INTRODUCTION

→ Objective of a business is to maximize the value of firm

↳ also maximize the value of share holders.

Financial Management Decision

- Financing decision
  - how much funding? (Fund raising)
    - debt fund
      - borrowed fund
        - (Bank loan)
        - (Issue of Debentures / Bonds)
        - (Issue of preference shares)
    - equity
      - investors
- Investment decision
- Dividend decision

equity → a long-term security yielding a fixed rate of interest, issued by a company and secured against assets.

Debentures / Bonds → a long-term security yielding a fixed rate of interest, issued by a company and secured against assets.

preference → a share which entitles the holder to a fixed dividend, whose payment takes priority over that of ordinary share dividends.

Equity

- Own savings
- Family & friends
- Angel investors
- Venture capital.

Venture capital (VC) is a form of private equity and a type of financing that investors provide to startup companies and small businesses that are believed to have long-term growth potential. Venture capital generally comes from well-off investors, investment banks, and any other financial institutions.

Investment decisions

- how to invest the funds & where to invest inorder to guarantee higher return.

Goals

- EPS (Earning per share)
  - $\boxed{\dfrac{\text{Profit (after taxes)}}{\text{total shares}}}$

Growth shares

- Shares whose price fluctuate a lot.

* TVM (Time value of Money)

→ Value of money today is more than value of money in future.

↳ Value of money / rupee received today is more valuable, so a rational investor / individual would prefer current receipts to future receipts.

↳ this is called Time Preference of Money.

→ Money received today has investment opportunity higher than money received in future.

⇒ Time Value of Money Techniques

Future Value (Compounding technique)

Present value (Discounting technique)

Future value

↳ what will be the value of money in future if invested today.

⇒ Future value of Single Amount (lumpsum)

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

present value → PV; interest → i; yrs → n

OR

$$\boxed{FV = PV \times FVIF}$$

FVIF → Future value of interest factor for single amount

⇒ Future value of Annuity

↳ Annuity is a stream of cashflows of equal amount at regular intervals.

→ When cashflow occurs at end of period, it is called **Deferred Annuity** and when CF occurs at beginning of period, it is called **Annuity Due**

End -> Deferred Annuity
Beginning -> Annuity Due

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→ Future Value of Deferred Annuity (End of Period)

$$FV = A\left[\frac{(i+1)^n - 1}{i}\right]$$

OR

$$FV = A \times FVIFA_{(i\%,\ n\,yrs)}$$

Future value of interest factor for annuity.

→ Future value of Annuity Due

$$FV = A\left[\frac{(i+1)^n - 1}{i}\right] \times (i+1)$$

OR

$$FV = A \times FVIAA_{(i\%,\ n\,yrs)} \times (i+1)$$

★ Doubling Period

↳ Shows how long will it take to double the investment at given rate of interest.

- Rule of 72

$$\boxed{n = \frac{72}{i}}$$

- Rule of 69

$$\boxed{n = \frac{69}{i}}$$

⇒ Rate of interest is to be taken in decimal.

Q-6.1 (Not mentioned anything, hence lumpsum)

$PV = 1000$

$n = 5$ yrs

(a) $8\% = i$

$\therefore i = 0.08$ ($\because$ in decimal)

$FV = PV \times (1+i)^n$

$= 1000 \times (1.08)^5$

$$\boxed{FV = 1469.328}$$

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OB

$FV = PV \times FVIF$

$= 1000 \times 1.469$

$\boxed{FV = 1.469}$

Q-6.2 $n = \frac{72}{i}$

$= \frac{72}{12}$

$\therefore \boxed{n = 6}$

Investment today = 5000

FV = 1,60,000

↓

The amount will grow to 1,60,000 in 30 yrs.

Q-6.4 Savings = 25000 per annum for 5 yrs & 3000 p.a for 10 yrs, thereafter

Total n = 15 yrs

i = 10%

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1000

2000 pa — 3000 pa

0 — 5 — 15

2000

$$FV = A\left[\frac{(i+1)^n - 1}{i}\right] + A\left[\frac{(i+1)^n - 1}{i}\right]$$

$$= 2000\left[\frac{(1.10)^{15} - 1}{0.10}\right] + 1000\left[\frac{(1.10)^{10} - 1}{0.10}\right]$$

$$= (2000 \times 31.772) + (1000 \times 15.937)$$

$$= \boxed{79481}$$

OR

$FV = 2000 \times FVIFA_{(10\%,\ 15yrs)} + 1000 \times FVIFA_{(10\%,\ 10yrs)}$

[CVFA]

Q 6.5

$FV = 10,00,000$

$n = 10$ yrs

$i = 12\%$

$A = ?$

$FV = A \times FVIFA_{(i\%,\ n\,yrs)}$

$\Rightarrow 10,00,000 = A \times \cancel{3.0106}\ 17.549$

$\cancel{A} = \boxed{56983} = A$

Q-6.6 $\quad \cancel{FV} = \cancel{PV}(1+\cancel{i})^n$

$\cancel{10000} = \cdot$

$FV = 10000$, $A = 1000$, $n = 6$ yrs

$\downarrow$

$FV = A \times FVIFA_{(i\%,\ 6\ yrs)}$

$\therefore 10 = FVIFA_{(i\%,\ 6\ yrs)}$

$\therefore \boxed{i = 21\%}$ or $\boxed{i = 20\%}$

$\downarrow$ 10.183 $\quad\quad$ $\downarrow$ 9.93

→ So actual rate will be between 21% & 20%

⇒ Using linear interpolation,

$$\boxed{I = \text{lower rate of return} + \text{difference btw two rates}\left[\frac{\text{val. req} - \text{value at lower rate}}{\text{Val at higher rate} - \text{value at lower rate}}\right]}$$

$\therefore \; i = 20 + 1 \left[\dfrac{10 - 9.930}{10.183 - 9.930} \right]$

$\boxed{i = 20.28\%}$

Q-6.7 FV = 5000

PV = 1000

n = 10 yrs

$FV = PV \times FVIF_{(i\%, 10)}$

$5 = FVIF_{(i\%, 10)}$

i = 17% & 18%

$\therefore \; i = 17 + 1 \left[\dfrac{5 - 4.807}{5.234 - 4.807} \right]$

$\boxed{i = 17.45\%}$

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★ Present value ~~&~~ for discounting technique

Present value of single amount (Clumpsum)

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

OR

$$PV = FV \times PVIF_{(i\%,\, n\ yrs)}$$

↳ Table C

Present value of annuity (Cdeferred)

$$\boxed{PV = A\left[\frac{(i+1)^n - 1}{i.(i+1)^n}\right]}$$

OR

$$PV = A \times PVIFA_{(i\%\, n\ yrs)}$$

★ Present value of annuity due

$$\boxed{PV = A \times \left[\frac{(1+i)^n - 1}{i(1+i)^n}\right] \times (1+i)}$$

OR

$$PV = \left[A \times PVIFA_{(i\%,\, n\ yrs)}\right] \times (1+i)$$

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* Present value of perpetuity
  ↓
  Infinite period

$$\boxed{PV = \frac{A}{i}}$$

* Present value of growing annuity
  ↳ here the amount of annuity will increase every year at a particular rate (growth rate)

$$\boxed{PV = A(1+g)\left[\frac{1 - \frac{(1+g)^n}{(1+i)^n}}{i - \underset{\text{growth rate}}{g}}\right]}$$

* Present value of uneven cashflows
  ↳ the amount of deposits / saving are changing every year.

$$\boxed{PV = \frac{A_1}{(1+i)^1} + \frac{A_2}{(1+i)^2} + \ldots \frac{A_n}{(1+i)^n}}$$

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6.8 $A = 10000$
$n = 8$

(i) $i = 10$

$$\therefore PV = \frac{10000}{(1.1)^8}$$

$$\boxed{PV = 4665.07}$$

6.9 $A = 2000$
$i = 10\% = 0.1$
$n = 5$ yrs

$$PV = n\left[\frac{(1+i)^n - 1}{i(1+i)^n}\right]$$

$$= 2000\left[\frac{(1.1)^5 - 1}{0.1(1.1)^5}\right]$$

$$\boxed{PV = 7582}$$

6.10 → Here the logic is that one cannot compare PV & FV

Alt-1 $PV = A \times PVIFA_{(15\%, 15 yrs)}$

$= 10,000 \times PVIFA$

$= 10,000 \times 5.847$

$\boxed{PV = 58470}$

→ ∴ Mr. Jingo should select Alt-1 as PV is higher than Alt-2

OR

Alt-1 $FV = A \times FVIFA_{(15\%, 15 yrs)}$

$= 10,000 \times 47.580$

$FV = 4,75,800$

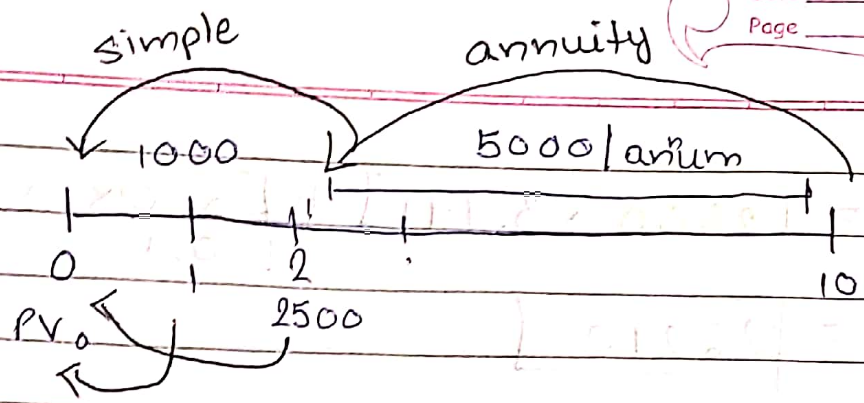
Alt-2 $FV = PV \times FVIF_{(15\%, 15 yrs)}$

$= 50000 \times 8.137$

$FV = 4,06,850$

∴ Alt-1 is better

6.12



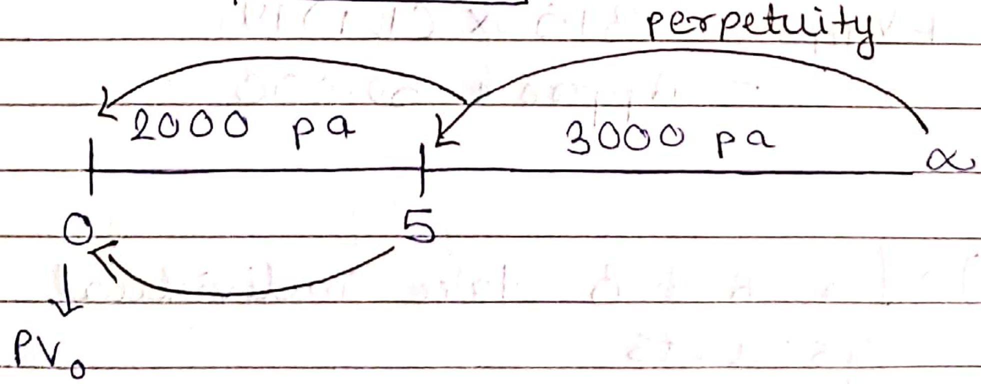
$$PV_0 = (1000 \times PVIF_{(12\%,\,1yr)}) + (2500 \times PVIF_{(12\%,\,2yr)}) + (5000 \times PVIFA_{(12\%,\,8y)} \times PVIF_{(12\%,\,2y)})$$

$$= [1000 \times 0.893] + [2500 \times 0.797] + [5000 \times 4.968 \times 0.797]$$

$$= \cancel{893}\ 22682.98$$

$$= \boxed{22683}$$

6.13

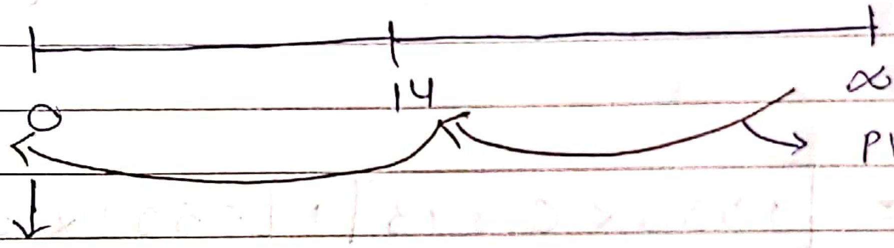


$$\therefore PV_0 = [2000 \times PVIFA_{(10\%,\,5yr)}] + \left[\frac{3000}{.10} \times PVIF_{(10\%,\,5yr)}\right]$$

$$= [2000 \times 3.791] + \left[\frac{3000 \times 0.621}{0.1}\right]$$

$$= \boxed{26212}$$

6.14 → First we have, cal PV of perpetuity which gives the P.V. @ the end of 14 yrs and then discount it to yr. 0



$$PV_{14} = \frac{A}{i}$$

$$= \frac{5000}{0.1}$$

$$= 50000$$

$$PV_0 = 50000 \times PVIF_{(10\%, 14y)}$$

$$\boxed{PV = 13150}$$

→ $FV_{14} = 13150 \times (1.1)^{14}$

= Approx 50,000

6.16 → For A & B take individual discounts

→ For C take annuity present value

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* Loan Amortization

6.40 $PV = 1,00,000$

$I = 9.5\% = 0.095$

$n = 5$ yrs

$\therefore PV = A\left[\frac{(i+1)^n - 1}{i(i+1)^n}\right]$

$100,000 = A\left[\frac{(1.095)^5 - 1}{0.095(1.095)^5}\right]$

$\therefore 100000 = 3.838A$

$\therefore A = 26054.48$

$\approx \boxed{26055}$

Loan Amortization schedule

① Yrs	② Opening amt	③ Install	④ Interest 9.5%	⑤ P [③-④]	⑥ Closing [②-⑤]
1	1,00,000	26055	9500	16555	83445
2	83445	26055	7927	18128	65317
3	65317	26055	6205	19850	45467
4	45467	26055	4319	21736	23731
5	23731	26055	2324	23731	0

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6.34 $A = 12\ cr$

$i = 12\% = 0.12$

$g = -3\% = -0.03$

i) If pipeline is used forever (perpetuity)

$$\boxed{PV = \frac{A}{i-g}} = \frac{120000000}{0.12-(-0.03)}$$

$$= 800000000$$

$$= 80\ cr$$

ii) If pipeline is scrapped after 25 yrs

$$\therefore \boxed{PV = A(1+g)\left[\frac{1 - \frac{(1+g)^n}{(1+i)^n}}{i-g}\right]}$$

$$= 12\ cr\ (1-0.03)\left[\frac{1 - \frac{(1-0.03)^{25}}{(1+0.12)^{25}}}{0.12-(-0.03)}\right]$$

$$= \boxed{75.468\ cr}$$

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(6.35) Number of barrels produced per year = 50000

growth rate = −5% = −0.05
barrel

Oil price = 50
growth for oil prices = 3% = 0.03

$n = 15$ yrs
$i = 10\% = 0.1$

→ PV of well's production

$$\therefore PV_0 = A(1+g)\left[\frac{1-\frac{(1+g)^n}{(1+i)^n}}{i-g}\right]$$

$$\boxed{g = (1-0.05)(1+0.03)-1}$$

$$= (0.95 \times 1.03) - 1$$

$$\boxed{g = -0.0215}$$

$$\therefore PV_0 = (50000 \times 50)(1-0.0215)\left[\frac{1-\frac{(1-0.0215)^{15}}{(1-0.1)^{15}}}{0.1-0.0215}\right]$$

$$= 24,46,250\left[\frac{0.827}{0.1215}\right] = \boxed{16651623.75}$$

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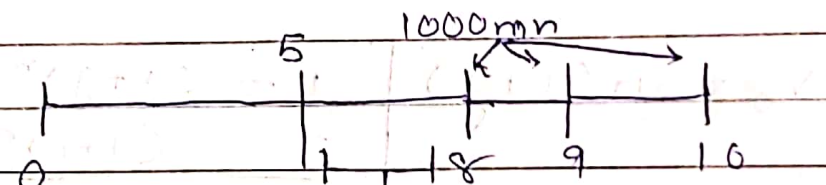
$$\Rightarrow \boxed{\text{Net } g = (1+g_1)(1+g_2) - 1}$$

★ Sinking fund

↳ term used by company, that need some fund at particular time, to make deposits and repay that time.

→ related with the concept of FV with annuity

(6.28)



→ Invest annually

→ no deposits

∴ ~~PV5~~

\# Part A → Discounted value of debentures to be redeemed / repaid b/w 8 to 10 yrs is calc at the end of 5th yr.

$$\therefore PV_5 = 1000\text{ mn} \times PVIF_{(8\%,\ 3yr)} \times PVIF_{(8\%,\ 4yr)} \times PVIF_{(8\%,\ 5yr)}$$

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$= 1000\text{mn} \times (0.794 + 0.735 + 0.681)$

$= 2.21 \times 1000$

$= \boxed{2210 \text{ mn}} = PV_5$

Now,

Part B → Annual deposit to be made in sinking fund from yr 0 to 5

$\therefore PV_5 = FV$

$\therefore FV = A \times FVIFA_{(8\%, n \text{ yrs})}$

$\therefore 2210 = A \times FVIF\ (8\%, 5 \text{ yrs})$

$\therefore 2210 = A \times 5.867$

$\therefore \boxed{A = 376.68 \text{ mn}}$

6.23 $FV = 50000$
$n = 10 \text{ yrs}$
$i = 12\% = 0.12$
$A = ?$

Begginning = annuity due

$\therefore FV = A \times FVIFA_{(12\%, 10 \text{yrs})} \times (1.12)$

$\therefore\ 50000 = A \times 17.549 \times 1.12$

$\therefore\ A = 2543.897$

$\boxed{A \approx 2544}$

* **Multi-period compounding**

* **Single Amount**

$$\boxed{FV = PV \times \left[1 + \frac{i}{m}\right]^{n \times m}}$$

m = no. of compounding

→ Semi-annually ⇒ m = 2
Quarterly ⇒ m = 4
monthly ⇒ m = 12
weekly ⇒ m = 52
daily ⇒ m = 365

* **Annuity**

$$\boxed{FV = A \left[\frac{\left(1 + \frac{i}{m}\right)^{n \times m} - 1}{\frac{i}{m}}\right]}$$

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* Effective Interest rate (EIR)

↳ shows how the compounding freq impacts the EIR

→ Effect of increasing the freq of compounding additional gains is in the form of interest

$$\boxed{EIR = \left[1 + \frac{i}{m}\right]^{m} - 1}$$

6.17 PV = 10000

$i = 16\% = 0.16$

$n = 5$ yrs

Quartely compounding ⇒ $m = 4$

$$\therefore \quad FV = PV\left(1 + \frac{i}{m}\right)^{n \times m}$$

$$= 10000\left(1 + \frac{0.16}{4}\right)^{5 \times 4}$$

$$= 10000\,(1.04)^{20}$$

$$= \boxed{21911.23}$$

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o Calc. EIR

$$EIR = \left(1 + \frac{i}{m}\right)^{m} - 1$$

$$= \left(1 + \frac{0.16}{4}\right)^{4} - 1$$

$\boxed{EIR = 0.16985}$ or 16.985%

$$FV = 10000 \times (1.16985)^{5}$$

$\boxed{FV = 21,911.23}$ → turns out to be same as calculated before.

6.18 $PV = 5000$
$i = 12\% = 0.12$
$m = 4$
$n = 5$

$$\therefore FV = PV\left(1 + \frac{i}{m}\right)^{n \times m}$$

$$= 5000\left(1 + \frac{0.12}{4}\right)^{20}$$

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$\therefore \boxed{FV = 9030.556}$ —— (1)

o Calculate EIR

$$EIR = \left(1 + \frac{i}{m}\right)^m - 1$$

$$= \left(1 + \frac{0.12}{4}\right)^4 - 1$$

$$\boxed{EIR = 0.1255}$$

$$FV = 5000 \times (1.1255)^5$$

$\therefore \boxed{FV = 9030}$ —— (2) (same as (1))

(6.19) A → 12.616 %
B → 26.248 %
C → 26.824 %

6.22 $PV = 10000$

$i = 10\% = 0.1$

$m = 2$

$n = 10$ yrs

$$FV = PV\left[1 + \frac{i}{m}\right]^{m \times n}$$

$$= 10000\left[1 + \frac{0.1}{2}\right]^{10 \times 2}$$

$$\boxed{FV_{10} = 26532.98}$$

→ Value of FV_{10} in terms of current rupee if inflation rate is 8%.

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

$$= \frac{26532.98}{(1.08)^{10}}$$

$$\boxed{PV = 12289.90}$$