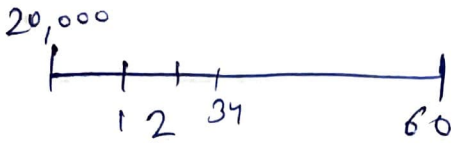
FM - Assignment

Roll No. 35

1)



$20,000 = 427.90\ a_{\overline{60}|}\ @\ i^{12}/_{12}$

$= \left(\frac{1-(1+i)^{-60}}{i}\right)$

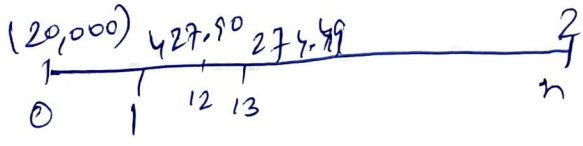
$46.738989 = \frac{1-(1+i)^{-60}}{i}$

$1+i = \left(1+\frac{i^{12}}{12}\right)^{12}$

$i = \frac{i^{12}}{12} = 0.8583\%$

$i^{12} = 10.2996\%$

$i = 10.79\%$



Capital left after 1yr $= 427.90\ a_{\overline{12}|}\ @\ 0.8583\%$

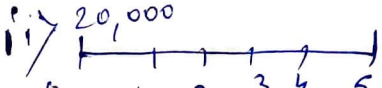
$= 427.90\left(\frac{1-1.008583^{-12}}{0.008583}\right)$

$= 427\ a_{\overline{12}|}\ @\ 0.008583$

$20,000 = 5134.8\ a_{\overline{1}|}\ @\ i$

$= 5134.8\left(\frac{1-1.1079^{-1}}{0.102996}\right)$

ii)



$20000(1.1079) = 5134.8\ s_{\overline{1}|}\ @\ 1.8\%$

$= 5134.8\left(\frac{1.108^{1}-1}{0.102996}\right)$

Capital left after 1year $= 5134.8\ a_{\overline{4}|}\ @ 1.8\%$

$= 16775.98$

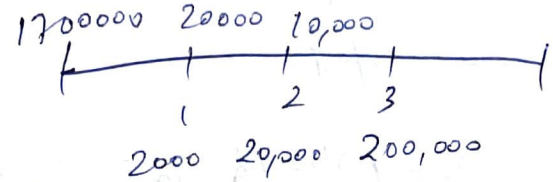
$16775.98 = 274.49\ a_{\overline{1}|}\ @ 10.8\% \times 12$

$16775.98 = 274.49 \times 12\left(\frac{1-(1.108)^{-t}}{0.102996}\right) = 0.4754 = (1.108)^{-t}$

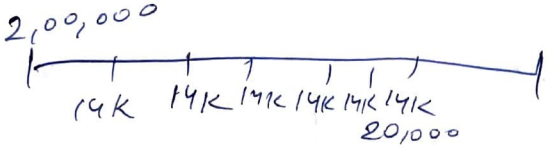
$t = 7.25yr$

iii) $12 \times 427.9 + 274.49 \times 48 = 18310.32$

2) a)



b)



a) $170000 = 20,000(1+i)^{-1} + 20000(1+i)^{-2} + 200,000(1+i)^{-3} - 20,000(1+i)^{-1} - 10,000(1+i)^{-2}$

$170000 = 10,000(1+i)^{-2} + 20,00,00(1+i)^{-3}$

$i = 0.07424 = 7.424\%$

b) $200000 = 14000\, a_{\overline{6}|}\ @ i\% = 14000\left(\frac{1-(1+i)^{-6}}{i}\right)$

$\frac{100}{7} = \frac{1-(1+i)^{-6}}{i} = 14.285714$

$7 - 7(1+i)^{-6} - 100i = 0$

$200000 = 14000\, a_{\overline{6}|}\ @ i\% + 200000(1+i)^{-6}$

$200 = 14\left(\frac{1-(1+i)^{-6}}{i}\right) + 200(1+i)^{-6}$

$200i = 14 - 14(1+i)^{-6} + 200i(1+i)^{-6}$

$i = 7\%$

2b) Project A

$-17,00,00 - 20,000(1.06)^{-1} - 10,000(1.06)^{-2} + 20,000(1.06)^{-1} + 20,000(1.06)^{-1} + 20,000(1.06)$

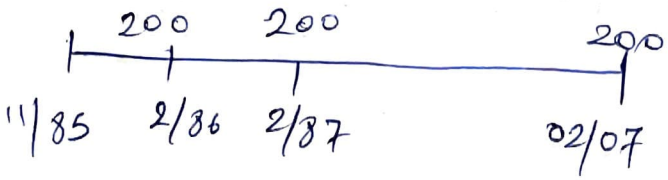
$= -170000 + 10,000(1.06)^{-2} + 20,00,00(1.06)^{-3}$

$= 6823.82$

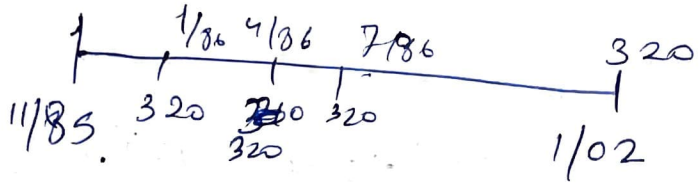
Project B, $-2000000 + 14000\, a_{\overline{6}|}\ @ 6\% + 2000000(1.06)^{-}$

$= 9834.65$

3)

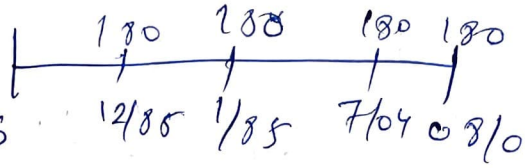


Annuity 1 = $200\,(v)^{1/4}\,(a^{\circ}_{\overline{22}|}\ @8\%) = 2161.363$



Annuity 2 = $320\,(1+i)^{1/12}\,(a^{(4)}_{\overline{16.25}|}\ @\ 8\%)$

$= 2957.872$



Annuity 3 = $180\,(a^{(12)}_{\overline{18.75}|}\ @\ 8\%) = 1780.665$

Total = 6899.90

$\therefore\ 6899.9 = A(1i)^{1/4}\,(a^{(2)}_{\overline{21.5}|}) \quad \therefore\ A = 656.56$

5i) $\text{TWRR} = \frac{16.4}{12.4} - 1 = 0.3226 = 32.26\%$

TWRR of equity fund $= \frac{15.5}{12.1} - 1 = 28.1\%$

ii) a) $1240(1i) + 1310(1i)^{3/4} + 1480(1i)^{1/2} + 1580(1i)^{1/4} = 4 \times 1640$

$i = 29.32\%$

b) $400 \times s^{\circ}_{\overline{1}|}{}^{(4)} = 100(16.4)\left(\frac{1}{12.4} + \frac{1}{13.1} + \frac{1}{14.9} + \frac{1}{15.8}\right)$

$s^{(4)}_{\overline{1}|} = 1.1801$

$i = 29.8\%$

iii) a) $121 = (1i) + 120(1i)^{3/4} + 1030(1i)^{1/2} + 1310(1i)^{1/4} = 4 \times 1550$

$i = 67.5\%$

b) $400 \times \ddot{s}^{(4)}_{\overline{7}|} = 100(15.8)\left(\frac{1}{12.1} + \frac{1}{9.2} + \frac{1}{10.3} + \frac{1}{13.1}\right)$

$\therefore \ddot{s}^{(4)}_{\overline{7}|} = 1.4135 \rightarrow = 70.98\%$

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6) i) $160000 = X\, a_{\overline{60}|}\ @\ 8\%$

$X = 23844.65$

ii) Loan o/s after 4th pay

$23844.65\,(a_{\overline{6}|}\ @\ 8\%) = 110231.44$

$\therefore Y a_{\overline{6}|} = 110231.44$

$Y = 25309.72$

iii) Loan o/s after 7th pay

$25309.72\,(a_{\overline{3}|}\ @ 10\%) = 62942.74$

$\therefore Z\, a_{\overline{3}|}\ @ 9\% = 62942.74$

$Z = 24869.77$

Yield $\Rightarrow$

$160000 + 1465\,(a_{\overline{4}|}) - 443.95\,(a_{\overline{7}|}) - 24865.77\,(a_{\overline{10}|}) = 0$

$i = 8.4\%$

7 i) $PV = 2.7 + 0.2\, a_{\overline{3}|}\ @\ i\% \quad -(i)$

$0.1v^3 + a_{\overline{10}|}\,(0.25v + 0.2v^2 + 0.1v^3)\ @\ i\% - (ii)$

$\therefore (i = ii) \quad i = 9.28\%$

ii) $0.1v^3 + 0.95\, a_{\overline{10}|} v^3$

$= (0.1v^3 + 0.185\, a_{\overline{10}|} v^3 - 2.3 - 6x2\, a_{\overline{3}|})$

$\therefore 4.19 - 3.19 = 1.0089$

as NPV is +ve, its good to invest thing

11) i) TWRR $\Rightarrow (1+i)^2 = \frac{506}{460}\left(\frac{586+50}{500+X}\right)\left(\frac{4}{550}\right) = 1.44$

$X = 655.78$

ii) MWRR $\Rightarrow 460(1+i)^2 + 40(1+i)^{7/4} - 50(1+i) = 655.78$

$MWRR = 19.85\%$

iii) $460(1+i) + 40(1+i)^{3/4} = 600$

$(1+i) = \frac{655.78}{550} = 1.192 \quad i = 20.445\%$

$\therefore$ LIRR $= (1+i)^2 = 1.9923(1-20.44\%) = 79.38\%$

12) i) a) DPP $\Rightarrow -800(1+i)^t - 50(1+i)^{t-1} + 100(s_{\overline{t-1}|} @ 7\%) = 0$

$t = 17.8yr$

b) AV $\Rightarrow 100(s_{\overline{4.235}|} @ 6\%) = 480$

$\therefore$ AV $= 480000$

ii) $i = 6\% \quad 100\, s_{\overline{7}|} = 102.97$

$\therefore$ DPP $\Rightarrow -800(1+i)^t - 50(1+i)^{t-1} + 102.97 s_{\overline{t-2}|} @ 7\% = 0$

$\therefore t = 18yr$

$\therefore$ AV $= 9.7714(1+i)^4 + 100 s_{\overline{4}|} @ 6\% = 462.79$

$A = 462.780$ Ans

73 i) $X\, a_{\overline{25}|}^{(12)} @ 7\% = 9880$

$X = 821.76$ $\quad \frac{X}{10} = 68.48$ $\quad = 6848$

ii) Loan o/s after 10/03/29

$X\, a_{\overline{34/3}|}^{(12)} @ 7\% = 648600$

iii) Loan o/s after 10/9/26 $\Rightarrow X\, a_{\overline{83/6}|}^{(12)} @ 7\%$

10/10) $\Rightarrow X\, a_{\overline{13.75}|}^{(12)} @ 7\%$

$\therefore$ Capital repaid $= X\left(\frac{v^{13.75} - v^{83/6}}{i^{(12)}}\right) @ 7\%$

$= 26.86$

iv) Capital repay continue in 12 installment is

$X\left(a_{\overline{22/3}|}^{(12)} - a_{\overline{19/3}|}^{(12)}\right) @ 7\% = 516.2$

Total int $= X - 516.2 = 305.86$

4) From the first principle

$$(I\ddot{a})_n = 1 + 2v + 3v^2 + 4v^3 + 3v^4 + \ldots + nv^{n-1} \quad @I$$

Multiplying both the sides by 'v'

$$V(I\ddot{a})_n = v + 2v^2 + 3v^3 + 4v^4 + 5v^5 + \ldots + nv^n$$

Subtracting

$$(1-v)(I\ddot{a})_n = 1 + v + v^2 + v^3 + v^4 + \ldots + v^{n-1} - nv^n$$

$$= (1-v^n)/(1-v) \ldots nv^n$$

$$d(I^{(1)}a)_n = {}^{(1)}a_n - nv^n$$

$$(I^{(1)}a_n) = \frac{{}^{(1)}a_n - nv^n}{d}$$ Hence Proved

9) (i) TWRR

$$(1+i)^3 = \frac{33}{30.50} \times \frac{(41.05-4.5)}{(33+6)} \times \frac{45.6}{41.05} \times \frac{47}{(45.6-2.50)}$$

$$(1+i)^3 = 1.228313$$

$$(1+i) = 1.070951$$

$$TWRR = 7.0951\%$$

MWRR

$$30.5 \times (1+i)^3 + 6 \times (1+i)^{2.25} + 4.5 \times (1+i)^{1.5} - 2.5 \times (1+i)^{0.5} = 47$$

At $i = 7\%$, LHS $= 46.76$

At $i = 7.5\%$, LHS $= 47.37$

By interpolation

$$MWRR = 7.206\%$$

(ii) ZRR

Year 2011 – equation of value

$30.5(1+i) + 6(1+i)^{0.25} = 38.80$

$i = 6\%$, LHS $= 38.42$

$i = 6.5\%$, LHS $= 38.87$

By interpolation, $i = 6.26\%$

Year 2012 – equation of value

$38.5(1+i) + 4.50(1+i)^{0.5} = 45$

$i = 4.5\%$, LHS $= 44.83$

$i = 5\%$, LHS $= 45.03$

By interpolation, $i = 4.92\%$

Year 2013 – equation of value

$45(1+i) - 2.50(1+i)^{0.5} = 42$

$i = 10\%$, LHS $= 46.88$

$i = 10.5\%$ LHS $= 47.097$

By interpolation, $i = 10.276\%$