Grading Scheme

total : 10 pts

1. Exponential decay model.
   +1 +1

2. (a) +1

3. From graph: $t = 1 \rightsquigarrow P(1) = 120$

$$P(t) = P_0 e^{-kt}$$

$$120 = 180 e^{-k \times 1}$$ +2 pts

- Correct substitution of 120, 180 and 1
- If one of them is wrong: -1

$$\frac{2}{3} = \frac{120}{180} = e^{-k} \Rightarrow \ln \frac{2}{3} = -k$$

$$\Rightarrow k = -\ln \frac{2}{3} = \ln \frac{3}{2}$$ +1

$\Rightarrow$ Model : $P(t) = 180 e^{\ln \frac{2}{3} t}$ +1

(c)

- If sign of k is not correct
- Do not carry over a deducted point

4) $P(t) = 180\ e^{\ln\frac{2}{3}\,t}$

$t = 5 \Rightarrow P(5) = \dfrac{180\ e^{(\ln\frac{2}{3})\,5}}{} \quad +1$

$= \dfrac{180\ e^{\ln(\frac{2}{3})^5}}{} \quad +1$

$= 180 \cdot \left(\frac{2}{3}\right)^5$ ↔ The same

$= 180 \times \dfrac{2^5}{3^5}$ (b)

$+1$