

$$i = \frac{\mathcal{E}}{R} = \frac{200 \sin 80\pi t}{2} \quad (12)$$

$$i = 100 \sin 80\pi t \quad (A)$$

$$L = 4\pi \times 10^{-7} \frac{N^2}{l} \quad (13)$$

$$2.5 \times 10^{-3} = 4\pi \times 10^{-7} \frac{N^2}{20 \times 10^{-2}} \times 25 \times 10^{-4}$$

$$N^2 = \frac{2.5 \times 10^{-3} \times 20 \times 10^{-2}}{4\pi \times 10^{-7} \times 25 \times 10^{-4}}$$

$$N^2 = 16 \times 10^4 \Rightarrow N = 400 \text{ لفه} \quad (10)$$

$$E = \frac{1}{2} L I^2 \quad (14)$$

$$= \frac{1}{2} (2.5 \times 10^{-3}) (8)^2 = 0.08 \text{ جول}$$

$$L = 4\pi \times 10^{-7} \frac{N^2}{l} \text{ س}$$

$$L = 4\pi \times 10^{-7} \frac{25 \times 10^4}{50 \times 10^{-2}} \times \pi \times 4 \times 10^{-4}$$

$$L = 8 \times 10^{-4} \text{ H} \quad (A)$$

$$l' = 2\pi r \times N \quad (16)$$

$$= 2\pi \times 2 \times 10^{-2} \times 500$$

$$= 62.8 \text{ m} \quad (C)$$

$$\text{عدد اللفات} = \frac{\text{طول الوشيفة}}{\text{قطر السلك}} = \frac{50 \times 10^{-2}}{1 \times 10^{-3}} \quad (17)$$

= 500 لفه

$$\text{عدد الطبقات} = \frac{\text{عدد اللفات الكلية}}{\text{عدد اللفات في الطبقة الواحدة}} = \frac{500}{500}$$

= 1 طبقة (A)

$$\mathcal{E}_{\text{max}} = NBS\omega \quad (11)$$

$$\omega = 2\pi f = 2\pi \times \frac{2400}{60} = 80\pi \text{ rad.s}^{-1}$$

$$\Rightarrow \mathcal{E}_{\text{max}} = 50 \times 0.4 \times 0.02 \times 80\pi = 100 \text{ V} \quad (B)$$

$$\mathcal{E} = \mathcal{E}_{\text{max}} \sin \omega t \quad (8)$$

$$\omega = 2\pi f = 2\pi \times \frac{2400}{60} = 80\pi \text{ rad.s}^{-1}$$

$$\mathcal{E}_{\text{max}} = NBS\omega = 25 \times 0.8 \times 0.04 \times 80\pi = 200 \text{ V} \Rightarrow \mathcal{E} = 200 \sin 80\pi t \quad (9)$$

$$\mathcal{E} = 100 \sin 20\pi t$$

$$\omega t = 20\pi t = \theta = 30^\circ \Rightarrow$$

$$\mathcal{E} = 100 \sin 30 = 50 \text{ V} \quad (A)$$

$$\mathcal{E} = 200 \sin 80\pi t \quad (11)$$

$$\mathcal{E} = 0 \Rightarrow \sin 80\pi t = 0 \Rightarrow 80\pi t = \pi k$$

$$\Rightarrow t = \frac{k}{80} \text{ (s)} \quad (16)$$

$$(B) \quad t = \frac{1}{80} \text{ (s)} \Leftarrow k=1 \text{ قيمة ابتدائية}$$

$$\mathcal{E} = 200 \sin 80\pi t \quad (11)$$

$$\Leftarrow \mathcal{E} \text{ أقصى} \Leftarrow \sin 80\pi t = 1$$

$$80\pi t = (2k+1) \frac{\pi}{2} \Rightarrow 80t = \frac{1}{2} (2k+1)$$

$$\Leftarrow 80t = \frac{1}{2} \Leftarrow k=0 \text{ قيمة اولية}$$

$$t = \frac{1}{160} \text{ (s)} \quad (B)$$

$$\omega = 2\pi f = 2\pi \times \frac{10}{\pi} = 20 \text{ rad.s}^{-1} \quad (21)$$

$$\mathcal{E}_{\text{max}} = NBS\omega = 50 \times 25 \times 10^{-3} \times 4 \times 10^{-4} \times 20$$

$$\mathcal{E}_{\text{max}} = 1 \times 10^{-2} \text{ V} \quad (A)$$

$$L = \frac{\mu_0^2 \times l^2}{l} = \frac{10^{-7} \times 36}{30 \times 10^{-2}} \quad (22)$$

$$L = 12 \times 10^{-6} \text{ H} \quad (C)$$

$$L = 4\pi \times 10^{-7} \frac{N^2}{l} \quad (23)$$

$$L = 4\pi \times 10^{-7} \frac{144 \times 10^4}{30 \times 10^{-2}} \times \pi \times 4 \times 10^{-4}$$

$$L = 7.68 \times 10^{-3} \text{ H} \quad (C)$$

$$\mathcal{E} = -L \frac{di}{dt} = -12 \times 10^{-6} \times 1 \quad (24)$$

$$= -12 \times 10^{-6} \text{ V} \quad (C)$$

$$N = \frac{l'}{2\pi r} = \frac{40}{2\pi \times 4 \times 10^{-2}} \quad (25)$$

$$N = \frac{4000}{8\pi} = \frac{4000}{25} = 160 \text{ لفة} \quad (D)$$

$$L = 4\pi \times 10^{-7} \frac{N^2}{l} \quad (26)$$

$$L = 4\pi \times 10^{-7} \frac{4 \times 10^4}{\frac{2\pi}{5}} \times 20 \times 10^{-4}$$

$$L = 8 \times 10^{-5} \text{ H}$$

$$\mathcal{E} = -L \frac{di}{dt} = -8 \times 10^{-5} \frac{-10}{0.5}$$

$$\mathcal{E} = +16 \times 10^{-4} \text{ V} \quad (D)$$

$$E = \frac{1}{2} LI^2 = \frac{1}{2} \times 5 \times 10^{-3} \times (2)^2 \quad (18)$$

$$= 0.01 \text{ J} \quad (D)$$

$$q = i \cdot \Delta t \quad (19)$$

$$i = \frac{\mathcal{E}}{R} = \frac{-\Delta\Phi}{R \cdot \Delta t} = \frac{-NBS\Delta\cos\alpha}{R \cdot \Delta t}$$

$$i = \frac{-500 \times 0.02 \times \pi \times 4 \times 10^{-4} (0-1)}{2 \times 0.5}$$

$$i = 4\pi \times 10^{-3} \text{ A} \Rightarrow q = 4\pi \times 10^{-3} \times 0.5$$

$$q = 2\pi \times 10^{-3} = 6.25 \times 10^{-3} \text{ C} \quad (D)$$

$$\text{عدد الطبقات} = \frac{\text{عدد اللفات الكلية}}{\text{عدد اللفات في الطبقة الواحدة}} \quad (20)$$

$$\text{عدد اللفات في الطبقة الواحدة} = \frac{\text{طول الوشيتة}}{\text{قطر السلك}} = \frac{\frac{2\pi}{5}}{\frac{\pi}{500}} = 200$$

$$L = \frac{\mu_0^2 \times l^2}{l} = \frac{10^{-7} \times 2500}{\frac{2\pi}{5}} = 2 \times 10^{-4} \text{ H}$$

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

$$2 \times 10^{-4} = 4\pi \times 10^{-7} \frac{N^2}{\frac{2\pi}{5}} \times \pi \times 4 \times 10^{-4}$$

$$N^2 = \frac{2 \times 10^{-4} \times \frac{2\pi}{5}}{4\pi \times 10^{-7} \times \pi \times 4 \times 10^{-4}} = 16 \times 10^4$$

$$N = 400 \text{ لفة} \Rightarrow \text{عدد الطبقات} = \frac{400}{200} = 2 \text{ طبقة} \quad (A)$$

4

$$i' = \frac{E}{R} = \frac{-25 \times 10^{-3}}{5}$$

$$i' = -5 \times 10^{-3} \text{ A} \Rightarrow$$

$$P = -25 \times 10^{-3} \times -5 \times 10^{-3} = 125 \times 10^{-6} \text{ W} \quad (c)$$

$$i' = \frac{E}{R} = \frac{-\Delta\Phi}{R \cdot \Delta t} = -\frac{N \Delta B S \cos \alpha}{R \cdot \Delta t} \quad (5)$$

$$i' = -\frac{1000 (0.06 - 0.02) \times 10 \times 10^{-4} \times 1}{10 \times 0.5}$$

$$i' = -8 \times 10^{-3} \text{ A} \quad (d)$$

$$E = -L \frac{di}{dt} = -25 \times 10^{-3} \times 5 \quad (6)$$

$$E = -125 \times 10^{-3} \text{ V} \quad (d)$$

$$i' = \frac{E}{R} = -\frac{\Delta\Phi}{R \cdot \Delta t} = -\frac{NBS \Delta \cos \alpha}{R \cdot \Delta t} \quad (7)$$

$$i' = -\frac{400 \times 10^{-2} \times \pi \times 16 \times 10^{-4} (0 - 1)}{2 \times 0.5}$$

$$i' = 2 \times 10^{-2} \text{ A} \quad (A)$$

$$i' = \frac{BLV}{R} = \frac{0.4 \times 20 \times 10^{-2} \times 4}{5} \quad (8)$$

$$i' = 64 \times 10^{-3} \text{ A} \quad (B)$$

$$P = E \cdot i \quad \dots (1) \quad (9)$$

$$E = -\frac{\Delta\Phi}{\Delta t} = -\frac{N \Delta B S \cos \alpha}{\Delta t} \quad \dots (2)$$

$$L = 4\pi \times 10^{-7} \frac{N^2}{l} \quad \text{حيث } N$$

$$2.5 \times 10^{-3} = \frac{4\pi \times 10^{-7} N^2}{25 \times 10^{-4}}$$

$$N^2 = \frac{2.5 \times 10^{-3} \times 25 \times 10^{-4}}{4\pi \times 10^{-7} \times 25 \times 10^{-4}} = 1600 \Rightarrow$$

تم الطالب ليتقوت

$$L = 4\pi \times 10^{-7} \frac{N^2}{l} \quad (1)$$

$$L = 4\pi \times 10^{-7} \frac{16 \times 10^4}{40 \times 10^{-2}} \pi \times 4 \times 10^{-4}$$

$$L = 64 \times 10^{-5} \text{ H}$$

$$E = -L \frac{di}{dt} = -64 \times 10^{-5} \times \frac{-10}{0.5}$$

$$E = +128 \times 10^{-4} \text{ V} \quad (d)$$

$$L = \frac{10^{-7} \times l^2}{40 \times 10^{-2}} = \frac{10^{-7} \times 16 \times 10^2}{40 \times 10^{-2}} \quad (2)$$

$$L = 4 \times 10^{-4} \text{ H}$$

$$E = -L \frac{di}{dt} = -4 \times 10^{-4} \times \frac{5}{0.5}$$

$$E = -4 \times 10^{-3} \text{ V} \quad (c)$$

$$P = E \cdot i \quad \dots (1)$$

$$E = BLV = 0.2 \times 20 \times 10^{-2} \times 4$$

$$E = 16 \times 10^{-2} \text{ V}$$

$$i' = \frac{E}{R} = \frac{16 \times 10^{-2}}{0.1} = 1.6 \text{ A} \Rightarrow$$

$$P = 16 \times 10^{-2} \times 1.6 \times 10^{-1} = 256 \times 10^{-3} \text{ W} \quad (c)$$

$$P = E \cdot i \quad \dots (1) \quad (4)$$

$$E = -\frac{\Delta\Phi}{\Delta t} = -\frac{N \Delta B S \cos \alpha}{\Delta t}$$

$$E = -\frac{400 (0.08 - 0.02) \times 5 \times 10^{-4} \times 1}{0.5}$$

$$E = -25 \times 10^{-3} \text{ V}$$

$$P = \mathcal{E}i = \frac{B^2 L^2 v^2}{R} \quad (12)$$

$$P = \frac{16 \times 10^{-2} \times (20 \times 10^{-2})^2 \times 16}{4}$$

$$P = 25.6 \times 10^{-3} \text{ W} \quad (A)$$

$$P = \mathcal{E} \cdot i \quad (13)$$

$$\mathcal{E} = - \frac{\Delta \Phi}{\Delta t} = \frac{-N \Delta B S \cos \alpha}{\Delta t}$$

$$\mathcal{E} = \frac{-1200 \times (0.04 - 0.02) \times \pi \times 4 \times 10^{-4} \times 1}{0.5}$$

$$\mathcal{E} = -6 \times 10^{-2} \text{ V}$$

$$i = \frac{\mathcal{E}}{R} = \frac{-6 \times 10^{-2}}{2} = -3 \times 10^{-2} \text{ A} \Rightarrow$$

$$P = -6 \times 10^{-2} \times -3 \times 10^{-2} = 18 \times 10^{-4} \text{ W} \quad (B)$$

$$\Delta \Phi = N \Delta B S \cos \alpha \quad (14)$$

$$\Delta \Phi = 1200 (0.04 - 0.02) \pi \times 4 \times 10^{-4} \times 1$$

$$\Delta \Phi = 3 \times 10^{-2} \text{ weber} \quad (C)$$

$$q = i \cdot \Delta t \quad (15)$$

$$i = \frac{\mathcal{E}}{R} = \frac{-\Delta \Phi}{R \cdot \Delta t} = - \frac{N B S \Delta \cos \alpha}{R \cdot \Delta t}$$

$$i = \frac{-3000 \times 0.04 \times \pi \times 4 \times 10^{-4} (0-1)}{2 \times 0.5}$$

$$i = 15 \times 10^{-2} \text{ A} \Rightarrow q = 15 \times 10^{-2} \times 0.5$$

$$q = 75 \times 10^{-3} \text{ C} \quad (C)$$

$$N = 40 \text{ لفه}$$

مفوضه ب (2):

$$\mathcal{E} = \frac{-40 \times (0.04 - 0.02) \times 25 \times 10^{-4} \times 1}{0.5}$$

$$\mathcal{E} = -4 \times 10^{-3} \text{ V} \Rightarrow i = \frac{\mathcal{E}}{R} = \frac{-4 \times 10^{-3}}{4}$$

$$i = -1 \times 10^{-3} \Rightarrow P = \mathcal{E} \cdot i$$

$$P = -4 \times 10^{-3} \times -1 \times 10^{-3} = 4 \times 10^{-6} \text{ W} \quad (B)$$

$$i = \frac{\mathcal{E}}{R} = \frac{-\Delta \Phi}{R \cdot \Delta t} = \frac{-N \Delta B S \cos \alpha}{R \cdot \Delta t} \quad (10)$$

لحساب N:

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

$$16 \times 10^{-3} = 4\pi \times 10^{-7} \frac{N^2}{40 \times 10^{-2}} \times 20 \times 10^{-4}$$

$$N^2 = \frac{16 \times 10^{-3} \times 40 \times 10^{-2}}{4\pi \times 10^{-7} \times 20 \times 10^{-4}} = 256 \times 10^4 \Rightarrow$$

$$N = 1600 \text{ لفه} \Rightarrow$$

$$i = \frac{-1600 (0.06) \times 20 \times 10^{-4} \times 1}{2 \times 0.5}$$

$$i = -192 \times 10^{-3} \text{ A} \quad (C)$$

$$\Delta \Phi = N \Delta B S \cos \alpha \quad (11)$$

$$\Delta B = 4\pi \times 10^{-7} \frac{N}{l} \Delta i$$

$$= 4\pi \times 10^{-7} \frac{1000}{20 \times 10^{-2}} (13-3)$$

$$\Delta B = 2\pi \times 10^{-2} \text{ T}$$

مفوضه ب (11):

$$\Delta \Phi = 1000 \times 2\pi \times 10^{-2} \times 25 \times 10^{-4} \times 1$$

$$\Delta \Phi = 0.05\pi \text{ weber} \quad (C)$$

6/ $i = \frac{\mathcal{E}}{R} = \frac{-\Delta\Phi}{R \cdot \Delta t}$ (20)

$$i = \frac{-NBS \Delta \cos \alpha}{R \cdot \Delta t} = \frac{-1200 \times 0.04 \times \pi \times 4 \times 10^{-4} (0 - 1)}{2 \times 0.5}$$

$$i = 0.06 \text{ A} \quad (c)$$

$$\mathcal{E} = \mathcal{E}_{\max} \sin \omega t \quad (21)$$

$$\omega = 2\pi f = 2\pi \times \frac{2}{\pi} = 4 \text{ rad} \cdot \text{s}^{-1}$$

$$\mathcal{E}_{\max} = NBS \omega = 1200 \times 0.04 \times \pi \times 4 \times 10^{-4} \times 4$$

$$\mathcal{E}_{\max} = 0.24 \text{ V} \Rightarrow \mathcal{E} = 0.24 \sin 4t \quad (B)$$

$$i = \frac{\mathcal{E}}{R} = \frac{BLv}{R} \quad (22)$$

$$i = \frac{0.2 \times 10^{-1} \times 0.5}{5} = 2 \times 10^{-3} \text{ A} \quad (c)$$

(23) $\sum \vec{F} = 0$ متوازنة

$$\vec{w} + \vec{f}_{s_0} + \vec{f} = \vec{0}$$

بالخط على محور سائرا ليه موجب عكس اتجاهه:

$$w - f_{s_0} + f = 0 \quad \dots (1)$$

$$f_{s_0} = f_s \quad \text{لأنه}$$

$$f_s = kx_0 \Rightarrow$$

$$w - kx_0 + f = 0 \Rightarrow$$

$$m = \frac{kx_0 - ILB \sin \theta}{g}$$

$$m = \frac{(100 \times 20 \times 10^{-2}) - (20 \times 0.8 \times 0.5 \times 1)}{10}$$

$$m = 1.2 \text{ kg} \quad (D)$$

$$i = \frac{\mathcal{E}}{R} = \frac{-\Delta\Phi}{R \cdot \Delta t} = \frac{-N \Delta B S \cos \alpha}{R \cdot \Delta t} \quad (16)$$

: ΔB \rightarrow

$$\Delta B = 4\pi \times 10^{-7} \frac{N}{l} \Delta i$$

$$\Delta B = 4\pi \times 10^{-7} \frac{600}{30 \times 10^{-2}} (0 - 2)$$

$$\Delta B = -5 \times 10^{-3} \text{ T} \Rightarrow$$

$$i = - \frac{200 \times -5 \times 10^{-3} \times \pi \times 4 \times 10^{-4} \times 1}{5 \times 0.5}$$

$$i = 5 \times 10^{-4} \text{ A} \quad (D)$$

$$P = \mathcal{E} \cdot i = \frac{B^2 L^2 v^2}{R}$$

$$P = \frac{10^{-2} \times (10 \times 10^{-2})^2 \times 100}{2} = 5 \times 10^{-3} \text{ W} \quad (c)$$

$$i = \frac{\mathcal{E}}{R} = \frac{BLv \cos \alpha}{R} \quad (18)$$

$$0.05 = \frac{0.5 \times 20 \times 10^{-2} \times v \times \frac{1}{2}}{0.4} \Rightarrow$$

$$v = \frac{0.05 \times 0.4}{0.5 \times 20 \times 10^{-2} \times 0.5} = 0.4 \text{ m} \cdot \text{s}^{-1} \quad (A)$$

$$\sum \vec{F} = \vec{0} \quad (19)$$

$$\vec{w} + \vec{R} + \vec{f} = \vec{0}$$

بالخط على محور سائرا ليه موجب عكس اتجاهه

$$w \sin \alpha + 0 - f \cos \alpha = 0$$

$$mg \sin \alpha = f \cos \alpha$$

$$mg \tan \alpha = f = ILB \sin \theta$$

$$m = \frac{ILB \sin \theta}{g \tan \alpha} \quad (c)$$

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7

$$\dot{C} = \frac{E}{R} = \frac{-\Delta\Phi}{R \cdot \Delta t} = - \frac{NBS \Delta \cos \alpha}{R \cdot \Delta t} \quad (24)$$

$$\dot{C} = \frac{-600 \times 0.04 \times \pi \times 16 \times 10^{-4} (0 - 1)}{5 \times 0.2}$$

$$\dot{C} = 0.12 \text{ A} \quad (c)$$

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09884405 / 4