

$$\mu = \frac{I_{effp}}{I_{effs}} = \frac{12}{36} = \frac{1}{3} \quad (13)$$

الجواب (D)

$$\mu = \frac{V_{effs}}{V_{effp}} = \frac{6}{120} = \frac{1}{20} = 0.05$$

المولدة خازنة للتوتر ورافعة للشدة
الجواب (B)

سَم الطالب الجيب

$$V_{effs} = R I_{effs} \quad (1)$$

حسب V_{effs} :

$$\mu = \frac{N_s}{N_p} = \frac{V_{effs}}{V_{effp}} \Rightarrow \frac{320}{80} = \frac{V_{effs}}{20}$$

$$V_{effs} = \frac{320 \times 20}{80} = 80 \text{ V}$$

نوضب (1):

$$80 = 10 I_{effs} \Rightarrow I_{effs} = \frac{80}{10} = 8 \text{ A}$$

الجواب (A)

$$V_{effs} = X_L I_{effs} = \omega L I_{effs} \quad (2)$$

$$100 = 100\pi L(5) \Rightarrow L = \frac{100}{500\pi} = \frac{1}{5\pi} \text{ H}$$

الجواب (B)

$$V_{effs} = R I_{effs} \Rightarrow 120 = 30 I_{effs} \quad (3)$$

$$I_{effsR} = I_{effs} = \frac{120}{30} = 4 \text{ A}$$

$$P_{avg} = P_{avg1} + P_{avg2} = V_{effs} I_{effs} \cos \phi_1 + 0$$

$$P_{avg} = 120 \times 4 \times 1 = 480 \text{ W}$$

حسب I_{effs} : اعتباراً على انشأ وشرائح

$$I_{effs}^2 = I_{effsR}^2 + I_{effsL}^2$$

$$I_{effs}^2 = (4)^2 + (3)^2 = 25 \Rightarrow I_{effs} = 5 \text{ A}$$

هذا البنك المؤتمت لبحث
المولدة الكهربائية

سَم الطالب الجيب

| | | |
|-------|--------|--------|
| A (3) | C (2) | C (1) |
| D (6) | C (5) | C (4) |
| C (9) | B (8) | C (7) |
| | B (11) | B (10) |

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سَم الطالب المتوسط

$$\mu = \frac{V_{effs}}{V_{effp}} \Rightarrow 0.5 = \frac{V_{effs}}{20} \quad (1)$$

$$V_{effs} = 20 \times 0.5 = 10 \text{ V} \quad (B)$$

$$B (4) \quad D (3) \quad C (2)$$

$$D (7) \quad C (6) \quad D (5)$$

$$\mu = \frac{N_s}{N_p} = \frac{375}{125} = 3 > 1$$

المولدة رافعة للتوتر خازنة للشدة
الجواب (B)

$$C (8)$$

$$(9)$$

$$D (10)$$

$$\mu = \frac{I_{effp}}{I_{effs}} \Rightarrow I_{effp} = \mu \cdot I_{effs} \quad (11)$$

$$I_{effp} = 2 \times 5 = 10 \text{ A} \quad (A)$$

$$(12)$$

$$\mu = \frac{I_{effp}}{I_{effs}} \Rightarrow 0.25 = \frac{20}{I_{effs}} \Rightarrow$$

$$I_{effs} = \frac{20}{0.25} = 80 \text{ A} \quad (D)$$

المولدة خازنة للتوتر رافعة للشدة

$$L = \frac{60}{4000\pi} = \frac{3}{200\pi} \text{ H} \quad \text{الجواب (D)}$$

$$P_{avg} = U_{eff_s} I_{eff_s} \cos \phi \quad (9)$$

$$24 = 6 I_{eff_s} (1) \Rightarrow$$

$$I_{eff_s} = \frac{24}{6} = 4 \text{ A}$$

$$U_{eff_s} = R I_{eff_s} \Rightarrow 6 = R(4)$$

$$R = \frac{6}{4} = 1.5 \Omega \quad \text{الجواب (A)}$$

$$P_{avg} = U_{eff_s} I_{eff_s} \cos \phi$$

$$24 = 6 I_{eff_s} (1) \Rightarrow$$

$$I_{eff_s} = \frac{24}{6} = 4 \text{ A}$$

$$\mu = \frac{U_{eff_s}}{U_{eff_p}} = \frac{I_{eff_p}}{I_{eff_s}} \Rightarrow \frac{6}{120} = \frac{I_{eff_p}}{4}$$

$$I_{eff_p} = \frac{6 \times 4}{120} = 0.2 \text{ A} \quad \text{الجواب (D)}$$

$$\mu = \frac{N_s}{N_p} = \frac{600}{300} = 2$$

$$U_{eff_s} = R I_{eff_s} \Rightarrow 80 = 20 I_{eff_s}$$

$$I_{eff_s} = \frac{80}{20} = 4 \text{ A} \Rightarrow$$

$$\mu = \frac{I_{eff_p}}{I_{eff_s}} \Rightarrow 2 = \frac{I_{eff_p}}{4} \Rightarrow$$

$$I_{eff_p} = 2 \times 4 = 8 \text{ A} \quad \text{الجواب (C)}$$

$$U_{eff_s} = R I_{eff_{sR}} \Rightarrow 80 = 20 I_{eff_{sR}} \quad (12)$$

$$I_{eff_{sR}} = \frac{80}{20} = 4 \text{ A}$$

$$U_{eff_s} = X_c I_{eff_{sC}} \Rightarrow 80 = 40 I_{eff_{sC}}$$

$$I_{eff_{sC}} = \frac{80}{40} = 2 \text{ A}$$

اعتاداً على أننا نزنيل:

$$I_{eff_c}^2 = I_{eff_{sR}}^2 + I_{eff_{sC}}^2$$

$$P_{avg} = U_{eff_s} I_{eff_s} \cos \phi$$

$$480 = 120 \times 5 \cos \phi \Rightarrow$$

$$\cos \phi = \frac{480}{120 \times 5} = \frac{4}{5} = 0.8 \quad \text{الجواب (C)}$$

$$U_{eff_s} = R I_{eff_s} \Rightarrow 120 = R(4) \quad (4)$$

$$R = \frac{120}{4} = 30 \Omega$$

$$P_{avg} = U_{eff_s} I_{eff_s} \cos \phi = 120 \times 4 \times 1$$

الجواب (C)

$$= 480 \text{ W}$$

$$U_{eff_s} = X_c I_{eff_s} = \frac{1}{\omega C} I_{eff_s} \quad (5)$$

$$120 = \frac{1}{100\pi \times \frac{1}{4000\pi}} I_{eff_s} \Rightarrow 120 = 40 I_{eff_s}$$

$$I_{eff_s} = \frac{120}{40} = 3 \text{ A} \quad \text{الجواب (B)}$$

$$U_{eff_s} = R I_{eff_s} \Rightarrow 80 = 20 I_{eff_s} \quad (6)$$

$$I_{eff_s} = \frac{80}{20} = 4 \text{ A} \quad \text{الجواب (C)}$$

$$U_{eff_s} = X_c I_{eff_s} = \frac{1}{\omega C} I_{eff_s} \quad (7)$$

$$80 = \frac{1}{100\pi C} (2) \Rightarrow C = \frac{2}{8000\pi} = \frac{1}{4000\pi} \text{ F}$$

الجواب (C)

(8) اعتاداً على أننا نزنيل:

$$I_{eff_s}^2 = I_{eff_{sR}}^2 + I_{eff_L}^2$$

$$(5)^2 = (3)^2 + I_{eff_L}^2 \Rightarrow$$

$$I_{eff_L}^2 = 25 - 9 = 16 \Rightarrow I_{eff_L} = 4 \text{ A}$$

$$U_{eff_s} = X_L I_{eff_L} = \omega L I_{eff_L}$$

$$60 = 100\pi L (4)$$

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3/ $P_{avg_{s_1}} = U_{eff_{s_1}} I_{eff_{s_1}} \cos \phi_1$ (2)

$720 = 120 I_{eff_{s_1}} \times 1 \Rightarrow$

$I_{eff_{s_1}} = \frac{720}{120} = 6 \text{ A}$

$P_{avg_{s_2}} = U_{eff_{s_2}} I_{eff_{s_2}} \cos \phi_2$

$600 = 120 I_{eff_{s_2}} \times \frac{1}{2} \Rightarrow$

$I_{eff_{s_2}} = \frac{600}{60} = 10 \text{ A}$

$\vec{I}_{eff_s} = \vec{I}_{eff_{s_1}} + \vec{I}_{eff_{s_2}}$

$I_{eff_s}^2 = I_{eff_{s_1}}^2 + I_{eff_{s_2}}^2 + 2 I_{eff_{s_1}} I_{eff_{s_2}} \cos(\phi_2 - \phi_1)$

$= 36 + 100 + 2(6)(10)(\frac{1}{2})$

$= 196 \Rightarrow I_{eff_s} = 14 \text{ A}$ (الجواب (c))

$\frac{N_s}{N_p} = \frac{U_{eff_s}}{U_{eff_p}} \Rightarrow \frac{300}{100} = \frac{U_{eff_s}}{12}$ (3)

$U_{eff_s} = 36 \text{ V}$

كمية الحرارة التي يسببها الماء البارد = كمية الطاقة الحرارية التي تنفقها المقاومة

$R I_{eff_s}^2 dt = m C_0 \Delta t$

$R \left(\frac{U_{eff_s}}{R} \right)^2 dt = m C_0 \Delta t$

$R = \frac{U_{eff_s}^2 \cdot dt}{m C_0 \Delta t} = \frac{(36)^2 \times 30}{200 \times 10^{-3} \times 4200 \times 2.2}$

$R = \frac{38880}{1848} = 21 \Omega$

(A) الجواب

$I_{eff_s} = \frac{U_{eff_s}}{R} = \frac{36}{21} = 1.71 \text{ A}$

$I_{eff_s}^2 = (4)^2 + (2)^2 = 16 + 4 = 20$
 $I_{eff_s} = 2\sqrt{5} \text{ A}$ (D) الجواب

(13) اعتماداً على استاذ زينب:

$I_{eff_s}^2 = I_{eff_{s_R}}^2 + I_{eff_{s_L}}^2$

$(5)^2 = (3)^2 + I_{eff_{s_L}}^2 \Rightarrow$

$I_{eff_{s_L}}^2 = 25 - 9 = 16 \Rightarrow I_{eff_{s_L}} = 4 \text{ A}$

$I_{max_{s_L}} = I_{eff_{s_L}} \sqrt{2} = 4\sqrt{2} \text{ A}$

$\omega = 2\pi f = 2\pi(50) = 100\pi \text{ rad.s}^{-1}$

$\phi = -\frac{\pi}{2} \text{ rad} \Rightarrow$

$i_{s_L} = I_{max_{s_L}} \cos(\omega t + \phi)$

$= 4\sqrt{2} \cos(100\pi t - \frac{\pi}{2})$

(C) الجواب

سرم الطالب المتفوت

$U_{eff_s} = R I_{eff_{s_1}} \Rightarrow 100 = 25 I_{eff_{s_1}}$ (1)

$I_{eff_{s_1}} = \frac{100}{25} = 4 \text{ A}$

$U_{eff_s} = X_L I_{eff_{s_2}} = \omega L I_{eff_{s_2}}$

$100 = 100\pi \times \frac{1}{3\pi} I_{eff_{s_2}}$

$I_{eff_{s_2}} = 3 \text{ A}$

اعتماداً على استاذ زينب

$I_{eff_s}^2 = I_{eff_{s_1}}^2 + I_{eff_{s_2}}^2 = (4)^2 + (3)^2$

$= 16 + 9 = 25 \Rightarrow$

$I_{eff_s} = 5 \text{ A}$ (C) الجواب

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$$\frac{N_s}{N_p} = \frac{V_{effs}}{V_{effp}} \Rightarrow \frac{400}{100} = \frac{V_{effs}}{20}$$

$$\Rightarrow V_{effs} = 4 \times 20 = 80 \text{ V}$$

تأثير الطاقه الحراريه = تأثير الطاقه الكهربائيه
تحويل الكفاءة

$$R I_{effs}^2 \cdot dt = m C_0 \Delta t$$

$$R \left(\frac{V_{effs}}{R} \right)^2 \cdot dt = m C_0 \Delta t$$

$$m = \frac{V_{effs}^2 \cdot dt}{R \cdot C_0 \cdot \Delta t} = \frac{(80)^2 (2 \times 60)}{4 \times 2000 \times 22}$$

$$m = \frac{168000}{369600} \approx 2 \text{ kg}$$

$$V_{effs} = R I_{effsR} \Rightarrow 60 = R(3)$$

$$R = \frac{60}{3} = 20 \Omega$$

$$P_{avg_{sR}} = V_{effs} I_{effsR} \cos \phi_1$$

$$= 60 \times 3 \times 1 = 180 \text{ W}$$

البواب (C)

$$\frac{N_s}{N_p} = \frac{V_{effs}}{V_{effp}} \Rightarrow \frac{300}{100} = \frac{V_{effs}}{200}$$

$$V_{effs} = 3 \times 200 = 600 \text{ V}$$

$$P_{avg_{s1}} = V_{effs} I_{effs1} \cos \phi_1$$

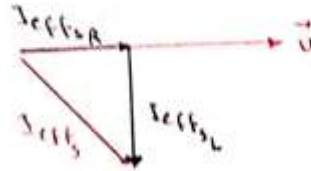
$$3600 = 600 \times I_{effs1} \quad (1)$$

$$I_{effs1} = \frac{3600}{600} = 6 \text{ A}$$

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$$V_{effs} = R I_{effsR} \quad (4)$$

$$120 = 30 I_{effsR} \Rightarrow I_{effsR} = \frac{120}{30} = 4 \text{ A}$$



$$I_{effs}^2 = I_{effsR}^2 + I_{effsL}^2 = 16 + 9 = 25$$

$$I_{effs} = 5 \text{ A}$$

$$V_{effs} = R I_{effs1} \Rightarrow 80 = 20 I_{effs1} \quad (5)$$

$$I_{effs1} = \frac{80}{20} = 4 \text{ A}$$

$$V_{effs} = X_c I_{effs2} = \frac{1}{\omega C} I_{effs2}$$

$$80 = \frac{1}{100\pi \times \frac{1}{2000\pi}} I_{effs2} \Rightarrow$$

$$80 = 20 I_{effs2} \Rightarrow I_{effs2} = \frac{80}{20} = 4 \text{ A}$$

اعتماداً على إشارات فرسيف:

$$I_{effs}^2 = I_{effsR}^2 + I_{effsC}^2 = 16 + 16$$

$$I_{effs}^2 = 32 \Rightarrow I_{effs} = 4\sqrt{2} \text{ A}$$

$$P_{avg_s} = P_{avg_{s1}} + P_{avg_{s2}}$$

$$= V_{effs} I_{effs1} \cos \phi_1 + 0$$

$$= 80 \times 4 \times 1 = 320 \text{ W}$$

$$\cos \phi = \frac{P_{avg_s}}{V_{effs} I_{effs}} = \frac{320}{80 \times 4\sqrt{2}}$$

$$\cos \phi = \frac{1}{\sqrt{2}} \quad \text{البواب (A)}$$

$$\frac{N_s}{N_p} = \frac{I_{eff_p}}{I_{eff_s}} \Rightarrow$$

$$\frac{200}{100} = \frac{I_{eff_p}}{4} \Rightarrow I_{eff_p} = 4 \times 2$$

$$I_{eff_p} = 8 \text{ A} \quad \text{الجواب (D)}$$

$$\frac{N_s}{N_p} = \frac{U_{eff_s}}{U_{eff_p}} \Rightarrow \frac{200}{100} = \frac{U_{eff_s}}{5} \quad (10)$$

$$U_{eff_s} = 5 \times 2 = 10 \text{ V}$$

كمية الطاقة الحرارية التي
تنتجها المقاومة = كمية الحرارة التي
يكتسبها الماء

$$R I_{eff_s_1}^2 \cdot dt = m C_0 \Delta t$$

$$\frac{U_{eff_s_1}}{I_{eff_s_1}} \cdot I_{eff_s_1}^2 \cdot dt = m C_0 \Delta t$$

$$I_{eff_s_1} = \frac{m C_0 \cdot \Delta t}{U_{eff_s_1} \cdot dt}$$

$$I_{eff_s_1} = \frac{400 \times 10^{-3} \times 200 \times 30}{10 \times 21 \times 60} = 4 \text{ A}$$

اعتادنا على اشتراطنا:

$$I_{eff_s}^2 = I_{eff_s_1}^2 + I_{eff_s_2}^2$$

$$25 = 16 + I_{eff_s_2}^2 \Rightarrow$$

$$I_{eff_s_2}^2 = 25 - 16 = 9 \Rightarrow I_{eff_s_2} = 3 \text{ A}$$

$$U_{eff_s_2} = X_L I_{eff_s_2} = \omega L I_{eff_s_2}$$

$$5 = 100 \pi L (3) \Rightarrow L = \frac{5}{300 \pi}$$

$$L = \frac{1}{60 \pi} \text{ H} \quad \text{الجواب (B)}$$

$$P_{avg_{s_2}} = U_{eff_s} I_{eff_s_2} \cos \phi_2$$

$$3000 = 600 \times I_{eff_s_2} \times \frac{1}{2}$$

$$I_{eff_s_2} = \frac{3000}{300} = 10 \text{ A}$$

اعتادنا على الجيب كمنه:

$$\vec{I}_{eff_s} = \vec{I}_{eff_s_1} + \vec{I}_{eff_s_2}$$

$$I_{eff_s}^2 = I_{eff_s_1}^2 + I_{eff_s_2}^2 + 2 I_{eff_s_1} I_{eff_s_2} \cos(\phi_2 - \phi_1)$$

$$= 36 + 100 + 2(6)(10)\left(\frac{1}{2}\right) = 196$$

$$I_{eff_s} = 14 \text{ A}$$

$$\frac{N_s}{N_p} = \frac{I_{eff_p}}{I_{eff_s}} \Rightarrow \frac{300}{100} = \frac{I_{eff_p}}{14}$$

$$I_{eff_p} = 3 \times 14 = 42 \text{ A} \quad \text{الجواب (D)}$$

$$\frac{N_s}{N_p} = \frac{U_{eff_s}}{U_{eff_p}} \Rightarrow \frac{200}{100} = \frac{U_{eff_s}}{5} \quad (9)$$

$$U_{eff_s} = 2 \times 5 = 10 \text{ V}$$

كمية الحرارة التي يكتسبها
الماء = كمية الطاقة الحرارية التي
تنتجها المقاومة

$$R I_{eff_s}^2 \cdot dt = m C_0 \Delta t$$

$$\frac{U_{eff_s}}{I_{eff_s}} \cdot I_{eff_s}^2 \cdot dt = m C_0 \Delta t$$

$$I_{eff_s} = \frac{m C_0 \cdot \Delta t}{U_{eff_s} \cdot dt} = \frac{100 \times 10^{-3} \times 4200 \times 240}{10 \times 42 \times 60}$$

$$I_{eff_s} = 4 \text{ A}$$

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