F.M

Assignment 2

Q1) 1) Apr

$$20{,}000 = 12 \times 427.90\, a_5^{(12)}$$

$$a_5^{(12)} = 3.89499$$

$$\text{Flat rate} = \frac{5 \times 12 \times 427.90 - 20000}{20{,}000 \times 5}$$

$$= 5.67\%$$

Approx $Apr = 11\%$

$$A6i = 11\%\ a_5^{(12)} = 3.87872$$

$$Ati = 10\%\ a_5^{(12)} = 3.96154$$

$$\frac{i - 10\%}{3.89499 - 3.96154} = \frac{11\% - 10\%}{3.87872 - 3.96154}$$

$$i = 10.8\%$$

$$APR = 10.8\%$$

ii) APR = 10.8%

After 1 year capital left to pay

$= 12 \times 427.90 a_{\overline{48}|10.8\%}^{(12)}$

$= 16,775.8$

Let x denote the term of new loan

$16,775.98 = 12 \times 274.49 a_{\overline{x}|}^{(12)}$

$16775.98 = 3293.88 \dfrac{1 - 1.108^{-x}}{12 \times (1.108^{\frac{1}{12}} - 1)}$

$1.108^{-x} = 0.4754$

$x = 7.25$

$= 7.25$ years to pay the loan

iii) Interest for original loan

$= 4 \times 12 \times 427.90 - 16775.98$

$= 3763.22$

Interest for new loan

$= 7.25 \times 12 \times 274.49 - 16775.98$

$= 7104.65$

$7104.65 - 3763.22$

$= 3341.43$

Mr & Mrs Jones will pay INR 3341.43 more interest under the new loan

(8)

i) a) Discount payback period

The discounted payback period is a capital budgeting procedure used to determine the profitability of a project

b) Payback period refers to the time required to recoup the funds expanded in an investment.

ii)

Q3 Value at 1/11/1985

Annuity 1 $= 200 \times v^{(4)}_{\overline{22}|} \quad$ at 8%

$= 200 \times 0.980944 \times 11.01678$

$= 2161.363$

Annuity 2 $= 320 \times (1+i)^{\frac{1}{4}} \times a^{(4)}_{\overline{16.25}|}$

$= 320 \times 1.0064 \times 9.1842$

$= 2957.872$

Annuity 3 $= 180 \times a^{(12)}_{\overline{18.75}|}$

$= 180 \times 9.892583$

$= 1780.665$

Total $= 2161.363 + 2957.872 + 1780.665$

$= 6,899.96$

Revised Annuit = $x \times (1+i)^{4} \times a^{(2)}_{2|5}$

$x = \frac{6899-90}{1.019427 \times 10.30886}$

$= 656.56$

Revised Annuity = 656.56

Q4 $(I\ddot{a})_n = 1 + 2v + 3v^2 + 4v^3 + 5v^4 + \ldots + nv^{n-1}$

eqn 1

Multiplying v on both sides

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

Substraction

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

$(1-v)(I\ddot{a})_n = \frac{(1-v^n)}{(1-v)} - nv^n$

$d(I\ddot{a})_n = \ddot{a} - nv^n$

$(I\ddot{a})_n = \frac{\ddot{a}_n - nv^n}{d}$

∴ hence prooved

Qs i) TWRR for property fund

$$\frac{16.4 - 1}{12.4}$$

$$= 0.3226$$
$$= 32.26\%$$

TWRR for equity fund

$$\frac{15.5 - 1}{12.1}$$

$$= 0.2810$$
$$= 28.10\%$$

ii) a) Assumption = 100 units

$$1246(1+i) + 1310(1+i)^{3/4} + 1480(1+i)^{1/2} + 1586(1+i)^{1/4}$$

$$= 4640$$
$$= 5566$$

$$i = 0.8932$$

$$= 29.32\%$$

b) Assumed ~~100 unit~~ purchase of INR 100 made each quarter.

$$400 \times s_{\overline{4}|i}^{(4)} = 100 \times 16.4 \left(\frac{1}{11.4} + \frac{1}{13.1} + \frac{1}{14.18} + \frac{1}{15.8} \right)$$

$$s_{\overline{4}|i}^{(4)} = 1.1861$$

$$i = 0.2978$$

$$= 29.78\%$$

iii) a)

$$100(1+i) + 92(1+i)^{3/4} + 103(1+i)^{1/2} + 130(1+i)^{1/4} = 4 \times 155.6$$

$$i = 0.6731$$

$$= 67.31\%$$

b) $400 \times s_{\overline{4}|i}^{(4)} = 100 \times 15.5 \left(\frac{1}{12.1} + \frac{1}{9.2} + \frac{1}{10.3} + \frac{1}{13.1} \right)$

$$s_{\overline{4}|i}^{(4)} = 4.4735$$

$$i = 0.7088$$

$$= 70.88\%$$

Q6 i) $160,000 = X a_{10}$ at 8%

$X = \frac{160,000}{a_{10}}$

$= \frac{160,000}{6.710}$

$= 23,844.65$

ii) $23,844.65 a_{6}$ at 8%

$= 23,844.65 \times 4.6229$

$= 110,231.42$

Y = new instalment

$Y a_{6} = 110,231.442$ at 6%

$Y = \frac{110231.442}{a_{6}}$

$= \frac{110231.442}{4.3553}$

$= 25,309.72$

ii) $25,209.72 \text{ at } 6\%$

$= 25309.72 \times 2.4864$

$= 62.942.74$

a_2 = new instalment

$2a_2 = 62,942.74 \text{ at } 9\%$

$$2 - \frac{629.74^2}{a_3} = \frac{62942.74}{2.5313}$$

$= 24,865.77$

Q1. i) 1) There are large buying and selling expenses

2) The return on property may be lower, especially in short term

3) The maintainance cost of the property is high.

ii) a) Government may raise money by floating a loan or stock exchange. The terms of issue are set out by tender. The investors are invited to nominate the price that they are prepared to pay for the loan is issued to highest bidder

b) Advantages

1) Government knows the price that investor pays therefore it will know the cost of borrowing

Disadvantage
1) Government may not meet its finance requirment

c) 1) Equity - dividend varies according to companies performance

2) Property - Rent payments are subject to previ

3) Index-linked bond — find redemption price can increase

Q8 i) $2\cdot7 + 6\cdot2a_{\overline{3}|}$ @ i → present val

$0\cdot1v^3 + \bar{a}_{10|}(0\cdot25v + 0\cdot2v^{2}0\cdot1)^3$ @ i

↓

expected value at

Equating both sides

$2\cdot7 + 6\cdot2a_{\overline{3}|} = 0\cdot1v^3 + \bar{a}_{10|}(0\cdot25v + 0\cdot2v^{2}0\cdot1)^3$ @ i

$i = 9\cdot3\%$

ii) $0\cdot1v^3 + 0\cdot85\bar{a}_{10|}v^3$

$0\cdot1v^3 + 0\cdot85\bar{a}_{10|}v^3 - 2\cdot7 - 6\cdot2a_{\overline{3}|}$ @ $i = 1\%$

$0\cdot1\times0\cdot7513 + 0\cdot85\times6\cdot7513 + 6\cdot4463 - 2\cdot70 - 6\cdot2\times2\cdot4868$

$= 1\cdot19 - 3\cdot19$

$= -1\cdot0087$

As NPV is positive it is worth investing.

Q4 i) TWRR

$$(1+i)^3 = \frac{33}{30.56} \times \frac{41.05-45}{33+6} \times \frac{45.6}{41.85} +$$

$$\frac{47}{(45.62-56)}$$

$$(1+i)^3 = 1.81967 \times 0.95179 \times 1.1084 +$$

$$(1+i)^3 = 1.22833$$

$$1+i = \sqrt[3]{1.22833}$$

$$(1+i) = 1.07095$$

$$i = 1.07095 - 1$$

$$i = 7.095\%$$

MIORR

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

$$= 47.$$

i = 7% LHS = 46 = 7 4
i = 7.5% LHS = 47.3

MIRR = 7.2%

ii) Linked rate of return..

iii) TWRR eliminates the effect of the cashflow amount & timing and therefore gives a fairer basis for assisting investment performance.

Q10