

30.6

α) Ο χρόνος ημιζωής είναι ο t τέτοιος ώστε :

$$Q(t) = \frac{Q_0}{2} \Rightarrow Q_0 e^{ct} = \frac{Q_0}{2} \Rightarrow e^{ct} = \frac{1}{2} \stackrel{t=14}{\Rightarrow} e^{14c} = \frac{1}{2} \Rightarrow$$

$$\Rightarrow \ln e^{14c} = \ln \frac{1}{2} \Rightarrow 14c \ln e = -\ln 2 \Rightarrow c = -\frac{\ln 2}{14}$$

β) Έχουμε : $Q(7) = 50\sqrt{2} \Rightarrow Q_0 e^{c \cdot 7} = 50\sqrt{2} \Rightarrow$

$$\Rightarrow Q_0 = \frac{50 \cdot 2^{\frac{1}{2}}}{e^{-\frac{\ln 2}{14} \cdot 7}} = \frac{50 \cdot 2^{\frac{1}{2}}}{e^{-\frac{\ln 2}{2}}} = \frac{50 \cdot 2^{\frac{1}{2}}}{e^{\ln 2^{\frac{1}{2}}}} = \frac{50 \cdot 2^{\frac{1}{2}}}{2^{\frac{1}{2}}} = 50 \cdot 2 = 100$$