

PNI 1997 SUPPLETIVA - 3° quesito

$$n = 2 \cdot 10^{10} \text{ nuclei}$$

$$p = 10^{-10} \left\{ \begin{array}{l} \text{prob. che un nucleo decada} \\ \text{in un secondo} \end{array} \right\}$$

$$a) \mu = \lambda = p \cdot n = \boxed{2}$$

$$b) P(X=0) = \frac{\lambda^0}{0!} e^{-\lambda} = \boxed{e^{-2}}$$

$$P(X=1) = \frac{\lambda^1}{1!} e^{-\lambda} = \boxed{2 \cdot e^{-2}}$$

$$P(X=2) = \frac{\lambda^2}{2!} e^{-\lambda} = \boxed{2 \cdot e^{-2}}$$

$$P(X=3) = \frac{\lambda^3}{3!} e^{-\lambda} = \boxed{\frac{4}{3} e^{-2}}$$

$$P(X=4) = \frac{\lambda^4}{4!} e^{-\lambda} = \boxed{\frac{2}{3} e^{-2}}$$

$$c) P(X > 4) = 1 - [P(X=0) + P(X=1) + P(X=2) + P(X=3) + P(X=4)] =$$

$$= 1 - e^{-2} \left(1 + 2 + 2 + \frac{4}{3} + \frac{2}{3} \right) =$$

$$= \boxed{1 - 7 \cdot e^{-2}}$$