UNIT - 1

Unit - 2 = 1, 2, 4, 5, . . . + prblms (Time value of money)

[2m - sum → Just calculate Interest]
[8m or 12m - sum → PV of cash flow]

Problems (Practice)

1) You invest Rs. 1000 for 3 yrs in a savings account that pay 10% interest per yr. Find out the interest & principal amount after 3 yrs.

$$CV = P(1+r)^n = 1000(1+0.1)^3$$

CV = 1331 Rs Interest is Rs 331 after 3 yrs

2) You deposit Rs. 1000 today in a bank which pay 10% interest compounded annually how much will the deposit grow to after 8 yrs & 12 yrs.

$$CV = 1000(1.1)^8 = 2147 \text{ Rs}$$

$$\begin{aligned} 8 \text{ yrs} \\ 12 \text{ yrs} = 1000(1.1)^{12} = 3138 \text{ Rs} \end{aligned}$$

CONSTRUCTION

Page No. :
Expt. No. :

3).

Calculate total P.V of cash flow

Year	Cash flow	PVF 12%	P.V
1	2000	0.893	1786
2	3000	0.797	2391
3	3000	0.712	2136
4	4000	0.636	2544
5	4000	0.567	2268
6	5000	0.507	2535
7	6000	0.452	2712
8	7000	0.404	2828

$$\text{Total P.V of cash flow} = \underline{\underline{\text{Rs. 19,200}}}$$

4)

You have decided to deposit Rs. 30000 per yr in your PFAC for 30 yrs what will be the accumulated Account in your Public Provident Fund (PPF), at the end of 30 years if the interest rate is 11%.

$$FV = 30000 \left(\frac{(1 + 0.11)^{20} - 1}{0.11} \right) \quad \begin{matrix} \text{F.V of annuity} \\ \text{Formula} \end{matrix}$$

$$= \text{Rs. } 59,70,626$$

5)

You want to buy a house after 5 yrs when it is expected to cost Rs. 2 million how much should save annually if your savings earn a compound return of 12%.

$$\text{Here FV} = 2000000$$

$$2000000 = A \times \left(\frac{(1 + 0.12)^5 - 1}{0.12} \right)$$

$$A = \text{Rs. } 3,14,819.46$$

Teacher's Signature:

(S18)

(S18)

Debenture valuation model

$V_d \rightarrow$ current val of debentures / bonds.

$$(\text{Value of Debentures}) \quad V_d = I(ADF) + F(DFF)$$

$I \rightarrow$ Interest payable on the bond / debentures

$ADF \rightarrow$ Annuity Discount Factor applicable to Interest

$F \rightarrow$ Face value of debentures

$DFF \rightarrow$ Appropriate Discount Factor applicable to Face value

A debenture of Rs. 100 carrying interest at 15% will become due for repayment after 5 years. The required rate of return of these debentures is 10%. calculate the current value of Debentures.

[Note : Always see the table for ADF & DFF

with req rate of return %.]

$$V_d = I(ADF) + F(DFF)$$

$$I = 15\%, F = 100, DFF = 0.621, ADF = 3.791$$

$$\text{of Face value} = \frac{15}{100} \times 100 = 15$$

$$V_d = 15(3.791) + 100(0.621)$$

$$= 118.965 \text{ or } 119$$

Also have a idea that If Fixed rate of int > Req rate of int
then \Rightarrow Bond value is high
else if is low.

2) Face value of debenture Rs. 1000 annual int rate 15%. Expected int rate 15%. Maturity period 5 yrs. calculate the value of debentures.

$$V_d = ? \quad I = 15\% \text{ of face value} = \frac{15}{100} \times 1000$$

$$\therefore I = 150 \quad ADFI = 3.352 \quad DFF = 0.497$$

$$V_d = 150 (3.352) + 1000 (0.497)$$

$$\therefore V_d = 999.8 \approx 1000$$

3) Face value of debentures Rs. 1000 Annual int rate 12%. Maturity period = 5 yrs. Expected int rate 15%.

$$I = 12\% \text{ of } 1000 = 120$$

$$V_d = 120 (3.352) + 1000 (0.497) = 899.24$$

4) Mr. A hold a debentures of Rs. 1000 carrying int rate of 12% per annum. The interest is payable half yearly on 30th June & 31st December. The debenture is payable at a premium of 10% after 8 years. The key rate of return is 16% per annum. calculate the val of debentures.

Note : For half yearly $\rightarrow I = I/2$ Quarterly $\therefore I/4$
 [If premium % is given Face value = face value + prem % of Face value]

$$\text{Face value} = 1000 + 10\% \text{ of } 1000 = 1000 + 100 = 1100$$

$$I = \frac{12}{100} \times 1000 \times \frac{6}{12} = \frac{120}{2} = 60$$

half yearly

Teacher's Signature:

$$ADFI = 8.851 \quad DFF = 0.292$$

$$V_d = 60(8.851) + 1100(0.292) =$$

Perpetual Debentures : ~~(Q)~~ 4m

$$\text{Value of debenture, } V_d = \frac{A}{i} \quad A \rightarrow \text{Annual int amt} \\ i \rightarrow \text{Expected rate of int}$$

Sums:

i) A debenture of Rs. 100 carrying int at 15%. will become due for repayment after 5 years. The required rate of return of this debenture is 10%. Calculate the current val of debentures.

The Annuity table (Already solved)

ii) A debenture holder is to receive an annual int of Rs. 100 for perpetual on his debenture of Rs. 1000. calculate the value of debenture if required rate of return i) 15% ii) 8% - iii) 10%.

$$A = \text{Rs. } 100 \quad i) i = 15\% \Rightarrow V_d = \frac{100}{0.15} = 666.66 = 667$$

$$ii) i = 8\% \quad V_d = \frac{100}{0.08} = 1250 \quad iii) V_d = \frac{100}{0.1} = 1000$$

Irredeemable Debentures:

$$\text{Yield of debenture, } Y_d = \frac{A_i}{Mpd} \times 100\% \quad A_i \rightarrow \text{Annual int} \\ Mpd \rightarrow \text{Market price of debentures}$$

i) calculate the yield of a debenture of Rs. 1000 having a current market value of Rs. 800 & carrying int at 10% per annum.

$$A_i = \text{Rs. } 1000 \times 10\% = \text{Rs. } 100, \quad Mpd = \text{Rs. } 800$$

$$Y_d = \frac{100}{800} = 0.125 \times 100 = 12.5\%$$

Redeemable Debentures :

Page No. :
Expt. No. :

$$P = \frac{A_i}{(1+r)} + \frac{A_i}{(1+r)^2} + \dots + \frac{A_i}{(1+r)^n} + \frac{M}{(1+r)^n}$$

*P = Market price of debentures | M = Face (or) Maturity value
 A_i = Annual mt in rs | n = no. of yrs left to maturity
 r = rate of mt*

not required

- 1) A company's debentures has a par value of Rs. 1000 carrying mt at 9% and maturity after 8 yrs. The current price of debt is Rs. 800. You are req to calculate yield to maturity on debenture.

$$\boxed{\text{Yield to Maturity } YTM = \frac{A_i + (F-P)/n}{(F+P)/2}}$$

$F \rightarrow \text{Face value}$
 $P \rightarrow \text{Market price}$
 $A_i \rightarrow \text{Annual mt amt}$

$A_i = 1000 \times 9\% = \text{Rs. } 90$
 $F = \text{Rs. } 1000, P = \text{Rs. } 800$
 $n = 8 \text{ yrs}$

$$\Rightarrow YTM = \frac{90 + (1000 - 800)/8}{1000 + 800/2}$$

$$= \frac{115}{900} = 12.70\%$$

- 1) Current Market price of a debt of X Ltd is Rs. 800 having a face value of Rs. 1200. The debt will be redeemed after 5 yrs. The debt carries mt rate of 12% per annum. Calculate Yield to Maturity on debt.

$$A_i = 1200 \times 12\% = 144 \text{ rs}, P = 800, n = 5 \text{ yrs}$$

$$YTM = \frac{144 + (1200 - 800)/5}{1200 + 800/2} = \frac{224}{1000} = 0.224 = 22.4\%$$

Teacher's Signature:

(Q) 4m or 6m (X) (X)

perpetual A Rs. 100 perpetual bond is currently selling for Rs. 95. The coupon rate of int. 13.5%. & appropriate discount rate is 15%. Calculate intrinsic value of bond if it is bought? what is its yield to maturity?

$$\text{Intrinsic value of Bond} = \frac{\text{Interest}}{k_d} \quad k_d \rightarrow \text{discount rate of debenture}$$

$$= \frac{13.5}{15} \times 100$$

$$= \text{Rs. } 95 > \text{Rs. } 90 \text{ (current value)}$$

so the bond is overvalued, thus not to be bought

$$YTM (\text{Yield to Maturity}) = \frac{\text{Interest} \times 100}{\text{Current value of Bond}}$$

$$= \frac{13.5}{95} \times 100 = 14.21\%$$

(Redeemable)

The current market price of debenture of X Ltd. Rs. 800 having a face value of Rs. 1000. The debentures will be redeemed after 5 yrs. Int. rate of 12% p-a - calculate YTM.

$$A_i = 1000 \times 12\% = 120 \text{ Rs}$$

$$YTM = \frac{A_i + (F - P)/n}{(F + P)/2} = \frac{120 + (1000 - 800)/5}{(1000 + 800)/2}$$

$$= \frac{120 + 40}{900} = 17\%$$

Page No. :
Expt. No. :

Preference shares → Fixed rate of return
irrespective of shares

(contingent) Redeemable \longleftrightarrow Irredeemable (without maturity)

Redeemable Pref shares :

Annuity \rightarrow For table values
 P \rightarrow P.V

Value of Redeemable Pref shares = P.V of dividends + r.v of maturity value

i) Calculate the value of Pref shares from the following info

Face value is Rs. 100, Dividend rate 10%, Current market rate 15%, Maturity period 10 yrs

Given Discount factor at 15% for annuity of Rs. 1 for 10 yrs = 5.019, Discount factor at 15% for P.V of Rs. 1 payable after 10 yrs = 0.247

$$\text{Value of pref shares} = \frac{10}{0.247} \times 5.019 + 100 \times 0.247$$

Irredeemable Pref shares :

$$V_p = D_p / Y_p \quad D_p \rightarrow \text{Dividend on a pref share}$$

$Y_p \rightarrow$ Yield on a pref share

i) A company issued irredeemable pref share of Rs. 100 carrying dividend rate of 10%. such type of prefer share now carry a dividend of 15%. calculate value of pref share

$$D_p = 100 \times 10\% = 10 \text{ Rs}, Y_p = 0.15$$

$$V_p = 10 / 0.15 = 66.67$$

Teacher's Signature:

Two methods of valuation
of Equity shares

Dividend capitalization approach
Earnings capitalization "

[Scans in whatsapp grp Images sent by me on Aug 27]
[Single valuation, Multi valuation in whatsapp grp]

Growth in Dividends :

(A) A company has a share capital of Rs. 500000. Company has a policy of retaining 60% of its earnings. Calculate growth rate in dividends if company earns 10% on its capital employed.

Soln : 1st year
Total earnings ($500000 \times 10\%$)

50000

30000

(-) Retained earnings 60%
 $50000 \times 60\%$

20000

Dividend distributed

2nd year

Total earnings on capital (53000)

53000

$50000 + 3000 \rightarrow$ (Rs. from 1st yr retained earnings)

(-) Retained earnings 60%
 $53000 \times 60\%$

31800

21200

$$\text{Growth in Dividends} = \frac{\text{Dividends in 2nd yr} - \text{Dividends in 1st yr}}{\text{Dividend in 1st yr}}$$

$$= \frac{21200 - 20000}{20000} = \frac{1200}{20000}$$

$$= 0.06 \times 100 = 6\%$$

nothing

~~Low~~

High Risk High Divid.



Page No. :

Expt. No. :

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

D_1 → Dividend at end of the year

P_0 → Current market price of equity share

k_e → capitalisation rate

g → growth rate in dividend

- 1) ABC Ltd expected to pay dividend at Rs. 40 per share. Dividends are expected to grow perpetually at 10%. Calculate the market val of share if capitalisation rate is 15%.

Soln: $P_0 = \frac{D_1}{k_e - g} = \frac{40}{(0.15 - 0.10)} = \text{Rs. } 800$

Variable Growth in dividend :

- (III 8.15) A company is expected to pay dividend of Rs. 4 per share after a year. If dividend (ques in whatsapp Aug 29)
- $$1.15 \Rightarrow (1+r) \quad r = 0.15 \text{ (given)}$$
- (PVF alone will be given)

Risk & UNCERTAINTY :

volatility - \uparrow volatile \uparrow Risk

No. of factors causing factor \rightarrow wrong method of investment
 \rightarrow wrong timing of investment \rightarrow Internal rate of risk

Risk : chance that an outcome or investment is original gains differ from expected outcome.

Types of Risk (4 m but only max 2 ½ m)

Based on external factors
eg: Govt policies

→ Systematic
 \downarrow
 > Uncontrollable by org
 > Macro in nature

→ Unsystemic
 \downarrow
 > Controllable by org
 > Micro in nature

Teacher's Signature:



Systematic risk: external factors

Types \Rightarrow a. Interest rates risk b. Market risk
c. Purchase power or inflationary risk

Unsystematic risk / unique risk / asset specific risk / diversifiable risk:

Internal factors

a. Business & liquidity risk b. Financial or credit risk

Total risk: c. operational risk

$$\boxed{\text{Total risk} = \text{systematic risk} + \text{unsystematic risk}}$$

- > standard deviation of returns is a measure of total risk.
> for diversified portfolio, $\text{Total risk} = \text{systematic risk}$

Risk - Return Relationship:

> greater risk chance of greater return

Portfolio Return: weighted avg of expected return

Portfolio Risk: " standard dev of return

> Capital Asset Pricing Model \rightarrow Provides Risk - Return Trade off
(CAPM)

Measurement of Risk:

1. Range analysis: High - Low
2. Probability Distribution
3. Standard deviation
4. Coefficient of variation: advanced method than std dev.
5. α & β

Portfolio Expected return

$$E(R_p) = \sum_{i=1}^n w_i E(R_i)$$

(X) 2m

$E(R_p) \rightarrow$ expected portfolio return

$w_i \rightarrow$ weight assigned to security i

$E(R_i) \rightarrow$ expected return on security i

$n \rightarrow$ no. of securities in portfolio

Sum: A portfolio consists of 4 securities with expected returns of 12%, 15%, 18%, 20%. The proportions of portfolio value invested in these securities are 0.2, 0.3, 0.3, 0.2. calculate expected portfolio return.

$$\begin{aligned} E(R_p) &= 0.2(12\%) + 0.3(15\%) + 0.3(18\%) + 0.2(20\%) \\ &= 16.3\% \end{aligned}$$

Standard dev as a measure of noise :

$$\sigma = \sqrt{\sum_{i=1}^n (R_i - \bar{R})^2 p_i}$$

$\bar{R} \rightarrow$ weighted avg.
 $\left[\bar{R} = \sum_{i=1}^n R_i \times p_i \right]$

Standard deviation \rightarrow measures the variation in actual return from the expected avg return.

$$SD, \sigma = \sqrt{\frac{\sum_{i=1}^N (x_i - \bar{x}_i)^2}{N}}$$

$x \rightarrow$ Actual return

$\bar{x} \rightarrow$ Avg return

$N \rightarrow$ No. of observations

> Sum (Illustration 7 in ppt) for above formula SD

Given Year 1 2 3 4 5 Return 50 70 80 100 90

$$SD = 17.20\%$$

Teacher's Signature:

(Q) Measurement of systematic Risk : (R) Dog gun

i) Correlation Method :

$$\beta = \frac{r_{im} \sigma_i \sigma_m}{\sigma_m^2}$$

$\beta \Rightarrow$ Beta or measurement of systematic risk

$r_{im} \Rightarrow$ Correlation coeff of returns of stock & returns of market index

$\sigma_i \Rightarrow$ std dev of return of stock i

$\sigma_m \Rightarrow$ std dev of return of market index

$\sigma_m^2 \Rightarrow$ variance of market returns

ii) Regression Method :

$$y = \alpha + \beta x_i$$

$y \rightarrow$ Dependent var
 $x_i \rightarrow$ independent var
 $\alpha \rightarrow$ alpha constant
 $\beta \rightarrow$ beta constant

This eqn is known as characteristic line

$$\alpha = \bar{Y} - \beta \bar{x}_i, \quad \beta = \frac{n \sum xy - (\sum x)(\sum y)}{n \sum x^2 - \sum (x)^2}$$

Ques. (Illustration 8) :

The return on individual security (R_i) & market return (R_m)

is given below :

(X) R_p	14	18	6	12	13	19	11	6	9	8	$\sum R_i = 111$	Mean $111/10 = 11.1$
(Y) R_m	16	20	9	8	10	9	11	18	17	15	$\sum R_m = 133$	$133/10 = 13.3$
$R_i \times R_m$	224	360	84	96	130	126	121	108	153	120	$\sum R_i \times R_m = 1492$	
R_i^2	196	324	36	144	169	196	121	36	81	64	$\sum R_i^2 = 1367$	

$$\sum (R_i)^2 = 111^2$$

$$R_f = R_p - 2.9$$

$$\beta = \frac{n \sum R_i * R_m - (\sum R_i)(\sum R_m)}{n \sum R_i^2 - \sum (R_i)^2}$$

$$= 10 * 1492 - 111 * 113 / 10 * 1367 - (111)^2$$

$$\beta = 0.1163$$

$$\alpha = 13.3 - (0.1163 \times 11.1)$$

$$\alpha = 9.55$$

Measure of risk std dev :

$$\sigma = \sqrt{\sum_{i=1}^n (R_i - \bar{R})^2 p_i} \quad \bar{R} \rightarrow \text{weighted avg}$$

$$\bar{R} = \sum_{i=1}^n R_i \times p_i$$

> (sum in ppt) Which proposal is best ?

(Q) Risk of two assets portfolio: (Q. Part-c)

$$(\text{std dev}) \sigma_p = \sqrt{\sigma_x^2 w_x^2 + \sigma_y^2 w_y^2 + 2 \sigma_x \sigma_y w_x w_y \times \text{corr}_{xy}}$$

Sum:

Securities M & N are equally risky, but they have different expected returns.

Expected return (r.)

M

16.00

N

24.00

Weight

0.5

0.5

Std dev (r.)

20.00

20.00

What is the portfolio risk (^{std dev} variance) if (a) $\text{corr}_{MN} = +1.0$,

b) $\text{corr}_{MN} = -1.0$ c) $\text{corr}_{MN} = 0.0$ d) $\text{corr}_{MN} = +0.10$
and e) $\text{corr}_{MN} = -0.10$?

Teacher's Signature:

a) Correlation is +ve, $\text{corr}_{mn} = +1.0$

$$\sigma_p = \sqrt{\sigma_x^2 w_x^2 + \sigma_y^2 w_y^2 + 2 \sigma_x \sigma_y w_x w_y} = \sigma_x w_x + \sigma_y w_y$$

$$\sigma_p = 20 \times 0.5 + 20 \times 0.5 = 20.0\%$$

b) Correlation is -ve, $\text{corr}_{mn} = -1.0$

$$\sigma_p = \sqrt{(20^2 \times 0.5^2) + (20^2 \times 0.5^2) + (2 \times 0.5 \times 0.5 \times 20 \times 20) \times -1.0}$$

Multiply the corr -ve value at last in the above formula

$$\sigma_p = \sqrt{100 + 100 - 200} = 0.0\%$$

c) Correlation is zero, $\text{corr}_{mn} = 0.0$

$$\sigma_p = \sqrt{\sigma_x^2 w_x^2 + \sigma_y^2 w_y^2}$$

$$\sigma_p = \sqrt{20^2 \times 0.5^2 + 20^2 \times 0.5^2} = \sqrt{200} = 14.14\%$$

d) $\text{corr}_{mn} = +0.10$

$$\sigma_p = \sqrt{20^2 \times 0.5^2 + 20^2 \times 0.5^2 + (2 \times 0.5 \times 0.5 \times 20 \times 20) \times 0.10}$$
$$= 14.83\%$$

e) $\text{corr}_{mn} = -0.10$

$$\sigma_p = \sqrt{20^2 \times 0.5^2 + 20^2 \times 0.5^2 + (2 \times 0.5 \times 0.5 \times 20 \times 20) \times -0.10}$$
$$= 13.42\%$$

Date :

in PPT
Prblm 4-1

Year

2003

2004

5

6

7

8

9

10

11

12

13

(X) : Part - 1

Page No. :
Expt. No. :Annual rate of return :

Year	DN per share	Closing share price	Annual Rate of return
2003	2.5	12.25	-
2004	2.5	14.2	$\frac{2.5 + (14.2 - 12.25)}{12.25} = 36.33\%$
5	2.5	17.5	$\frac{2.5 + (17.5 - 14.2)}{14.2} = 40.85\%$
6	3.0	16.75	$\frac{3.0 + (16.75 - 17.5)}{17.5} =$
7	3.0	18.45	
8	3.25	22.25	
9	3.5	23.50	
10	3.5	27.75	
11	3.5	25.5	
12	3.75	27.95	
13	3.75	31.30	

Calculate (Ques)

 $(\frac{\sum R_i}{n})$

i) Annual rate of return ii) expected (Avg) rate of return iii) var iv) std dev. of returns

$$\text{Variance} = \frac{1}{n-1} \sum_{i=1}^n (R_i - \bar{R})^2$$

$R_i \rightarrow$ Annual rate of return
 $\bar{R} \rightarrow$ Avg annual rate of return

$$\text{std dev} = \sqrt{\text{var}}$$

Teacher's Signature:

(CAP)

② Capital asset pricing model (CAPM) : ~~Red~~

③ Assumptions of CAPM ~~Red~~

- > Market efficiency \rightarrow Risk aversion & mean variance optimization
- > Homogeneous expectations \rightarrow Single time period
- > Risk free Rate.

Security Market Line : SML

> The risk-return relationship eqn :

$$E(R_j) = R_f + \left(\frac{E(R_m) - R_f}{\sigma_m^2} \right) (\text{cov}_{jm})$$

$$\Rightarrow E(R_j) = R_f + [E(R_m) - R_f] \beta_1$$

$E(R_m)$ - expected return on market portfolio
 R_f \rightarrow risk free rate of return
 β_1 \rightarrow undiversifiable risk of security j

Mistakes of CAPM :

- > Unrealistic assumptions
- > difficult to test & validate the theory

Problem 4.2 ~~Red~~

Expected return R_i if return & probability is given
& variance P_i

$$E(R_i) = \sum R_i \times P_i$$

$$\sigma^2 = \sum (R_i - E(R_i))^2 \times P_i$$

Leverage :

Master table to calculate the average
(Profitability statement)

Particulars

Amount (Rs.)

~~GA~~ ~~DT~~

Types of Leverage

~~DT~~ ~~FL~~

Operating

> Fixed costs
contribution

EBIT

Earnings before
Interest & Tax

Contribution = Sales - VC

Degree of operating leverage (DOL)

$\frac{\% \Delta \text{ in Profit or EPS}}{\% \Delta \text{ in sales}}$

$\frac{\% \Delta \text{ in EBIT}}{\% \Delta \text{ in sales}}$

Financial Leverage

$$= \frac{\text{EBIT}}{\text{EBT}}$$

$$DFL = \frac{\% \Delta \text{ in EPS}}{\% \Delta \text{ in EBIT}}$$

$$\text{or } \frac{\% \Delta \text{ in EBT}}{\% \Delta \text{ in EBIT}}$$

Combined leverage = Operating \times Financial

↓

$$= \frac{\text{Contribution}}{\text{EBIT}} \times \frac{\text{EBIT}}{\text{EBT}} = \boxed{\frac{\text{Contribution}}{\text{EBT}}}$$

$$DCL = \frac{\% \Delta \text{ in EBIT}}{\% \Delta \text{ in sales}} \times \frac{\% \Delta \text{ in EPS}}{\% \Delta \text{ in EBIT}} = \frac{\% \Delta \text{ in EPS}}{\% \Delta \text{ in sales}}$$

Teacher's Signature:

Part C

Calculate operating, financial & combined leverage.

Sales

X 400000

Y 800000

VC

X 160000

Y 240000

FC

X 128000

Y 280000

Interest

X 48000

Y 120000

Sales

X 400000

Y 800000

\rightarrow VC

$\frac{-160000}{}$

$\frac{-240000}{}$

contribution

X 240000

Y 560000

\rightarrow FC

$\frac{-128000}{}$

$\frac{-280000}{}$

EBIT

X 112000

Y 280000

\rightarrow Int

X 48000

Y 120000

EBT

X 64000

Y 160000

For X

$$OL = \frac{\text{contribution}}{\text{EBIT}} = \frac{240000}{112000} = 2.14 \text{ times}$$

For Y

$$OL = \frac{560000}{280000} = 2 \text{ times}$$

$$FL = \frac{\text{EBIT}}{\text{EBT}} = \frac{112000}{64000} = 1.75 \text{ times}$$

$$FL = \frac{280000}{160000} = 1.75 \text{ times}$$

$$CL = \frac{\text{Contribution}}{\text{EBT}} = \frac{240000}{64000} = 3.75 \text{ times}$$

$$CL = \frac{560000}{160000} = 3.5 \text{ times}$$

(Higher the leverage value higher the risk)

D
XX
 Part B
 QM

A firm sells its only product at Rs. 12 per unit. Its variable cost is Rs. 8 per unit. Present sales are 1000 units. Calculate operating leverage in each of the situations.

- When FC is Rs. 1000
- When FC is 1500 Rs.
- When FC is Rs. 1200

$$\text{Sales} = 12 \times 1000 = 12000$$

$$VC = 8 \times 1000 = 8000$$

	case i) (FC=1000)	case ii) (FC=1200)	case iii) (FC=1500)
sales	12000	12000	12000
- VC	8000	8000	8000
Contribution	4000	4000	4000
- FC	1000	1200	1500
EBIT or (operating profit)	3000	2800	2500
Operating leverage	$\frac{4000}{3000} = 1.33$ times	$\frac{4000}{2800} = 1.43$ times	$\frac{4000}{2500} = 1.6$ times (high risk)

2) X Ltd has a choice of following 3 financial plans

Particulars	Plan 1	Plan 2	Plan 3
Equity share capital	6,00,000	5,00,000	2,00,000
b.t - debentures	4,00,000	5,00,000	8,00,000
EBIT	2,50,000	2,50,000	2,50,000

Point out financial leverage in each case & comment

soln:	Plan I	Plan II	Plan III
EBIT	250000	250000	280000
→ Dmt on debt interest @ 10%.	(400000 x 10%) = 40000	(500000 x 10%) = 50000	(800000 x 10%) = 80000
EBT	210000	200000	170000
Financial Leverage	$\frac{250000}{210000}$ = 1.19 times	$\frac{250000}{200000}$ = 1.25 times	$\frac{280000}{170000}$ = 1.67 times (high risk)

∴ Degree of FL is higher in Plan III

Q) Calculate operating leverage, financial lever & combined lever from the following info :

O/P - 3,00,000 units FC - 3,50,000 $\frac{\text{unit}}{\text{VC}} - \text{Rs.} 1$ Int. expenses - Rs. 25000

Unit SP - Rs. 3

Profitability Stmt

$$\begin{aligned} \text{Sales} &= 3,00,000 \times 3 \\ &= 900000 \end{aligned}$$

$$\begin{aligned} \rightarrow \text{VC} &= 300,000 \times 1 \\ \text{Contribution} &= 300,000 \\ &= 600000 \end{aligned}$$

$$\begin{aligned} \rightarrow \text{FC} &= 350000 \\ \text{EBIT} &= 250000 \end{aligned}$$

$$\begin{aligned} \rightarrow \text{Dmt} &= 250000 \\ \text{EBT} &= 225000 \end{aligned}$$

OL = $\frac{\text{Contribution}}{\text{EBIT}}$

$$= \frac{600000}{250000} = 2.4 \text{ times}$$

$$FL = \frac{\text{EBIT}}{\text{EBT}} = \frac{250000}{225000} = 1.12 \text{ times}$$

$$CL = \frac{\text{Contribution}}{\text{EBT}} = \frac{600000}{225000}$$

$$= 2.67 \text{ times}$$

Part
~~(a)~~

4) A firm has sales of Rs. 15,00,000, VC - Rs. 900000, FC - Rs. 3,00,000. Debt of Rs. 8,00,000 at 8%. calculate DL, FL & CL. If the firm decides to double its EBIT how much of a raising sales would be needed on percentage basis?

Sales	1500000
- VC	<u>900000</u>
Contribution	600000
- FC	<u>300000</u>
EBIT	300000
- Int (800000 × 8%)	<u>64000</u> 286000
EBT	236000

$$DL = \frac{600000}{300000} = 2$$

$$FL = \frac{300000}{236000} = 1.27$$

$$CL = \frac{600000}{236000} = 2.54$$

ii) Required sales to double Profit(EBIT) = $\frac{FC + \text{Desired EBIT}}{\text{P/V ratio}}$

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

$$\text{Required sales to double EBIT} = \frac{300000 + (\uparrow 2 \times 300000)}{0.40}$$

$$\text{P/V ratio} = \frac{600000}{1500000} \times 100 = 40\%$$

$$\therefore \text{Required sales to double EBIT} = 22,50,000$$

$$\text{Increased sales} = 2250000 - 1500000 = 750000$$

$$\% \text{ Increase in sales} = \frac{750000}{1500000} \times 100 = 50\%$$

Teacher's Signature:

UNIT - 3

Cost of Capital :

> Capital structure - debt & equity

↳ equity, pref shares & debentures

↳ made by Financial Manager

Significance of cost of capital :

- evaluating investment decision
- designing a firm's debt policy
- appraising the financial performance of top management.

Concept of opportunity cost of capital :

Cost of Capital :

i) Cost of Long term Debt :

a) Cost of irredeemable debentures : $k(d) = I(1-t)/NP$

$$k(d) = \text{cost of debt after tax} \quad I = \text{Annual interest payment}$$

$$NP = \text{Net Proceeds (new issue)} \text{ or current Market Price (existing debt)}$$

$$t = \text{applicable tax rate}$$

(shown in ppt) ~~Ex 2m~~

b) cost of redeemable debt

case(i) : where only Int is tax deductible

$$k(d) = \frac{F(1-t) + (RV-NP)/n}{(RV+NP)/2}$$

RV - Redemption value
of debentures

n → remaining life of debentures

case ii) : when Discount / Premium is also tax deductible

$$k(d) = \frac{I + (RV - NVP)/n}{(RV + NVP)/2} \times (1 - t)$$

~~Case-II portion~~

preference stock valuation - cost of capital
sum in ppt ~~(K)~~ 2m used case (i) formula

~~(X)~~ Cost of long term Debt ~~(X)~~ This is given in Ques

Year	O/S	Int @ 8%.	Repayable Total O/F	Disc factor @ 6%	PV
1	5000	400	1000	0.9434	1320.75
2	4000	320	1000	0.8903	1174.80
3	2000	240	1000	0.8394	1041.11
4	2000	160	1000	0.7921	918.83
5	1000	80	1000	0.7473	807.09
					5262.55

Ques → MM sell 5yr bond of ₹ 5000 at 8% mt - bond
amortised equally over life . Calc bond's PV for an
investor if he expects a min rate of return of 6% ?

Cost of convertible debentures : debentures converted to equity shares

In sum,
Redemption value , RV = $10 \times 12 \times (1 + 0.05)^5$ \rightarrow no. of shares for each debenture \downarrow growth rate
 \downarrow current mp of equity shares each

Capital Budgeting :

Nature & features \rightarrow Investment decisions

\rightarrow Capital budgeting decisions

Features of investment decisions

Importance of Investment decisions

Types of Investment Decisions :

\rightarrow Expansion of existing or new business

\rightarrow Replacement & modernization

Other types \Rightarrow Mutually exclusive, Independent, Contingent

Investment evaluation criteria:

Investment Decision rule:

Evaluation criteria $(12m)$ sum of theory (P)

\hookrightarrow Discounted cash flow \hookrightarrow non Discounted cash flow

Discounting Criteria: Net Present value

i) NPV Method : $NPV = PV \text{ of inflows} - PV \text{ of outflows}$

Evaluation of NPV \Rightarrow Accept $NPV > 0$

Reject $NPV < 0$

May or
may not accept $NPV = 0$

Eg 8.1: Assume 2500 Rs now Cash inflows 900, 800,
700, 600, 500. Opportunity cost of capital 10%.

Calculate NPV.

$$NPV = \frac{C_1}{(1+k)^1} + \frac{C_2}{(1+k)^2} + \dots + \frac{C_n}{(1+k)^n} - C_0$$

$C_1, \dots, C_n \rightarrow$ inflows $C_0 \rightarrow$ outflows
 $k \rightarrow$ opportunity cost rate $n \rightarrow$ no. of years

$$NPV = \left(\frac{900}{(1+0.10)^1} + \frac{800}{(1+0.10)^2} + \frac{700}{(1+0.10)^3} + \frac{600}{(1+0.10)^4} + \frac{500}{(1+0.10)^5} \right) - 2500 = 225$$

ii) Profitability Index : = $\frac{\text{Total cash inflows}}{\text{Total cash outflows}}$
 $> 1 \text{ accept} | < 1 \text{ reject}$

iii) Internal Rate of Return

IRR = Higher Rate - $\frac{NPV \text{ of higher rate}}{NPV \text{ of lower rate}} * \text{Diff in rate}$
 Diff in cash flows (inflows)

Vice versa (instead of higher rate \Leftrightarrow lower rate)

iv) Pay Back Period :

i) cash flow constant, PBP = $\frac{\text{Initial Investment}}{\text{Inflow}}$

ii) Not constant PBP = completed, $\frac{\text{Reg. inflow}}{\text{Inflow of next year}} \times 12$

v) Accounting/Average Rate of Return :

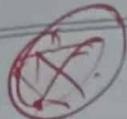
ARR on arg invest = $\frac{\text{Arg. Profit After Tax} \times 100}{\text{Arg. Invest}}$

ARR on initial invest = $\frac{\text{Arg. Profit After Tax} \times 100}{\text{Initial Invest}}$

Arg. Invest = Original Invest - ($\Delta cap/2$)

Teacher's Signature:

Problem:



ques

Year	1	2	3	4	5	outflow 100000
cash flow	20k	30k	40k	50k	70k	cost & cap 10%

$$\begin{aligned}
 a) NPV &= \frac{20000}{(1+0.1)^1} + \frac{30000}{(1+0.1)^2} + \frac{40000}{(1+0.1)^3} + \frac{50000}{(1+0.1)^4} + \frac{20000}{(1+0.1)^5} \\
 &\quad - 100000 \\
 &= 18181.82 + 24793.39 + 30052 + 34150 + 18627.7 = 125750
 \end{aligned}$$

(con)

In question will be given PVF @ 10%.

so	Year	Cash flows	PVF @ 10%	PV of cash inflows
	1	20000	0.909	18180
	2	30000	0.826	24780
	3	40000	0.751	30040
	4	50000	0.683	34150
	5	20000	0.620	18600

Total cashflow

125750

\rightarrow cash outflow

100000

NPV

25750

Profitability index (PI) = $\frac{\text{Net inflow}}{\text{Net outflow}}$

$$\frac{125750}{100000} = 1.2575$$

Higher Rate

computation

of IRR

lower rate

Year	Ashflow	PVF @ 19%	PV of cashflows	PVF @ 18%	PV of cashflows
1	20000	.84	16800	.847	16940
2	80000	.706	21180	.718	21540
3	40000	.593	23720	.609	24360
4	50000	.499	24950	.516	25800
5	30000	.42	12600	.437	13110
	Total cash flows		99250		101750
	\rightarrow cash outflows		100000		100000
	NPV		-750		+1750

Date :

Page No. :

Expt. No. :

$$IRR = \frac{\text{Higher Rate} - \frac{NPV \text{ of Higher rate}}{NPV \text{ of Lower rate}} \times \text{Diff in rate}}{\text{Diff b/w cash inflows of 2 rates}}$$

Higher rate = 19%. $NPV \text{ of Higher rate} = -750$

$Diff \text{ b/w cash inflows} = 99250 - 101750 = -2500$

$Diff \text{ in Rate} = 19 - 18 = 1$

$$\therefore IRR = 19 - \frac{-750}{-2500} \times 1 = 18.7\%$$

PBP

(Non-discounting)

Year	Cash flows
1	20000
2	30000
3	40000
4	50000
5	30000

Cumulative cash flow

20000

50000

90000

140000

170000

Cash outflow taken 100000
so completed

years is 3 yrs

$$PBP = \frac{\text{Completed yrs} + \left(\frac{\text{Reg inflow}}{\text{Inflow of next yr}} \times 12 \right)}{12}$$

→ Non day × 365

$$PBP = \frac{2 \left(100000 - 90000 \right)}{3 \left(50000 / 4 \text{ m yr} \right) \times 12} = \frac{5 \text{ yrs}}{3 \text{ yrs} \times 2 \text{ m}}$$

(Discounted)

Year	Cashflows	PVF @ 10%	PV of cashflow	Cumulative cashflow
1	20000	0.909	18180	18180
2	30000	0.826	24780	42960
3	40000	0.751	30040	73000 < 100000
4	50000	0.683	34150	107150
5	20000	0.620	12400	125750

$$PBP = \frac{2 + \frac{100000 - 73000}{36150} \times 12}{12} = 12.48 \text{ years}$$

$$PBP \text{ } (X) \text{ } 2m \quad PBP = \frac{\text{Initial Investment}}{\text{Cash Flow After Tax}}$$

Working result of 2 machines are given

	Mac X	Mac Y
Cost	45000	45000
Sales per year	100000	80000
Total cost per year (excluding depr)	36000	30000
expected life	2 yr	3 yr

Depreciation = $\frac{\text{Original cost} - (\text{scrap value})}{\text{expected life}}$
 Cost of capital [Q was absent]

Working Capital Estimation Part - B

Q1: Consider cost of goods sold = Sales - Gross profit
 or
 = opening stock + purchases - closing stock

In Q1 selling price Rs. 8 for 100000 units

$$\Rightarrow \text{Sales} = 800000$$

$$\text{Profit} \Rightarrow 25\% \text{ on sales} = 200000$$

$$\Rightarrow \text{cost of goods sold} = 800000 - 200000 = 600000$$

Working Capital = Current Assets - current Liabilities