

ΠΑΝΕΛΛΗΝΙΕΣ ΕΞΕΤΑΣΕΙΣ 2012

ΦΥΣΙΚΗ Γ.Π.

Οι απαντήσεις των θεμάτων

ΘΕΜΑ Α

A1. γ

A2. δ

A3. γ

A4. 1 $\rightarrow \gamma$

2 $\rightarrow \delta$

3 $\rightarrow \beta$

4 $\rightarrow \alpha$

5 $\rightarrow \epsilon$

A5.

α. Λ

β. Λ

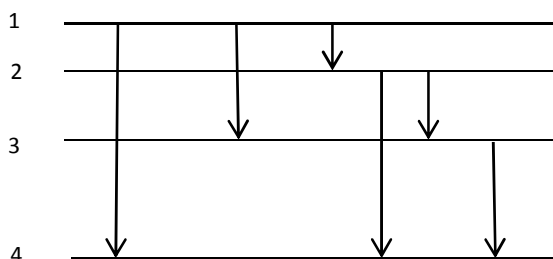
γ. Λ

δ. Σ

ε. Σ

ΘΕΜΑ Β

B1.



$$n_x = 4$$

Σωστό το β.

Γ3.

$$P = \frac{P_x}{\alpha} = 1000W$$

Ισχύς:

$$P = \frac{N \cdot e}{t} = \frac{P}{V} \Rightarrow \frac{N}{t} = \frac{P}{e \cdot v} = 5 \cdot 10^{17} \text{ ηλεκτρόνια/s}$$

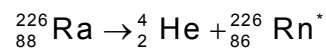
Γ4.

Από:

$$\pi = \frac{E_\phi}{E} = \frac{h \cdot f_\phi}{h \cdot f_{\max}} = \frac{f_\phi}{f_{\max}} = \frac{\frac{c}{\lambda_\phi}}{\frac{c}{\lambda_{\min}}} = \frac{4\lambda_{\min}}{c} = \frac{1}{4} \Rightarrow 25\%$$

ΘΕΜΑ Δ

Δ1.



Δ2.

$$\begin{aligned} Q &= (M_{\text{Ra}} - M_\alpha - M_{\text{Rn}}) \cdot c^2 \Rightarrow \\ \Rightarrow Q &= M_{\text{Ra}} \cdot c^2 - M_\alpha \cdot c^2 - M_{\text{Rn}} \cdot c^2 \Rightarrow \\ \Rightarrow Q &= 4,9\text{MeV} \end{aligned}$$

Δ3.

$$\begin{aligned} \text{Από (ΑΔΕ)} \Rightarrow K_{\alpha\gamma} &= M_{\text{τελ}} \\ \Rightarrow K_{\alpha\gamma} &= \frac{K \cdot q_\alpha \cdot q_{\text{Sn}}}{d_{\min}} \\ \Rightarrow K_{\alpha\gamma} &= \frac{9 \cdot 10^9 \cdot 2 \cdot 50 \cdot 1,6 \cdot 1,6 \cdot 10^{-38}}{3 \cdot 10^{-14}} \\ \Rightarrow K_{\alpha\gamma} &= 3 \cdot 2,56 \cdot 10^{-13} \text{ J} \quad \text{ή} \\ \Rightarrow K_{\alpha\gamma} &= 7,68 \cdot 10^{-13} \text{ J} \end{aligned}$$

Δ4.

Από :

$$\begin{aligned}Q &= K_{\alpha} + E_{Rn} \Rightarrow \\ \Rightarrow E_{Rn} &= 4,9\text{MeV} - 7,68 \cdot 10^{-13} \text{ J} \\ \Rightarrow E_{Rn} &= 4,9 \cdot 10^6 \text{MeV} - \frac{7,68 \cdot 10^{-13}}{1,6 \cdot 10^{-19}} \text{ eV} \\ \Rightarrow E_{Rn} &= 2,72 \cdot 10^4 \text{ eV}\end{aligned}$$

Αλλά:

$$\Rightarrow E_{Rn} = N \cdot E_{\text{ion}} = N \cdot |E_1| \Rightarrow N = \frac{E_{Rn}}{|E_1|} = \frac{2,72 \cdot 10^4}{13,6} \Rightarrow N = 2000 \text{ άτομα H}$$