Q.1 $d^{(4)} = 8\%$

$\frac{d^{(4)}}{4} = 2\%$

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

$$(1-0.02)^4 = 1-d$$

$$d = 1 - (1-0.02)^4$$

$$d = 0.07763184$$

$$i = \frac{d}{1-d} = 0.08416 5785$$

i) $\delta = \ln(1+i)$

$\delta = \ln(1.084165785)$

$\delta = 0.080810829$

$\delta = 8.0810829\%$

ii) $i = 0.084165785$

iii) $d^{(12)} = 12\left(1-(1-0.07763184)^{1/12}\right)$

$= 0.08053939$

Q. 2 $\delta(t) = 0.004t + 0.0002t^2$

$$PV = 1000 \times \frac{1}{e^{\int_0^{10} (0.04t + 10.0002t^2)\,dt}}$$

$$e^{\int_0^{10} (0.04t + 0.0002t^2)\,dt}$$

$$= e^{\left[\frac{0.04t^2}{2} + \frac{0.0002t^3}{3}\right]_0^{10}}$$

$$= e^{[0\ 4/15]}$$

$$PV = \frac{1000}{e^{4/15}} = 765.928$$

$AV(0,10) = 1000$

$AVO = 765.928$

$$A(0,10) = \frac{1000}{765.928}$$

$(1+i)^{10} = 1.3056057$

$i = 2.7025449\%$

Q.5 (i) $d^4 = 0.06$

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

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

$$d = 0.058663449$$
$$i = 0.062319315$$

a) $$\left(1 + \frac{i^{(2)}}{2}\right)^2 = (1+i)$$

$$i^2 = 0.061377516$$

b) $$d^{(12)} = 12\left(1 - (1-d)^{1/12}\right)$$
$$= 0.060307525$$

(ii)

$$15 \text{ April } 2005 \xrightarrow{\text{Amt } 200000} 17 \text{ June}$$

May June 63 days

$$1 + i = 1.1$$
$$i = .1$$

Amt paid $= 2{,}00{,}000 \times (1.1)^{\frac{63}{365}}$
$= ₹\ 203317.3715$

.12

0 —— 2 —— $4\frac{1}{2}$ years —— 6

$i^{(12)} = 6\%$ $2\ i^{(4)} = 1.5\%$ simple int $d^{(12)} = 6\%$

$$A(0,2) = \left(1 + \frac{i^{(12)}}{12}\right)^{12 \times 2}$$

$$= \left(1 + \frac{0.06}{12}\right)^{24}$$

$$= 1.127159776$$

$$A(2, 4.5) = (1 + 10(0.015))$$

$$= 1 + 0.15$$

$$= 1.15$$

$$\left(1 - \frac{d^{(12)}}{12}\right)^{12 + 6} = (1-d)^{1.5}$$

$$\left(1 - \frac{0.06}{12}\right)^{18} = (1-d)^{1.5}$$

$$0.913724886 = (1-d)^{1.5}$$

$$\frac{1}{(1-d)^{1.5}} = 1.09442132 5$$

$$AV = 7049 \times (1.127159776)(1.15)(1.09442132 5)$$

$$= 9999.893616$$

.13 $t = ?$

$\xleftrightarrow{i = 10\%}$

$AV = PV \times A(0,t)$

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

$2 = (1+i)^n$

$\log 2 = n \log(1.1)$

$$\frac{\log 2}{\log(1.1)} = n$$

$7.2725 = n$

(ii) $d^{(12)} = 10\% = 0.1$

$$\frac{d^{(12)}}{12} = \frac{0.1}{120}$$

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

$$\left(1 - \frac{1}{120}\right)^{12} - 1 = -d$$

$0.09554162 6 = d$

$$2\cancel{x} = \cancel{x} \times \frac{1}{(1-d)^n}$$

__/__/__

$$(1-d)^n = 0.5$$

$$(0.904458374)^n = 0.5$$

$$n \log(1-d) = \log 0.5$$

$$n = 6.90255 \text{ years}$$