

**ΦΥΣΙΚΗ ΓΕΝΙΚΗΣ
ΠΑΝΕΛΛΗΝΙΕΣ 2007
ΕΝΔΕΙΚΤΙΚΕΣ ΑΠΑΝΤΗΣΕΙΣ**

ΘΕΜΑ 1^ο

1. β
2. γ
3. γ
4. β
5. α. Λ β. Σ γ. Λ δ. Λ ε. Λ

ΘΕΜΑ 2^ο

1. γ. Αιτιολόγηση

$$\left. \begin{array}{l} \lambda_{\min 1} = \frac{h \cdot c}{eV} \\ \lambda_{\min 2} = \frac{h \cdot c}{e2V} \end{array} \right\} \Rightarrow \left. \begin{array}{l} \frac{\lambda_{\min 1}}{\lambda_{\min 2}} = 2 \\ c = \lambda \cdot f \Rightarrow \lambda = \frac{c}{f} \end{array} \right\} \Rightarrow \frac{c}{f_1} = 2 \Rightarrow \frac{f_2}{f_1} = 2 \Rightarrow f_1 = \frac{f_2}{2}$$

2. α. Αιτιολόγηση

$$\left. \begin{array}{l} T_A = 4T_B \\ T = \frac{\ln 2}{\lambda} \end{array} \right\} \Rightarrow \frac{\ln 2}{\lambda_A} = 4 \frac{\ln 2}{\lambda_B} \Rightarrow \lambda_B = 4\lambda_A \quad (1)$$

$$\left. \begin{array}{l} \left| \frac{\Delta N}{\Delta t} \right|_A = \lambda_A \cdot N_0 \\ \left| \frac{\Delta N}{\Delta t} \right|_B = \lambda_B \cdot N_0 \end{array} \right\} \Rightarrow \frac{\left| \frac{\Delta N}{\Delta t} \right|_A}{\left| \frac{\Delta N}{\Delta t} \right|_B} = \frac{\lambda_A}{\lambda_B} \stackrel{(1)}{\Rightarrow} \frac{\left| \frac{\Delta N}{\Delta t} \right|_A}{\left| \frac{\Delta N}{\Delta t} \right|_B} = \frac{\lambda_A}{4\lambda_A} \Rightarrow \left| \frac{\Delta N}{\Delta t} \right|_A = \frac{1}{4} \left| \frac{\Delta N}{\Delta t} \right|_B$$

3. β. Αιτιολόγηση

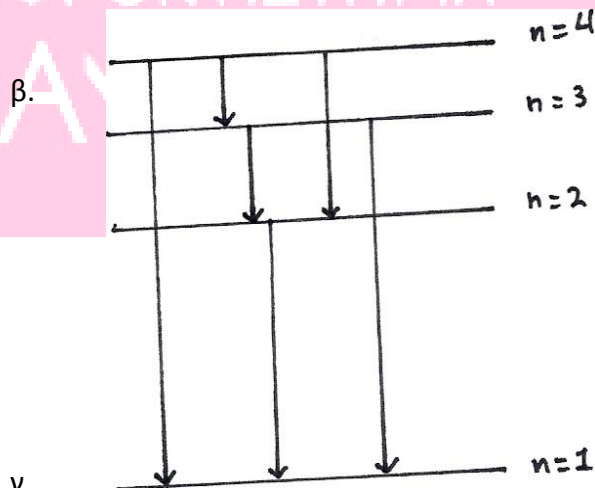
$$\left. \begin{array}{l} \frac{1}{2} = \frac{c_A \cdot t_A}{c_B \cdot t_B} \\ A: d = c_A \cdot t_A \\ B: 2d = c_B \cdot t_B \end{array} \right\} \Rightarrow n_A = \frac{\lambda_0}{\lambda_A} = \frac{c_0}{c_A} \Rightarrow c_A = \frac{\lambda_A \cdot c_0}{\lambda_0} \left. \begin{array}{l} \Rightarrow \frac{1}{2} = \frac{\frac{\lambda_A \cdot c_0}{\lambda_0} \cdot t_A}{\frac{\lambda_B \cdot c_0}{\lambda_0} \cdot t_B} \\ \Rightarrow \frac{1}{2} = \frac{\lambda_A \cdot t_A}{\lambda_B \cdot t_B} \\ \Rightarrow \lambda_A = \frac{\lambda_B}{2} \end{array} \right\} \Rightarrow$$

$$\Rightarrow \frac{1}{2} = \frac{\lambda_B \cdot t_A}{\lambda_B \cdot t_B} \Rightarrow t_A = t_B$$

ΘΕΜΑ 3^ο

α. $E_{\text{iov}} = E_{\infty} - E_n = 0,85 \Rightarrow 0 - E_n = 0,85 \Rightarrow E_n = -0,85 \text{ eV}$

αλλά: $E_n = \frac{E_1}{n^2} \Rightarrow n^2 = \frac{E_1}{E_n} = \frac{-13,6}{-0,85} \Rightarrow n = 4$

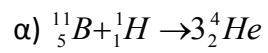


$$\frac{75}{100} K = E_4 - E_1 \Rightarrow K = \frac{100}{75} (-0,85 + 13,6) \Rightarrow K = 17 \text{ eV}$$

δ. $E_{1 \rightarrow 4} = E_4 - E_1 = 12,75 \text{ eV}$

$$E_{1 \rightarrow 4} = h \cdot f \Rightarrow f = \frac{E_{1 \rightarrow 4}}{h} = \frac{12,75}{4,25 \cdot 10^{-15}} = 3 \cdot 10^{15} \text{ Hz}$$

ΘΕΜΑ 4^ο



β) $Q = \Delta m \cdot c^2 = (M_B + M_H - 3M_a)c^2 \Rightarrow$
 $\Rightarrow Q = M_B \cdot c^2 + M_H \cdot c^2 - 3M_a c^2 = 10260 + 940 - 3 \cdot 3730$
 $\Rightarrow Q = 11200 - 11190 \Rightarrow Q = 10 \text{ MeV}$

γ) αφού $Q > 0$ άρα ΕΞΩΘΕΡΜΗ

δ) $K_{\text{τέλος}} = 2 \text{ MeV} + 10 \text{ MeV} = 12 \text{ MeV}$

ΦΡΟΝΤΙΣΤΗΡΙΑ

ΑΝΑΤΟΛΙΚΟ

