Φυσική γενικής παιδείας Γ΄ λυκείου 4/1/12

Ζ1.Α

1β, 2α, 3δ, 4δ

Β

α. Λ, β.Σ, γ.Λ, δ.Λ, ε.Λ

Ζ2.

1 $\mathrm{E}\varphi = |\Delta \mathrm{K}| = \frac{1}{4}\mathrm{K} \Rightarrow hc = \frac{1}{4}eV \Rightarrow \lambda = \frac{4hc}{eV} \Rightarrow \lambda = \lambda_{\min}$, *σωστό το γ*

2

$$F_K = F_C \Rightarrow \frac{mu^2}{r} = K\frac{e^2}{r^2} \Rightarrow u = \sqrt{\frac{Ke^2}{mr}}$$

$$\left.\begin{array}{l} u_2 = \sqrt{\frac{Ke^2}{mr_2}} \\ u_1 = \sqrt{\frac{Ke^2}{mr_1}} \\ r_2 = 4r_1 \end{array}\right\} \Rightarrow \frac{u_2}{u_1} = \frac{1}{2} \Rightarrow u_2 = \frac{u_1}{2},\ \sigma\omega\sigma\tau\acute{o}\ \tau o\ \gamma.$$

3

$\mathrm{H}\ \varepsilon\lambda\acute{\alpha}\chi\iota\sigma\tau\eta\ \mathrm{E}_{\delta\iota\acute{\varepsilon}\gamma\varepsilon\rho\sigma\eta\varsigma}\ \alpha\pi\acute{o}\ \tau\eta\ \theta\varepsilon\mu\varepsilon\lambda\iota\acute{\omega}\delta\eta\ \varepsilon\acute{\iota}\nu\alpha\iota\ \mathrm{E}_{\delta_{1\to 2}} = \mathrm{E}_2 - \mathrm{E}_1 = \frac{\mathrm{E}_1}{4} - \mathrm{E}_1 = 10,2eV$

$\mathrm{E}_\varphi = 3,4eV$, *άρα* $\mathrm{E}_\varphi < \mathrm{E}_{\delta_{\min}}$ *άρα δεν διεγείρεται κ το φωτόνιο δεν απορροφάται, σωστό το δ.*

4.

$$\left.\begin{array}{l} \mathrm{K} = \frac{1}{2}\mathrm{K}_{\eta\lambda}\frac{e^2}{r} \\ U = -\mathrm{K}_{\eta\lambda}\frac{e^2}{r} \\ E = -\frac{1}{2}\mathrm{K}\frac{e^2}{r} \end{array}\right\} \Rightarrow K = -E, U = 2E$$

$$\acute{\alpha}\rho\alpha\ \frac{U_2}{K_3} = 2\frac{E_2}{-E_3} = \frac{2\frac{E_1}{4}}{-\frac{E_1}{9}} = -\frac{9}{2},\ \sigma\omega\sigma\tau\acute{o}\ \tau o\ \alpha.$$

Z3

$$\alpha.\ \left.\begin{array}{l} \mathrm{E}\varphi = hf \\ f = \dfrac{c_o}{\lambda_o} \end{array}\right| \Rightarrow \mathrm{E}\varphi = \frac{hc}{\lambda_o} = 3\cdot 10^{-19} J$$

$$\beta.\ \overline{p} = \frac{E_{o\lambda}}{t} = \frac{N}{t} E\varphi = 10^{18}\cdot 3\cdot 10^{-19} = 0,3 watt$$

$\gamma.\Sigma\varepsilon\ \chi\rho\acute{o}\nu o\ \Delta t = \Delta t_1 + \Delta t_2 = 0,5\ \kappa\ \mu\acute{\varepsilon}\nu\varepsilon\iota\ \alpha\nu\alpha\mu\mu\acute{\varepsilon}\nu o\ \gamma\iota\alpha\ \Delta t_2 = 0,4s\ \acute{\eta}\ \Delta t_2 = \frac{4}{5}\Delta t$

$\acute{\alpha}\rho\alpha\ \sigma\varepsilon\ \chi\rho\acute{o}\nu o\ t = 5\sec \Rightarrow t_2 = \frac{4}{5}t \Rightarrow t_2 = 0,4s\ \alpha\nu\alpha\mu\mu\acute{\varepsilon}\nu o$

$\sigma\upsilon\nu\varepsilon\pi\acute{\omega}\varsigma\ \mathrm{E}o\lambda = \overline{p}\cdot t_2 = 1,2 joule$

$$\delta.\ \left.\begin{array}{l} \mathrm{N} = \dfrac{d}{\lambda} \\ \lambda = \dfrac{\lambda_0}{n} \end{array}\right\} \Rightarrow \mathrm{N} = \frac{d\cdot n}{\lambda_0} = \frac{1,1\cdot 10^{-2}\cdot 1,2}{6,6\cdot 10^{-7}} = 2\cdot 10^4\ \mu.\kappa$$

$$\left.\begin{array}{l} t = \dfrac{d}{c} \\ c = \dfrac{c_0}{n} \end{array}\right\} \Rightarrow t = \frac{d\cdot n}{c_0} = \frac{1,1\cdot 10^{-2}\cdot 1,2}{3\cdot 10^8} = 4,4\cdot 10^{-11}\sec$$

Z4.

$$a.\ K_{\Pi\Rho\Iota\Nu} = \mathrm{E}_{\delta_{1\to 4}} = \mathrm{E}_4 - \mathrm{E}_1 = \frac{\mathrm{E}_1}{16} - \mathrm{E}_1 = 12,75 eV$$

$$\beta.\ \mathrm{E}\varphi_{4\to 2} = \mathrm{E}_4 - \mathrm{E}_2 = \frac{\mathrm{E}_1}{16} - \frac{\mathrm{E}_1}{4} = 2,55 eV = 4,08\cdot 10^{-19} J$$

$$\mathrm{E}\varphi = \frac{hc_0}{\lambda_0} \Rightarrow \lambda_0 = \frac{hc_0}{\mathrm{E}\varphi} = 4,85\cdot 10^{-7} m = 485 nm\ o\rho\alpha\tau\acute{o}$$

$$\gamma.\ \frac{L_4}{L_2} = \frac{4\hbar}{2\hbar} = 2,\ \frac{K_4}{K_2} = \frac{-\mathrm{E}_4}{-\mathrm{E}_2} = \frac{\frac{\mathrm{E}_1}{16}}{\frac{\mathrm{E}_1}{4}} = \frac{1}{4}$$

$$\delta.\ \left.\begin{array}{l} \lambda' = \lambda_0 - \dfrac{20}{100}\lambda_0 \Rightarrow \lambda' = \dfrac{8}{10}\lambda_0 \\ n = \dfrac{\lambda_0}{\lambda} \end{array}\right\} \Rightarrow n = \frac{10}{8} = 1,25$$