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18/1 Assignment 2:

1. loan amt. = ₹20000
inst. = ₹427.9 pm arrears t = 5 years

Flat rate = total int / loan amt × term in yr.

$$= \frac{25674 - 20000}{20000 \times 5}$$

$$= \frac{5674}{100000} = \boxed{0.05674}$$

(i) APR = 2 × Flat rate

= 2 × 0.05674

= **0.11348**

(ii) inst = ₹274.49

loan o/s = ₹15156.5486

loan amt paid in yr 1 = ₹5138.4.8

Int component of yr 1 = ₹291.3485

Cap repaid = ₹4843.4514

same APR

$$\therefore \quad 0.11348 = 2 \times \frac{16469.4 - 15756.55}{15756.55 \times t}$$

$$\frac{0.11348 \times 15756.55}{2625.7} = \frac{1}{t}$$

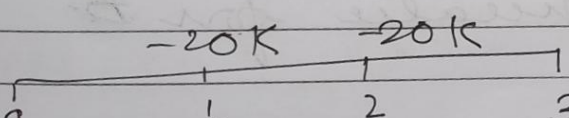
$$\boxed{t = 1.53 \text{ yrs}}$$

2. (i)(a) the time period when NPV turns negative i.e. intial outlay is recovered taking int into account.

(b) cumulative receipts > initial expenditure

(ii) shows difference between PV of inflow & PV of outflow. ~~Project~~ greater NPV will ~~give~~ & indicate a more profitable

Project A



-1.7L 20K 20K 2L

$$NPV_A = -170K + 10KV^2 + 200V^3 \quad @6\%$$

$$= \boxed{₹6822.85}$$

IRR = PV = 0

$0 = -170 + 10v^1 + 200v^3$

$IRR_A = \boxed{7.423\%}$

Project B

$NPV_B = -200k + 14K\, a_{\overline{6}|}^{(6\%)} + 200Kv^6$

$= \boxed{98\ 34.65}$

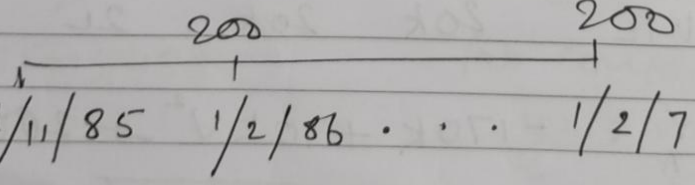
IRR = PV = 0

$0 = -200 + 14\, a_{\overline{6}|} + 200v^6$

$IRR_B = \boxed{7\%}$

(iii) B will be more ~~is better~~ as more profitable because ~~also~~ with similar IRR's NPV is much greater for B.

3.

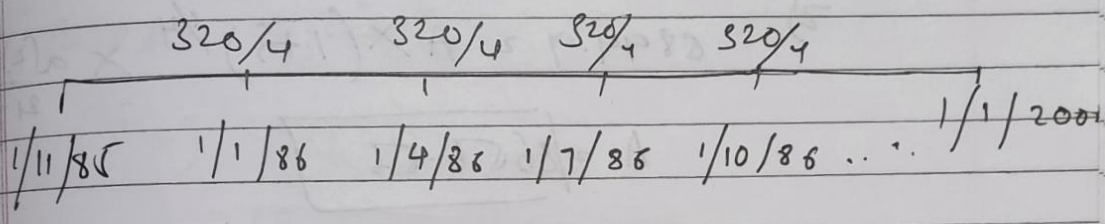


annuity 1

$\Rightarrow 200 \times v^{1/4} \times \ddot{a}_{\overline{27}|}$

$= \boxed{2161.36}$

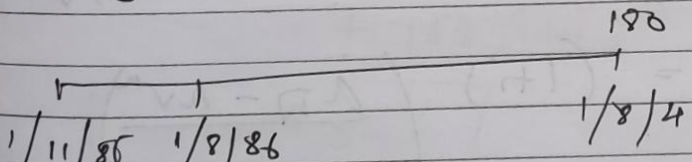
annuity 2



$\Rightarrow 320 \times (1+i)^{1/12} \times a^{(4)}_{\overline{16}|4}$

$= \boxed{£957.872}$

annuity 3



$\Rightarrow 180 \times a^{(12)}_{\overline{14.33}|}$ @ 8%

$= \boxed{£1780.665}$

Sum

2) $1780.67 + 2957.87 + 2161.36$

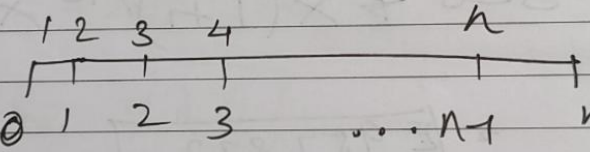
$= \boxed{£6899.9}$

~~new~~ new annuity

2) $6899.9 = A \times (1+i)^{1/4} \times a^{(2)}_{\overline{2}|}$

$A = \boxed{£656.56}$

4. $(\ddot{Ia})_{\overline{n}|}$



$PV = 1 + 2v + 3v^2 \cdots nv^{n-1}$

$= (1+i)\left(\frac{\ddot{a}_{\overline{n}|} - nv^n}{i}\right)$

$= \frac{\ddot{a}_{\overline{n}|} - nv^n}{i/1+i}$

$(\ddot{Ia})_{\overline{n}|} = \boxed{\frac{\ddot{a}_{\overline{n}|} - nv^n}{d}}$

5. (i) TWRR property

$(1+i) = \frac{16.4}{12.4}$

$i = \boxed{32.258\%}$

TWRR equity

$(+i) = 18.5$

$i^{[2]}_{[1]} = \boxed{24.099\%}$

(ii) (a) let 10 units per quarter

$124(1+i) + 131(1+i)^{3/4} + 148(1+i)^{1/2} + 158(1+i)^{1/4}$

$i = \boxed{29.32\%}$

(b) let ₹100 worth units

$\Rightarrow 400 \, s^{(4)}_{\overline{17}|i} \Rightarrow i = \boxed{29.79\%}$

(iii) let 10 unit

$$124(1+i') + 92(1+i')^{3/4} + 103(1+i')^{1/2} + 131(1+i')^{1/4} = 4 \times 152$$

$$\boxed{i = 67.31\%}$$

let ₹100 per quarter

$$400\, s^{(4)}_{\overline{1}|} \Rightarrow i' = \boxed{70.887\%}$$

6. $165000 = X\, a_{\overline{10}|}$ @ 8% pa

(i) $X = \boxed{23849.65}$

(ii) loan o/s after 4th payment

$$= 23849.65 \times a_{\overline{6}|}$$ @ 8% pa

$$= \boxed{110231.4325}$$

annual repayment

$$110231.4325 = Y \times a_{\overline{6}|}$$ @ 10%

$$Y = \boxed{25309.722}$$

(iii) loan o/s. after 7th payment

$= 25309.722 \times a_{\overline{3}|}$ @ 10%.

$= ₹ 62942.747$

$₹ 62942.747 = X \times a_{\overline{3}|}$ @ 10%

$X = ₹ 24865.779$

total repayment

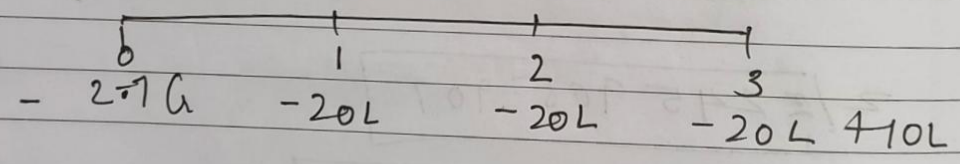
$= (4 \times 23844.65) + (3 \times 25309.722) + 3(24865.779)$

$= ₹ 245905.907$

$i = 4.3914\%$

7.

8.



NPV

$\Rightarrow -27G - 20L\, a_{\overline{3}|}^{@i} + 0.1v^3 + (0.25v + 0.2v^2 + 0.1v^3)\, a_{\overline{10}|}$

$i = \boxed{9.3\%}$

(ii) $0.1v^3 + 0.85\bar{a}_{\overline{10}|}v^8 - 2.7 - 0.2a_{\overline{8}|}$ @ $i = 10\%$

$= \boxed{1.0089}$

NAV is +ve ∴ profitable

9. (i) TWRR

$\Rightarrow (1+i)^5 = \frac{83}{80.5} \times \frac{58.65}{89} \times \frac{45.6}{41.05} \times \frac{47}{43.1}$

$\boxed{i = 7.0987\%}$

(ii) MWRR.

$\Rightarrow 47 = 30.5(1+i)^3 + 6(1+i)^{2.25} + 4.5(1+i)^{1.5} - 2.5(1+i)^{0.7}$

$\boxed{i = 7.206\%}$

TWRR takes time into acc. without completely depending on cashflows unlike MWRR which completely relies on cashflows.

10. loan = $180K \{ a_{\overline{15}|}^{@12\%} + 20K (Ia)_{\overline{15}|}$

$= \boxed{₹2040582}$

total ~~cost~~ = loan itself

$= 80\% \text{ of } TC + 20\% \text{ of } TC$

$\Rightarrow \boxed{2550727.5}$

loan o/s after time 8

$\Rightarrow 340000\, a_{\overline{7}|}^{@12\%} + 20000 (Ia)_{\overline{7}|}$

$= \boxed{1875852}$

yr	loan st.	~~expected~~ inst	int	cap.
9	1875852	360000	225102.24	134897.8
10	1740954	360000	208914.5	151085.49

loan o/s

9. 1740954

10. 1589869

11. TWRR

$$(1+i)^2 = \frac{500}{460} \times \frac{590}{540} \times \frac{X}{540}$$

$$(1.2)^2 = \frac{X}{540}$$

$$X = \boxed{655.78}$$

MWRR

$$460(1+i)^2 + 40(1+i)^{1.75} - 50(1+i) = 655.78$$

$$i = \boxed{19.8\%}$$

eff. i at 2015

$$460(1+i) + 40(1+i)^{0.75} = 600$$

$$i = \boxed{20.44\%}$$

i at 2016

$$(1+i) = \frac{655.78}{570} = 1.1923$$

TWRR

$$(1+i)^2 = 1.1923 \times 1.2044$$

$$i = \boxed{19.85\%}$$

12. DPP is taken when time value of money is accounted for through interest.

$$0 = -800(1+i)^{t} - 50(1+i)^{t-1} + 100\,\bar{s}_{\overline{t-1}|}$$

$$t = \boxed{17.767}$$

Acc. profit after 22 yr

$$\Rightarrow 100\,\bar{s}_{\overline{4.233}|}^{@\,6\%} = 480$$

$$\Rightarrow \boxed{₹\,488000}$$

$$\Rightarrow 1000\,\bar{s}_{\overline{n}|} = 102.971$$

$$-800(1+i)^{t} - 50(1+i)^{t-1} + 102.971\,s_{\overline{n}|}^{@\,7\%} \geq 0$$

$$t = \boxed{18\ \text{yr}}$$

$$AV_{22} = 462.79$$

$$\Rightarrow \boxed{₹\,462790}$$

13. $X\, a^{(12)@7\%}_{\overline{25}|} = 9880$

$X = 821.76$

per month ⇒ **68.48**

loan o/s after 10/3/29

⇒ $821.76 \times a^{(12)}_{\overline{11\frac{1}{3}}|} =$ **64800**

int ⇒ $821.76 - 576.20 =$ **305.56**

loan o/s 10/9/16

$821.76 \times a^{(12)}_{\overline{3\frac{1}{3}}|}$

loan o/s 10/10/16

$821.76 \times a^{(12)}_{\overline{13.75}|}$

= **26.86**

cap repayment

⇒ $821.76 \left(a^{(12)}_{\overline{7\frac{1}{3}}|} - a^{(12)}_{\overline{6\frac{1}{3}}|} \right)$

= **576.20**