
سويزانا التعليمية

رقم السؤال	الإجابة الصحيحة	التعليل
1	A	$\theta=90^\circ \Rightarrow \sin\theta=1$
2	B	
3	C	$F=kx=16\times0.1=1.6N$
4	A	$T_0=const\sqrt{\ell}$ لتصحيح التقديم يجب زيادة الدور الخاص
5	A	
6	D	
7	C	$T_0'=T_0(1+\frac{\theta_{max}^2}{16})=T_0(1+\frac{0.64}{16})=T_0(1+0.04)=T_0\times1.04$
8	C	$T_0=2\sqrt{\ell}\Rightarrow1=2\sqrt{\ell}\Rightarrow1=4\ell\Rightarrow\ell=\frac{1}{4}=0.25m$
9	C	$\frac{T_0'}{T_0}=\sqrt{\frac{\ell'}{\ell}}\Rightarrow\frac{1}{2}=\sqrt{\frac{\ell-0.6}{\ell}}\Rightarrow\frac{1}{4}=\frac{\ell-0.6}{\ell}\Rightarrow\ell=4\ell-2.4\Rightarrow3\ell=2.4\Rightarrow\ell=0.8m$
10	A	$E_k=\frac{1}{2}k(\theta_{max}^2-\theta^2)=\frac{1}{2}\times0.02(\frac{10}{9}-\frac{10}{36})=0.01\times\frac{30}{36}=\frac{1}{12}\times10^{-1}J$
11	A	$m=3m_0\Rightarrow\gamma=3$ $\gamma=\frac{1}{\sqrt{1-\frac{v^2}{c^2}}}\Rightarrow3=\frac{1}{\sqrt{1-\frac{v^2}{c^2}}}\Rightarrow9=\frac{1}{1-\frac{v^2}{c^2}}\Rightarrow1=9-9\frac{v^2}{c^2}\Rightarrow9\frac{v^2}{c^2}=8$ $\Rightarrow v=\frac{\sqrt{8}}{3}c=\frac{2\sqrt{2}}{3}c$
12	B	$E_P=\frac{1}{2}kx^2\Rightarrow0.02=\frac{1}{2}100x^2\Rightarrow0.02=50x^2\Rightarrow x^2=\frac{0.02}{50}=0.0004$ $x=0.02m$
13	D	تناسب عكسي
14	D	$v=\frac{Q'}{s}=\frac{Q'}{\pi r^2}=\frac{0.05\pi}{\pi25\times10^{-4}}=\frac{500}{25}=20m.s^{-1}$
15	B	$C=\frac{q}{U}=\frac{2\times10^{-5}}{2\times10^3}=10^{-8}F$ $\omega_0=\frac{1}{\sqrt{LC}}=\frac{1}{\sqrt{4\times10^{-4}\times10^{-8}}}=\frac{1}{2\times10^{-6}}=\frac{10^6}{2}=5\times10^5rad.s^{-1}$
16	B	$\frac{T_0}{2}=1\Rightarrow T_0=2s\Rightarrow\omega_0=\frac{2\pi}{T_0}=\frac{2\pi}{2}=\pi rad.s^{-1}$ $i=-I_{max}\sin\omega_0t\Rightarrow i=-2\sin\pi t$

$\cos\theta_{\max}=1-\frac{v^2}{2gl}=1-\frac{4}{2\times10\times0.4}=\frac{1}{2}\Rightarrow\theta_{\max}=60^\circ$	B	17
$U_{eff_C}=\sqrt{U_{eff}^2-U_{eff_R}^2}=\sqrt{2500-900}=\sqrt{1600}=40V$	B	18
$B=B'\Rightarrow 2\times10^{-7}\frac{I}{d}=2\pi\times10^{-7}\frac{NI'}{r}\Rightarrow\frac{I}{d}=\pi\frac{I'}{d}\Rightarrow I=\pi I'$	B	19
$B=4\pi\times10^{-7}\frac{NI}{\ell}\Rightarrow 2\times10^{-3}=4\pi\times10^{-7}\frac{N\times4}{4\pi\times10^{-2}}\Rightarrow 2\times10^{-3}=10^{-5}\times4N$ $N=\frac{2\times10^{-3}}{4\times10^{-5}}=\frac{200}{4}=50$	D	20
	D	21
	B	22
$W=NIsB(\cos\alpha_2-\cos\alpha_1)=100\times\frac{1}{10\pi}\times4\pi\times10^{-4}\times4\times10^{-2}=16\times10^{-5}J$	B	23
$r=\frac{m_e v}{eB}$ تناسب طردي	B	24
ليمنع عملية التقريب حسب قانون لنز	B	25
$\varepsilon=-\frac{N(B_2-B_1)\pi r^2}{\Delta t}=-\frac{100(0.08-0)\pi\times16\times10^{-4}}{2}=-2\times10^{-2}V$	A	26
$I_{eff}^2=I_{eff_1}^2+I_{eff_2}^2+2I_{eff_1}I_{eff_2}\cos\varphi_L\Rightarrow 49=16+25+2(4)(5)\cos\varphi_L$ $49=41+40\cos\varphi_L\Rightarrow\cos\varphi_L=\frac{8}{40}=0.2$	B	27
$\mu=\frac{I_{eff_P}}{I_{eff_S}}\Rightarrow 2=\frac{I_{eff_P}}{5}\Rightarrow I_{eff_P}=10A$	C	28
	D	29
$f=n\frac{v}{2L}\Rightarrow 640=n\frac{640}{3}\Rightarrow n=3$	C	30
$\mu=\frac{m}{L}=2\times10^{-2}kg.m^{-1}$ $f=\frac{n}{2L}\sqrt{\frac{F_T}{\mu}}=\frac{1}{2}\sqrt{\frac{2}{2\times10^{-2}}}=\frac{1}{2}\times10=5Hz$	A	31
$L=n\frac{\lambda}{2}$ $n=1\Rightarrow L=\frac{\lambda}{2}$	B	32
الدور الخاص لا يتعلق بالسعة الزاوية	C	33

$f = n\frac{v}{2L} \Rightarrow 110 = n\frac{330}{2\times 3} \Rightarrow n = 2$	B	34
$\omega_0 = \frac{2\pi}{T_0} = \frac{2\pi}{2} = \pi rad.s^{-1}$ $(x)''_t = -\omega_0^2 x \Rightarrow (x)''_t = -10x$	A	35
$E_k = \frac{1}{2}k(X^2_{max} - x^2) = \frac{1}{2}k(X^2_{max} - \frac{X^2_{max}}{4}) = \frac{3}{4}E_{tot}$	D	36
$\theta = \frac{\pi}{2}\cos\frac{\pi}{3} = \frac{\pi}{2}\times\frac{1}{2} = \frac{\pi}{4}rad$	B	37
$Q' = \frac{V}{\Delta t} = \frac{0.5}{250} = 2\times 10^{-3} m^3.s^{-1}$ $Q = \rho Q' = 10^3 \times 2\times 10^{-3} = 2kg.s^{-1}$	C	38
$\frac{U_{eff_s}}{U_{eff_p}} = \frac{N_S}{N_P} \Rightarrow \frac{U_{eff_S}}{40} = \frac{450}{150} = 3 \Rightarrow U_{eff_S} = 120V$ $X_L = \frac{U_{eff_S}}{I_{eff_L}} = \frac{120}{4} = 30\Omega$	C	39
$m = 3m_1$ $d = \frac{-m_1\frac{\ell}{2} + m_2\frac{\ell}{2}}{m_1 + m_2} = \frac{-m_1\frac{\ell}{2} + 2m_1\frac{\ell}{2}}{3m_1} = d = \frac{m_1\frac{\ell}{2}}{3m_1} = \frac{\ell}{6}$ $I_\Delta = m_1\frac{\ell^2}{4} + 2m_1\frac{\ell^2}{4} = \frac{3}{4}m_1\ell^2$ $T_0 = 2\pi\sqrt{\frac{I_\Delta}{mgd}} = 2\pi\sqrt{\frac{\frac{3}{4}m_1\ell^2}{3m_1 g\frac{\ell}{6}}} = 2\pi\sqrt{\frac{3\ell}{2g}} = 2\pi\sqrt{\frac{3\times 0.5}{2\times 10}} = 2\sqrt{\frac{3}{4}} = \sqrt{3}s$	C	40