# FM Assignment

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i) $d^4$ is 8% = 0.08

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

$$= 1 - \left(1 - \frac{0.08}{4}\right)^4$$

$$d = 0.07763184$$

$$i = \frac{d}{1-d} = 0.84165784$$

i) $\delta_z = \log(1 + 0.084165784)$

$\delta_z = 0.08081078$

$= 8.081078\%$

ii) $d_z = 0.084165784 = 8.4165784\%$

iii) $d^{12} = P\left[1 - (1-d)^{1/P}\right]$

$= 12\left[1 - (1 - 0.07763184)^{1/12}\right]$

$= 0.080539339$

$= 8.0539339\%$

2) $\delta(t)$

$= 0.004t + 0.0002t^2$

i) $1000\, e^{\int_0^{10} 0.004t + 0.002t^2\, dt}$

$= 1000 \cdot e^{-[0.004t^2/2 + 0.0002t^3/3]_0^{10}}$

$= 1000 \cdot e^{-[0.004(10)^2/2 + 0.0002(10)^3/3 - 0)]}$

$= 1000 \cdot e^{-[0.2 + 0.06666]}$

$= 1000 \cdot e^{-[0.26666]}$

$= 765.933446$

ii) $PV = 1000 \cdot V(0,10)$

$765.933446 = 1000 \cdot V(0,10)$

$V(0,10) = \frac{765.933446}{1000}$

$V(0,10) = 0.765933446$

~~$V(0,10) = 0.7659$~~

$\therefore 0.765933446 = \frac{1}{(1+i)^{10}}$

$1.305596469 = (1+i)^{10}$

~~$i = 0.027024719$~~

$\therefore i = 0.027024719$

3) ~~d = xxxi~~

$$d = \frac{i}{1+i} \quad \text{(i)}$$

(ii)

a) $\frac{d^4}{4} = 2.25\%$

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

$$d = 1 - \left(1 - 0.0225\right)^4$$

$$d = 0.087007806$$

$$d^2 = 2\left(1 - \left(1 - 0.87007806\right)^{1/2}\right)$$

$$d^2 = 0.088987499$$

b) $d = 1 - \left(1 - \frac{0.05}{1/2}\right)^{1/2} = 5.1316701$

$$d^2 = p\left[1 - (1 - 0.05131\,6201)^{1/p}\right] = \text{~~2(1-(~~}$$

$$= 5.1992506\%$$

(iii) $\frac{1}{(1+i)^{91/365}} = \left(1 - \frac{91\,d}{365}\right)$

$$d = \frac{365}{91}\left(1 - \frac{1}{(1.05)^{91/365}}\right)$$

$$= 0.048246619$$

$$= 4.8246619\%$$

4) i) d is the annual rate at which we discount the value of an investment to determine the present value of its future cash flows.

ii) $i = 0.08$

a) $d = \frac{i}{1+i} = 0.074074074$

$d^{12} = 12\left[1-(1-0.074074074)^{1/12}\right]$

$d^{12} = 7.671146776\ \%$

5) $i^{365} = \left[365(1+0.08)^{1/365} - 1\right]$

$i^{365} = 0.076969155$

c) $\delta = \log(1+i)$

$= \log(1+0.08)$

$= 0.076961041$

d) $i^{(0.5)} = 0.5\left[(1+0.08)^{1/0.5} - 1\right]$

$i^{(0.5)} = 8.321\ \%$

5) i) $d^4 = 6\%$

a) $i^2 = d = 1 - \left(1 - \frac{d^4}{4}\right)^4$

$d = 1 - \left(1 - \frac{0.06}{4}\right)^4$

$d = 5.86634469\%$

$i^2 = \frac{d}{(1-d)} = \frac{0.05866344 69}{1 - 0.05866344 69} =$

$= 6.23193361\%$

$i^2 = 2\left[(1 + 0.06231933 6)^{1/2} - 1\right]$

$i^2 = 6.13775351\%$

b) $d^{12} = 12\left[1 - (1 - 0.05866344 69)^{1/12}\right]$

$d^{12} = 0.660302524$

$d^{12} = 6.030252 4\%$

ii) $200000 \cdot AV(0,1) = 220000$

$AV(0,1) = \frac{220000}{200000}$

$\therefore AV(0,1) = 1.1$

$\therefore (1+i)^4 = 1.1$

$\therefore i = 0.1$

a) $200000 \times (1+0.1)^{93/365} = ₹\ 204916.3569$

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7) $26000 = 20000 \cdot A(0.17)$

$\therefore A(0.17) = \frac{26000}{20000}$

$\therefore A(0.17) = 1.3$

$\therefore (1+i)^{17/12} = 1.3$

$\therefore (1+i) = 1.3^{(12/17)}$

$\therefore i = 20.345706 71\%$

i) $i^4 = 4[(1+0.020345706)]^{1/4} - 1)$

$i^4 = 18.955254 5\%$

ii) $d = \frac{i}{1+i} = 0.169060511$

$d^2 = P\left(1 - \left(1 - \frac{dP}{P}\right)^P\right)$

$d^2 = 2(1-(1-0.16906051)^{1/2})$

$d^2 = 0.176882351$

iii) $i = 20.345706 71\%$

iv) $i > i^4 > d^2 > d$

12) C = Amount invested = 7049

$AV_6 = C \cdot A(0,6)$

$AV_6 = 7049 \times A(0,2) \times A(2,4.5) \times A(4.5,6)$

* $A(0,2)$

$i^{(12)} = 6\%$

$i^{(12)/12} = 0.5\%$

$A(0,2) = (1.005)^{24}$

$A(2,4.5)$

~~For every quarter~~

is quarterly $= 1.5\%$

$A(2,4.5) = (1 + 10(0.15)) = (1.15)$

$A(4.5,6)$

$d^{12} = 6\%$

$d^{(12)/12} = 0.5\%$

$A(4.5,6) = \dfrac{1}{(1-0.005)^{18}}$

$AV_6 = 7049 \times A(0,2) \times A(2,4.5) \times A(4.5,6)$

$AV_6 = 7049 \times (1.005)^{24} \times (1.15) \times \dfrac{1}{(1-0.005)^{18}}$

$\therefore AV_6 = 9999.894$

15) i) $x(1+0.10)^n = 2x$

$(1.10)^n = 2$

$\log(1.10)^n = \log 2$

$n \log(1.10) = 0.693147718$

$n \times 0.095310179 : 0.693147718$

$n = 0.693147718 \mid 0.095310179$

$n = 7.2754$

ii) $d^{12} = 10\%$

$d = 1 - \left(1 - \frac{d^{10}}{12}\right)^{12}$

$d = 1 - \left(\frac{0.10}{12}\right)^{12}$

$d = 0.095541699$

$x \,//\, (1 - 0.095541699)^n = 2x$

$\frac{1}{(1-0.095541699)^n} = 2$

$1x \,(1-0.095541699)^{-n} = 2$

$-n \quad \log(0.904458301) = \log 2$

$-n = \frac{0.693147718}{0.100419078}$

$n = 6.902544891$