

Assignment

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

$$\delta = \ln \left(\frac{1}{1-d} \right)$$

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

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

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

$$= 4 \ln \left(\frac{1}{0.98} \right)$$

$$= 0.080810$$

$$= 8.081082\%$$

$$= 8.081082\%$$

$$1+i = 1.084165$$

$$= 0.084165$$

$$i = 8.4165$$

ii) $d^{(12)}$

$$\left(1 - \frac{d^{(4)}}{4} \right)^4 = 1 - \frac{d^{(12)}}{12}$$

$$\left(1 - \frac{d^{(4)}}{4} \right)^{\frac{1}{3}} = 1 - \frac{d^{(12)}}{12}$$

$$(1 - 0.02)^{\frac{1}{3}} = 1 - \frac{d^{(12)}}{12}$$

$$\frac{d^{(12)}}{12} = 0.006711$$

$$d^{(12)} = 8.053933\%$$

ii) $d^{(4)} = 8\%$

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

$$1+i = \left(\frac{1}{1-0.02} \right)^4$$

$$3. \text{ i) } 1+i = \frac{1}{1-d} \quad \text{and} \quad 1-d = \frac{1}{1+i}$$

$$2d = \frac{1+i-i}{1+i} = ? \quad d = \frac{i}{1+i} = i \cdot \frac{1-i}{1+i} = i \cdot \frac{1-i}{2}$$

$$2d = 1.8 = 9$$

$$\text{ii) a) } d^{(4)} = 2.25 = 0.0225$$

$$d^{(2)} = ?$$

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

$$\left(1 - \frac{2.25}{4}\right)^4 = \left(1 - \frac{d^{(2)}}{2}\right)^2$$

$$(1 - 0.0225)^4 = 1 - \frac{d^{(2)}}{2}$$

$$\frac{d^{(2)}}{2} = 0.0449375$$

$$d^{(2)} = 0.0889875$$

$$\text{b) } d^{(1/2)} = 5\% = 0.05$$

$$d^{(2)} = ?$$

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

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

$$(1 - 0.1)^{\frac{1}{2}} = 1 - \frac{d^{(2)}}{2}$$

$$\frac{d^{(2)}}{2} = 1 - (0.9)^{\frac{1}{2}}$$

$$= 2 \times 0.26$$

$$= 0.05199$$

4) ii) a) $p = 0.08$, $d^{(12)} = ?$

$$\left(1 - \frac{d^{(12)}}{12}\right)^{12} = \frac{1}{1 + 0.08}$$

$$1 - \frac{d^{(12)}}{12} = \left(\frac{1}{1.08}\right)^{\frac{1}{12}}$$

$$= 0.9936$$

$$d^{(12)} = 0.07671 \text{ or } 7.671\%$$

b) $i^{(365)} = ?$ $i = 0.08$

$$\left(1 + \frac{i^{(365)}}{365}\right)^{365} = 1 + 0.08$$

$$\left(1 + \frac{i^{(365)}}{365}\right) = (1.08)^{\frac{1}{365}}$$

$$\frac{i^{(365)}}{365} = 1.0021 - 1 = 0.0021$$

$$i^{(365)} = 0.76650$$

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

$$= \ln(1 + 0.08)$$

$$= 0.07692$$

d) $i^{(0.5)} = ?$ $i = 0.08$

$$\left(1 + \frac{i^{(0.5)}}{0.5}\right)^{0.5} = (1 + 0.08)^{0.5}$$

$$\left(1 + \frac{i^{(0.5)}}{0.5}\right) = (1.08)^2$$

$$i^{(0.5)} = 0.1664 \times 0.5$$

$$= 0.0832$$

$$= 8.32\%$$

$$S.i) d^{(4)} = 6\%$$

$$a) p^{(2)} = ?$$

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

$$1 + \frac{i^{(2)}}{2} = \frac{1}{\left(\frac{1 - 0.06}{4}\right)^2}$$

$$1 + \frac{i^{(2)}}{2} = 1.030688768$$

$$\frac{i^{(2)}}{2} = 0.0306$$

$$i^{(2)} = 0.061377$$

$$i^{(2)} = 6.1377\%$$

$$b) d^{(12)} = ? \quad d^{(4)} = 6\%$$

$$\left(\frac{1 - d^{(4)}}{4}\right)^4 = \left(\frac{1 - d^{(12)}}{12}\right)^{12}$$

$$\left(\frac{1 - d^{(4)}}{4}\right)^{\frac{1}{3}} = 1 - d^{(12)}$$

$$\left(\frac{1 - 0.06}{4}\right)^{\frac{1}{3}} = 1 - \frac{d^{(12)}}{12}$$

$$d^{(12)} = 0.060302$$

$$= 6.03025\%$$

ii)

6. i) let the retail price be ~~of Rs 100~~ Rs 100

a) cash payment = 30% below

$$= 100 - \frac{30}{100} \times 100 = 100 - 30 = 70$$

b) six month credit = 25% below

$$\text{Payment after 6 months} = 100 - \frac{25}{100} \times 100$$

$$= 100 - 25 = 75$$

Therefore the ~~effective~~ effective rate of disc

$$70 = 75(1-d)^{0.5}$$

$$\frac{70}{75} = (1-d)^{0.5} \Rightarrow \left(\frac{70}{75}\right)^2 = (1-d)$$

$$d = 0.1288 \quad \text{or } 12.88\%$$

ii) $d^{(12)} = ?$

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

Raising both side

$$(1-0.1288)^{\frac{1}{12}} = \frac{1-d^{(12)}}{12}$$

$$d^{(12)} = 0.1371 \quad \text{or } 13.71\%$$

$$i^{(2)} = ?$$

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

$$1 + \frac{i^{(2)}}{2} = \left(\frac{1}{1-0.1288}\right)^{\frac{1}{2}}$$

$$\frac{i^{(2)}}{2} = 0.0714$$

$$2$$

$$i^{(2)} = 0.1428$$

14.285% per year

cost payment = 30% below

$$\delta = \ln(1 + i) - 100 = 100 - 30 = 70$$

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

monthly credit = 25% below

$$25 = \ln\left(\frac{1}{1-0.1288}\right)$$

$$25 = -0.13798$$

$$= 13.798\%$$

$$25 = 25(1-d)^{-2}$$