

**QUESTION 7 (50 MARKS)**

**Question 7 (a)**

$$P = \frac{F}{\left(1 + \frac{r}{100}\right)^n}$$

**Question 7 (c) (i)**

$$P = \frac{200}{(1.06)^7} = \text{€}133 \text{ million}$$

The exploration company **should sell in 2020** because you would need €133 million now to make this money. However, the multinational company is only offering you €120 million now.

**Question 7 (c) (iii)**

$$120 = \frac{200}{(1+i)^7}$$

$$(1+i)^7 = \frac{200}{120} = \frac{5}{3}$$

$$1+i = \left(\frac{5}{3}\right)^{\frac{1}{7}}$$

$$\therefore i = \left(\frac{5}{3}\right)^{\frac{1}{7}} - 1 = 0.076 = 7.6\%$$

**Question 7 (b)**

$$P = \frac{50\,000}{(1.03)^6} = \text{€}41\,874$$

**Question 7 (c) (ii)**

$$P = \frac{200}{(1.08)^7} = \text{€}116.7 \text{ million}$$

The exploration company should **take the offer now** because you would need €116.7 million now to make this money. However, the multinational company is offering you €120 million now.

**Question 7 (d) (i)**

$$P = \frac{3}{1.06} = \text{€}2.83 \text{ billion}$$

**Question 7 (d) (ii)**

Year	Reduction in Billions
1	3
2	3
3	3
4	3
5	3
6	2
7	2
8	2
9	2
10	2

$$\begin{aligned}
 P &= \frac{3}{1.06} + \frac{3}{1.06^2} + \frac{3}{1.06^3} + \frac{3}{1.06^4} + \frac{3}{1.06^5} + \frac{2}{1.06^6} + \frac{2}{1.06^7} + \frac{2}{1.06^8} + \frac{2}{1.06^9} + \frac{2}{1.06^{10}} \\
 &= \frac{3}{1.06} \left[ 1 + \frac{1}{1.06} + \frac{1}{1.06^2} + \frac{1}{1.06^3} + \frac{1}{1.06^4} \right] + \frac{2}{1.06^6} \left[ 1 + \frac{1}{1.06} + \frac{1}{1.06^2} + \frac{1}{1.06^3} + \frac{1}{1.06^4} \right] \\
 &= \left( \frac{3}{1.06} + \frac{2}{1.06^6} \right) \left[ 1 + \frac{1}{1.06} + \frac{1}{1.06^2} + \frac{1}{1.06^3} + \frac{1}{1.06^4} \right] \\
 &= \left( \frac{3}{1.06} + \frac{2}{1.06^6} \right) \left[ \frac{1 \left( 1 - \left( \frac{1}{1.06} \right)^5 \right)}{1 - \left( \frac{1}{1.06} \right)} \right] \\
 &= \text{€}18.9 \text{ billion}
 \end{aligned}$$