

**ΑΠΟΛΥΤΗΡΙΕΣ ΕΞΕΤΑΣΕΙΣ ΤΗΣ Γ' ΛΥΚΕΙΟΥ  
ΦΥΣΙΚΗ ΓΕΝΙΚΗΣ ΠΑΙΔΕΙΑΣ**

ΟΙ ΑΠΑΝΤΗΣΕΙΣ ΤΩΝ ΘΕΜΑΤΩΝ ΑΠΟ ΤΟΝ ΚΑΘΗΓΗΤΗ

**Κύριο ΚΥΡΙΑΚΙΔΗ ΓΙΑΝΝΗ**

του ΦΡΟΝΤΙΣΤΗΡΙΟΥ



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**ΘΕΜΑ Α**

**A1.** (δ)

**A2.** (γ)

**A3.** (β)

**A4.** (α)

**A5.**  $\alpha \rightarrow \Sigma$ ,  $\beta \rightarrow \Sigma$ ,  $\gamma \rightarrow \Lambda$ ,  $\delta \rightarrow \Sigma$ ,  $\epsilon \rightarrow \Lambda$

**ΘΕΜΑ Β**

**B1. α)** (i)

**β)** Από το διάγραμμα:  $n_\alpha > n_\beta \Leftrightarrow \frac{C_o}{C_\alpha} > \frac{C_o}{C_\beta} \Leftrightarrow C_\alpha < C_\beta$  (1)

$$t_\alpha = \frac{d}{C_\alpha}, \quad t_\beta = \frac{d}{C_\beta} \stackrel{(1)}{\Rightarrow} t_\alpha > t_\beta$$

**B2. α)** (ii)

$$\beta) \frac{K_3}{K_1} = \frac{\kappa \cdot \frac{e^2}{2r_3}}{\kappa \cdot \frac{e^2}{2r_1}} = \frac{r_1}{r_3} = \frac{r_1}{9r_1} = \frac{1}{9}$$

$$\frac{L_3}{L_1} = \frac{3 \cdot \frac{h}{2\pi}}{1 \cdot \frac{h}{2\pi}} = 3$$

**B3. α) (ii)**

$$\beta) E_{Bx} = 200 \cdot 7,8 = 1560 \text{ MeV}$$

$$E_{By} = 120 \cdot 8,5 = 1020 \text{ MeV}$$

$$E_{B\Omega} = 80 \cdot x$$

$$\text{Άρα: } 164 = 1020 + 80x - 1560 \Leftrightarrow x = 8,8 \frac{\text{MeV}}{\text{νουκλεόνια}}$$

### ΘΕΜΑ Γ

$$\Gamma 1. E = hf = \frac{hc}{\lambda_1} \Rightarrow \lambda_1 = \frac{hc}{E} = \frac{6,6 \cdot 10^{-34} \cdot 3 \cdot 10^8}{15 \cdot 10^3 \cdot 1,6 \cdot 10^{-19}} \text{ m} \Rightarrow$$

$$\Rightarrow \boxed{\lambda_1 = 8,25 \cdot 10^{-11} \text{ m}}$$

$$\Gamma 2. \lambda_{\min} = \frac{\lambda_1}{3} \Rightarrow \frac{hc}{eV} = \frac{\lambda_1}{3} \Rightarrow V = \frac{3hc}{e \cdot \lambda_1} \Rightarrow$$

$$\Rightarrow V = \frac{3 \cdot 6,6 \cdot 10^{-34} \cdot 3 \cdot 10^8}{1,6 \cdot 10^{-19} \cdot 8,25 \cdot 10^{-11}} \Rightarrow \boxed{V = 45 \text{ kV}}$$

$$\Gamma 3. I = \frac{N \cdot |e|}{t} \Rightarrow I = 3,2 \cdot 10^{-2} \text{ A}$$

$$P = I \cdot V \Rightarrow \boxed{P = 1,44 \text{ kW}}$$

$$\Gamma 4. \quad eV' = \frac{1}{2}mv'^2 \Leftrightarrow eV' = \frac{1}{2}m\frac{v^2}{4} \Leftrightarrow V' = \frac{V}{4} \Rightarrow$$

$$\stackrel{r'=1}{\Rightarrow} P' = \frac{P}{4} \Rightarrow \boxed{P' = 0,36 \text{ kW}}$$

### ΘΕΜΑ Δ

$$\Delta 1. \quad \left. \begin{array}{l} U_n = -\kappa \frac{e^2}{r_n} \\ E_n = -\kappa \frac{e^2}{2r_n} \end{array} \right\} \Rightarrow E_n = \frac{U_n}{2} = -0,85 \text{ eV}$$

$$E_n = \frac{E_1}{n^2} \Rightarrow n^2 = \frac{E_1}{E_n} \Rightarrow \boxed{n = 4}$$

$$\Delta 2. \quad E_{\text{ΑΠΟΡΡΟΦΗΣΗΣ}} = E_4 - E_1 = 12,75 \text{ eV}$$

$$E_{\text{ΑΠΟΡΡΟΦΗΣΗΣ}} = 50\%K_{\text{αρχ}} \Rightarrow \boxed{K_{\text{αρχ}} = 25,5 \text{ eV}}$$

$$\Delta 3. \quad L_n = 2L_1 \Leftrightarrow n \frac{h}{2\pi} = 2 \frac{h}{2\pi} \Rightarrow \boxed{n = 2}$$

$$\frac{f_{\Lambda}}{f_{\text{B}}} = \frac{\frac{E_4 - E_2}{h}}{\frac{E_2 - E_1}{h}} = \frac{E_4 - E_2}{E_2 - E_1} = \frac{16}{4} = 4 \Rightarrow \boxed{\frac{f_{\Lambda}}{f_{\text{B}}} = \frac{1}{4}}$$

$$\Delta 4. \quad L_4 = 2L_2 \Leftrightarrow \cancel{m}v_4r_4 = 2\cancel{m}v_2r_2 \Rightarrow \frac{2\cancel{m}r_4^2}{T_4} = 2 \frac{2\cancel{m}r_2^2}{T_2} \Rightarrow$$

$$\Rightarrow \boxed{T_4 = 8T_2}$$