حل البنك المؤتمت لبحث الدارة المهتزة

متم الطالب المتفوق

D (1	D (2	C (3
B (4	A (5	C (6
B (7	B (8	C (9
B (10	C (11	D (12
A (13	D (14	

متم الطالب المتوسط

C (1	C (2	A (3
C (4	D (5	A (6
B (7	C (8	B (9
B (10	A (11	D (12
D (13	A (14	C (15
A (16	D (17	A (18
A (19	B (20	C (21
D (22	B (23	A (24
B (25		

متم الطالب الجيد

(1

$$I_{max} = \omega_0 q_{max} \quad ---(1)$$

$$\omega_0 = \frac{1}{\sqrt{LC}} = \frac{1}{\sqrt{10^{-2}\times 1\times 10^{-6}}} = \frac{1}{\sqrt{10^{-8}}} = 10^4 \ rad\,s^{-1}$$

$$q_{max} = C \times U_{max} = 1\times 10^{-6}\times 100 = 10^{-4}\ C$$

نتوضح ب (1):

$I_{max} = 10^4 \times 10^{-4} = 1\ A$ الجواب (B)

(2

$$E = \frac{1}{2} C U_{max}^2 = \frac{1}{2}\times 2\times 10^{-5}\times (6)^2$$

$E = 36\times 10^{-5}\ J$ الجواب (A)

(3

$$\omega_0 = \frac{1}{\sqrt{LC}} \Rightarrow \omega_0' = \frac{1}{\sqrt{L\times 2C}}$$

$$\omega_0' = \frac{1}{\sqrt{2}\sqrt{LC}} = \frac{\omega_0}{\sqrt{2}}$$ الجواب (C)

(4

$$T_0 = \frac{\lambda}{v} = 2\pi\sqrt{LC}$$

$$\frac{\lambda}{3\times 10^8} = 2\pi\sqrt{10^{-3}\times 10^{-12}}$$

$$\lambda = 3\times 10^8 \times 2\sqrt{\pi^2\times 10^{-15}}$$

$$\lambda = 6\times 10^8\sqrt{10^{-14}} = 6\times 10^8\times 10^{-7} = 60\ m$$

الجواب (B)

(5

$$T_0 = 2\pi\sqrt{LC}$$

$0.02 = 2\pi\sqrt{2\pi\times 10^{-3} C}$ نربع الطرفين

$4\times 10^{-4} = 40\times 2\pi\times 10^{-3} C \Rightarrow$

$$C = \frac{4\times 10^{-4}}{40\times 2\pi\times 10^{-3}} = \frac{10^{-4}}{2\pi\times 10^{-2}} = \frac{1}{200\pi}$$

$C = \frac{1}{200\pi}\ F$ الجواب D

(6

$$E = \frac{1}{2} C U_{max}^2 = \frac{1}{2}\times 20\times 10^{-6}\times (500)^2$$

$E = 10^{-5}\times 25\times 10^4 = 2.5\ J$

(9) $\omega_0 = \frac{1}{\sqrt{LC}} = \frac{1}{\sqrt{1\times10^{-6}\times10^{-8}}} = 10^{7}\ rad.s^{-1}$

الجواب (B)

(10) $U_{max} = \frac{q_{max}}{C} = \frac{10^{-4}}{10^{-6}} = 100\ V$

الجواب (B)

(11) $I_{max} = \omega_0 q_{max}$

$= 10^{5}\times10^{-6} = 0.1\ A$ الجواب (D)

(12) $L = \frac{10^{-7}\times\ell'^2}{\ell} \Rightarrow 10^{-3} = \frac{10^{-7}\times\ell'^2}{100\times10^{-2}}$

$\Rightarrow \ell'^2 = \frac{10^{-3}\times100\times10^{-2}}{10^{-7}} = 10^{4} \Rightarrow \ell' = 100\ m$

الجواب (B)

(13) $U_{max} = \frac{q_{max}}{C} = \frac{4\times10^{-4}}{4\times10^{-6}} = 100\ V$

الجواب (B)

(14) $E = \frac{1}{2}\frac{q_{max}^2}{C} = \frac{1}{2}\frac{16\times10^{-8}}{4\times10^{-6}}$

$E = 2\times10^{-2}\ J$ الجواب (C)

(15) $\ell' = 2\pi r \times N \Rightarrow N = \frac{\ell'}{2\pi r}$

$N = \frac{18}{2\pi\times2\times10^{-2}} = \frac{1800}{4\pi} = \frac{18\times32\pi}{4\pi}$

$N = 144$ لفة الجواب (C)

(16) $q_{max} = C\times U_{max}$

$= 10^{-12}\times10^{3} = 10^{-9}\ C$ الجواب (C)

(17) $q_{max} = C\times U_{max} = 10^{-12}\times10^{3} = 10^{-9}\ C$

$E = \frac{1}{2}\frac{q_{max}^2}{C} = \frac{1}{2}\frac{10^{-18}}{10^{-12}} = \frac{1}{2}\times10^{-6}\ J$

$= 5\times10^{-7}\ J$ الجواب (A)

قسم الطالب بالمنقوت

(1) $f_0 = \frac{1}{T_0} = \frac{1}{2\pi\sqrt{LC}} = \frac{1}{2\pi\sqrt{10^{-3}\times10^{-9}}}$

$f_0 = \frac{1}{2\pi\sqrt{10^{-12}}} = \frac{1}{2\pi\times10^{-6}} = \frac{1}{2\pi}\times10^{6}$

$f_0 = \frac{100\times10^{4}}{2\pi} = \frac{32\pi\times10^{4}}{2\pi} = 16\times10^{4}\ Hz$

الجواب (B)

(2) $f_0 = \frac{1}{2\pi\sqrt{LC}}$

$f_0' = \frac{1}{2\pi\sqrt{\frac{L}{8}\times2C}} = \frac{1}{2\pi\sqrt{\frac{1}{4}LC}}$

$f_0' = \frac{2}{2\pi\sqrt{LC}} = 2f_0$

الجواب (B) يزداد إلى مثليه

(3) $f_0 = \frac{1}{T_0} = \frac{1}{2\pi\sqrt{LC}}$ (1)

$C = \frac{q}{U} = \frac{0.4\times10^{-6}}{200} = 2\times10^{-9}\ F$

$L = 4\pi\times10^{-7}\frac{N^2}{\ell}S$

$N = \frac{\ell'}{2\pi r}$ ، $S = \pi r^2$ نعوض

$\Rightarrow L = 4\pi\times10^{-7}\frac{\frac{\ell'^2}{4\pi^2r^2}}{\frac{\ell}{1}}\pi r^2 \Rightarrow$

$L = \frac{10^{-7}\times\ell'^2}{\ell} = \frac{10^{-7}\times1600}{20\times10^{-2}}$

$L = 8\times10^{-4}\ H$ نعوضه بـ (1)

$f_0 = \frac{1}{2\pi\sqrt{8\times10^{-4}\times2\times10^{-9}}} = \frac{1}{8\pi\sqrt{10^{-13}}}$

$$f_0 = \frac{1}{8\sqrt{\pi^2 \times 10^{-13}}} = \frac{1}{8} \times 10^6 = 125 \times 10^3 \text{ Hz}$$

الجواب (c)

(4

$$f_0 = \frac{1}{T_0} = \frac{1}{2\pi\sqrt{LC}} = \frac{1}{2\pi\sqrt{10^6 \times 10^{-4}}}$$

$$f_0 = \frac{1}{2\pi} \times 10^4 = \frac{100 \times 100}{2\pi} = \frac{3.1}{2\pi} \times 100$$

$$= 1600 \text{ Hz}$$

الجواب (A)

(5

$$\omega_0 = \frac{1}{\sqrt{LC}} \Rightarrow 10^5 = \frac{1}{\sqrt{10^{-3} C}}$$

نربع الطرفين:

$$10^{10} = \frac{1}{10^{-3} C} \Rightarrow C = 10^{-7} \text{ f}$$

$$U = \frac{q}{C} = \frac{10^{-6}}{10^{-7}} = 10 \text{ V}$$

الجواب (B)

(6

$$\omega_0 = \frac{1}{\sqrt{LC}} = \frac{1}{\sqrt{10^{-2} \times 10^{-8} \times 10^{-6}}} = 10^8 \text{ rad.s}^{-1}$$

الجواب (A)

(7

$$T_0 = \frac{\lambda}{v} = 2\pi\sqrt{LC}$$

$$\frac{60}{3 \times 10^8} = 2\pi\sqrt{L \times 10^{-12}} \Rightarrow$$

نربع الطرفين

$$\frac{400}{16} = 40 \times L \times 10^{-12} \Rightarrow L = \frac{10^{-15}}{10^{-12}}$$

$$L = 10^{-3} \text{ H}$$

الجواب (C)

(8

$$I_{max} = \omega_0 q_{max} \quad \text{--- (1)}$$

$$\omega_0 = \frac{1}{\sqrt{LC}} = \frac{1}{\sqrt{10^{-4} \times 4 \times 10^{-6}}} = \frac{1}{2} \times 10^5 \text{ rad.s}^{-1}$$

$$\Rightarrow I_{max} = \frac{1}{2} \times 10^5 \times 4 \times 10^{-4} = 20 \text{ A}$$

الجواب (D)

(9

$$q_{max} = C U_{max}$$

$$= 10^{-8} \times 10^2 = 10^{-6} \text{ C}$$

$$\omega_0 = \frac{1}{\sqrt{LC}} = \frac{1}{\sqrt{10^{-4} \times 10^{-8}}} = 10^6 \text{ rad.s}^{-1}$$

$$I_{max} = \omega_0 q_{max} = 10^6 \times 10^{-6} = 1 \text{ A}$$

$$\Rightarrow i = I_{max} \cos(\omega_0 t + \frac{\pi}{2})$$

$$i = 1 \cos(10^6 t + \frac{\pi}{2})$$

الجواب (D)

(10

$$I_{max} = \omega_0 q_{max} \quad \text{--- (1)}$$

$$\omega_0 = \frac{1}{\sqrt{LC}} \quad \text{--- (2)}$$

$$C = \frac{q}{U} = \frac{0.3 \times 10^{-6}}{300} = 1 \times 10^{-9} \text{ f}$$

$$L = 4\pi \times 10^{-7} \frac{N^2}{\ell} S$$

بما أن $N = \frac{\ell'}{2\pi r}$ و $S = \pi r^2$

نعوض:

$$L = 4\pi \times 10^{-7} \frac{\ell'^2}{4\pi^2 r^2} \pi r^2 \Rightarrow$$

$$L = \frac{10^{-7} \times \ell'^2}{\ell} = \frac{10^{-7} \times 324}{9 \times 10^{-2}}$$

$$L = 36 \times 10^{-5} \text{ H}$$

نعوض بـ (2):

$$\omega_0 = \frac{1}{\sqrt{36 \times 10^{-5} \times 10^{-9}}} = \frac{10^7}{6}$$

$$\omega_0 = \frac{1}{6} \times 10^7 \text{ rad.s}^{-1}$$

نعوض بـ (1):

$$I_{max} = \frac{1}{6} \times 10^7 \times 0.3 \times 10^{-6} = 0.5 \text{ A}$$

الجواب (A)

(11

$$\omega_0 = \frac{1}{\sqrt{LC}} \Rightarrow 10^3 = \frac{1}{\sqrt{10^{-4}C}}$$

نربع الطرفين:

$$10^6 = \frac{1}{10^{-4}C} \Rightarrow C = \frac{1}{100} = 10^{-2}\,f$$

الجواب (B)

(12

$$I_{max} = \omega_0 q_{max} = 10^3 \times 10^{-2} = 10\ A$$

$$i = I_{max}\cos(\omega_0 t + \frac{\pi}{2})$$

$$i = 10\cos(10^3 t + \frac{\pi}{2})$$ الجواب (D)

(13

$$T_0 = \frac{\lambda}{v} = 2\pi\sqrt{LC}$$

$$\frac{\lambda}{3\times10^8} = 2\pi\sqrt{10^{-3}\times10^{-12}} \Rightarrow$$

$$\lambda = 6\times10^8\sqrt{\pi^2\times10^{-15}} = 60\ m$$

الجواب (C)

(14

$$f_0 = \frac{1}{T_0} = \frac{1}{2\pi\sqrt{LC}} \quad \text{--- (1)}$$

$$C = \frac{q}{U} = \frac{0.4\times10^{-6}}{200} = 2\times10^{-9}\,f$$

$$L = \frac{10^{-7}\times l^2}{l}$$ (تم استنتاجه سابقاً)

$$L = \frac{10^{-7}\times1600}{20\times10^{-2}} = 8\times10^{-4}\ H$$

نعوضه بـ (1):

$$f_0 = \frac{1}{2\pi\sqrt{8\times10^{-4}\times2\times10^{-9}}} = \frac{1}{8\sqrt{\pi^2\times10^{-13}}}$$

$$f_0 = \frac{10^6}{8} = 125\times10^3\ Hz$$

الجواب (A)

(15

$$f_0 = \frac{1}{T_0} = \frac{1}{2\pi\sqrt{LC}}$$

$$f_0 = \frac{1}{2\pi\sqrt{10^{-2}\times10^{-12}}} = \frac{10^7}{2\pi}$$

$$f_0 = \frac{100\times10^5}{2\pi} = \frac{32\pi}{2\pi}\times10^5$$

$$f_0 = 16\times10^5\ Hz$$ الجواب (B)

(16

$$I_{max} = \omega_0 q_{max} \quad \text{--- (1)}$$

$$q_{max} = C\cdot U_{max} = 10^{-12}\times10^3$$

$$= 10^{-9}\ C$$

$$\omega_0 = \frac{1}{\sqrt{LC}} = \frac{1}{\sqrt{10^{-2}\times10^{-12}}} = 10^7\ rad.s^{-1}$$

$$\Rightarrow I_{max} = 10^7\times10^{-9} = 0.01\ A$$

$$\Rightarrow i = I_{max}\cos(\omega_0 t + \frac{\pi}{2})$$

$$i = 0.01\cos(10^7 t + \frac{\pi}{2})$$

الجواب C

المدرس فراس قلعه جي
إجازة في العلوم الفيزيائية والكيميائية
مبرز في التأهيل التربوي
٠٩٨٨٤٤٠٥٧٤