PHYSICS

BOOKS - MTG PHYSICS (ENGLISH)

ALTERNATING CURRENT

Mcqs

1. Alternating voltage (V) is represented by the equation

whrere V_m is the peak voltage

A. $V_t = V_m e^{\omega t}$

B. $V_t = V_m \sin \omega t$

C. $V(t) = V_m \cot \omega t$

D. $V(t) = V_m \tan t\omega t$

Answer: B

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2. A 100Ω resistor is connected to a 220 V, 50 Hz ac supply.

(a) What is the rms value of current in the circuit?

(b) What is the net power consumed over a full cycle?

A. $1.56A$

B. $1.56mA$

C. $2.2A$

D. $2.2mA$

Answer: C

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3. The peak voltage of an ac supply is 440 V, then its rms voltage is

A. $31.11V$

B. $311.1V$

C. $41.11V$

D. $411.1V$

Answer: B

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4. In the question number 3, the net power consumed over a full cycle is

A. 586 W

B. 242 W

C. $48.4W$

D. 484 W

Answer: D

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5. The rms value of current in an ac circuit is 25 A, then peak current is

A. $35.36mA$

B. $35.36A$

C. $3.536A$

D. $49.38A$

Answer: B

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6. A alternating voltage given by $V = 140 \sin 314t$ is connected across a pure resistor of 50 ohm. Find the rms current through the resistor.

A. $1.98A$

B. $5.63A$

C. $3.536A$

D. $49.39A$

Answer: A

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7. If V=100sin (100t)V and I =100sin $\left(100t+\frac{\pi}{3}\right)$ mA are the instantaneous values of voltage and current, respectively

A. $70.7V, 70.7mA$

B. $70.7V, 70.7A$

C. $141.4V, 141.4mA$

D. $100V, 100mA$

Answer: A

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8. The voltage over a cycle varies as

$$V = V_0 \sin \omega t \text{ for } 0 \le t \le \frac{\pi}{\omega}$$

$$= -V_0 \sin \omega t \text{ for } \frac{\pi}{\omega} \le t \le \frac{2\pi}{\omega}$$

The average value of the voltage one cycle is

A. $\dfrac{V_0}{\sqrt{2}}$

B. $\dfrac{V_0}{2}$

C. zero

D. $\dfrac{2V_0}{\pi}$

Answer: D

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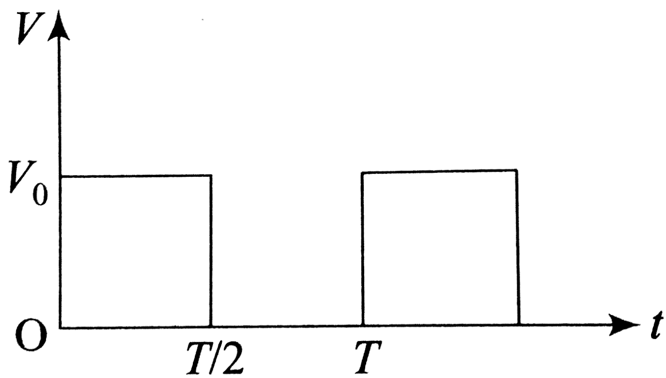
9. The rms value of potential difference V shown in the figure is



A. $\frac{V_0}{\sqrt{3}}$

B. V_0

C. $\frac{V_0}{\sqrt{2}}$

D. $\frac{V_0}{2}$

Answer: C

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10. The relation between an ac voltage source and time in SI units is $V = 120\sin(100\pi t)\cos(100\pi t)V$. The value of peak voltage and frequency will be respectively

A. 120 V and 100 Hz

B. $\frac{120}{\sqrt{2}} V$ and 100 Hz

C. 60 and 200 Hz

D. 60 V and 100 Hz

Answer: D

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11. A light bulb is rated at 100 W for a 220 V ac supply . The resistance of the bulb is

A. 284Ω

B. 384Ω

C. 484Ω

D. 584Ω

Answer: C

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12. V(rms)= 220volt , the peak voltage of the source is

A. 305 V

B. 310 V

C. 311 V

D. 315 V

Answer: C

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13. An ac source is of $\frac{200}{\sqrt{2}}$ V, 50 Hz. The value of voltage after $\frac{1}{600}s$ from the start is

A. 200 V

B. $\frac{200}{\sqrt{2}}V$

C. 100 V

D. 50 V

Answer: C

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14. The line that draws power supply to your house from street has

A. $220\sqrt{2}V$ average voltage.

B. 220 V average voltage.

C. Voltage and current out of phase by $\pi / 2$

.

D. Voltage and current possibly differing in phase ϕ such that $|\phi| < \frac{\pi}{2}$.

Answer: D

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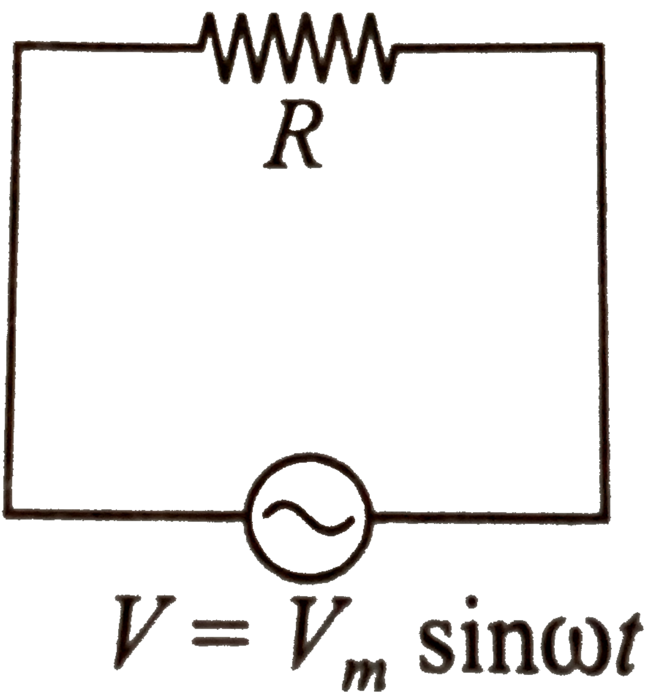
15. An ac source of voltage $V = V_m \sin \omega t$ is connected across the resistance R as shown in figure. The phase relation between current and voltage for this circuit is



A. both are in phase

B. both are out of phase by 90°

C. both are out of phase by 120°

D. both are out of phase by 180°

Answer: A

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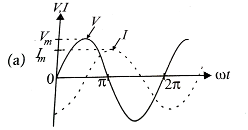
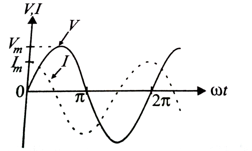
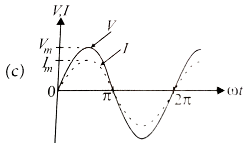
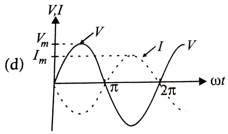
16. The phase relationship between current and voltage in a pure resistive circuit is best represented by

A. 

B. 

C. 

D. 

Answer: C

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17. In an circuit, V and I are given by $V = 150\sin(150t)V$ and $I = 150\sin\left(150t + \frac{\pi}{3}\right)A.$ The power dissipated in the circuit is

A. 106 W

B. 150 W

C. 5625 W

D. zero

Answer: C

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18. In the case of an inductor

A. Voltage lags the current by $\frac{\pi}{2}$

B. Voltage leads the current by $\frac{\pi}{2}$

C. Voltage leads the current by $\frac{\pi}{3}$

D. Voltage leads the current by $\frac{\pi}{4}$

Answer: B

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19. An ideal inductor is in turn put across 220 V, 50 Hz and 220 V, 100 Hz supplies. The current flowing through it in the two cases will be

A. equal

B. different

C. zero

D. infinite

Answer: B

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20. An inductor of 30 mH is connected to a 220 V, 100 Hz ac source. The inductive reactance is

A. 10.58Ω

B. 12.64Ω

C. 18.85Ω

D. 22.67Ω

Answer: C

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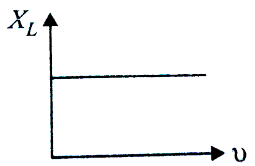
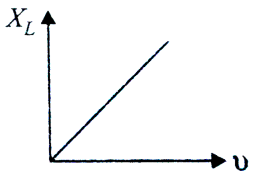
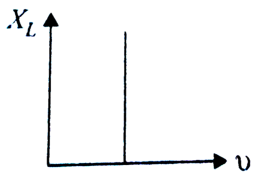
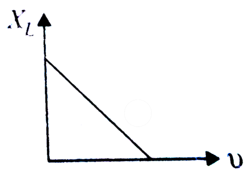
21. Which of the following graphs represent the correct variation of inductive reactance X_L with frequency υ?

A. 

B. 

C. 

D. 

Answer: B

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22. A 44 mH inductor is connected to 220 V, 50 Hz ac supply. The rms value of the current in the circuit is

A. $12.8A$

B. $13.6A$

C. $15.9A$

D. $19.5A$

Answer: C

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23. In a pure capacitive circuit if the frequency of ac source is doubled, then its capacitive reactance will be

A. remains same

B. doubled

C. halved

D. zero

Answer: C

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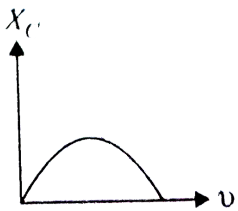
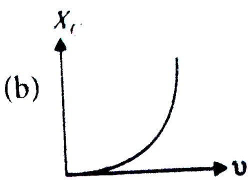
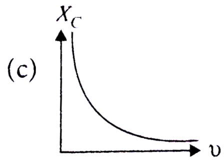
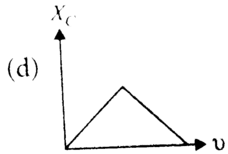
24. Identify the graph which correctly reperesents the variation of capacitive reactance X_C with frequency

A. 

B. 

C. 

D. 

Answer: C

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25. A $5\mu F$ capacitor is connected to a 200 V, 100 Hz ac source. The capacitive reactance is

A. 212Ω

B. 312Ω

C. 318Ω

D. 412Ω

Answer: C

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26. If a capacitor of $8\mu F$ is connected to a 220 V, 100 Hz ac source and the current passing through it is 65 mA, then the rms voltage across it is

A. $129.4V$

B. $12.94V$

C. $1.294V$

D. 15 V

Answer: B

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27. Phase difference between voltage and current in a capacitor in an ac circuit is

A. π

B. $\pi/2$

C. 0

D. $\pi/3$

Answer: B

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28. In an alternating current circuit consisting of elements in series, the current increases on increasing the frequency of supply. Which of the following elements are likely to consitute the circuit ?

A. Only resistor

B. Resistor and inductor

C. Resistor and capacitor

D. Only inductor

Answer: C

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29. A $30\mu F$ capacitor is connected to a 150 V, 60 Hz ac supply. The rms value of current in the circuit is

A. 17 A

B. $1.7A$

C. $1.7mA$

D. $2.7A$

Answer: B

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30. A $60\mu F$ capacitor is connected to a 110 V, 60 Hz a.c. supply Determine the r.m.s value of current in the circuit.

A. $1.49A$

B. $14.9A$

C. $2.49A$

D. $24.9A$

Answer: C

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31. In the question number 30, the net power absorbed by the circuit in one complete cycle is

A. 5 W

B. 10 W

C. 15 W

D. zero

Answer: D

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32. In which of following circuits the maximum power dissipation is observed?

A. Pure capacitive circuit

B. Pure inductive circuit

C. Pure resistive circuit

D. None of these

Answer: C

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33. When an AC voltage of 220 V is applied to the capacitor C

A. the maximum voltage between plates is 220 V.

B. the current is in phase with the applied voltage.

C. the charge on the plate is not in phase with the applied voltage.

D. power delivered to the capacitor per cycle is zero.

Answer: D

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34. An alternating voltage (in volts) given by $V = 200\sqrt{2}\sin(100t)$ is connected to $1\mu F$ capacitor through an ideal ac ammeter in series. The reading of the ammeter and the average power consumed in the circuit shall be

A. 20 mA, 0

B. 20 mA, 4W

C. $20\sqrt{2}mA, 8W$

D. $20\sqrt{2}mA, 4\sqrt{2}W$

Answer: A

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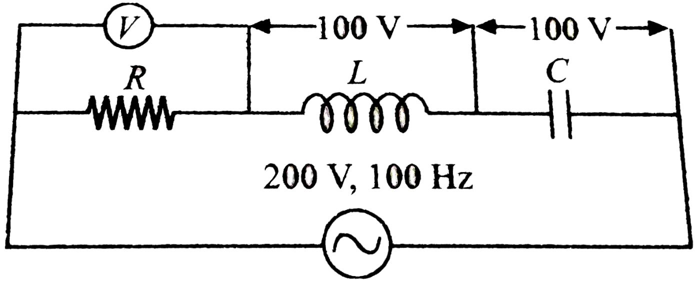
35. In the circuit shown in figure, what will be the reading of the voltmeter ?



A. 300 V

B. 900 V

C. 200 V

D. 400 V

Answer: C

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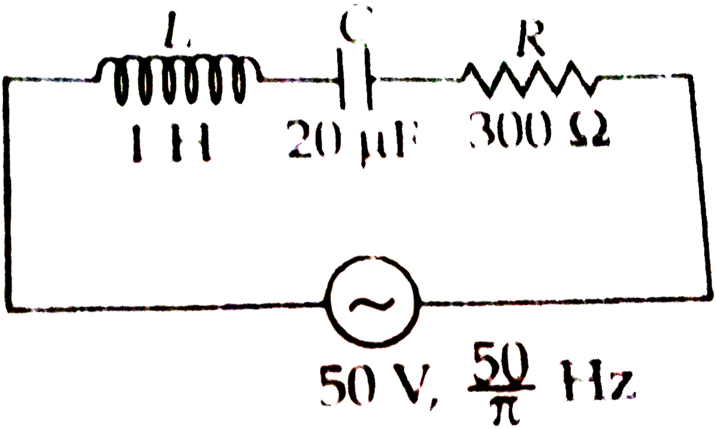
36. In the series LCR circuit shown the impedance is



A. 200Ω

B. 100Ω

C. 300Ω

D. 500Ω

Answer: D

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37. A circuit containing a 20Ω resistor and $0.1\mu F$ capacitor in series is connected to 320 V ac supply of angular frequency $100 \text{ rad } s^{-1}$. The impedance of the circuit is

A. $10^5\Omega$

B. $10^4\Omega$

C. $10^6\Omega$

D. $10^{10}\Omega$

Answer: A

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38. A $0.2k\Omega$ resistor and $15\mu F$ capacitor are connected in series to a 220 V, 50 Hz ac source. The impadance of the circuit is

A. 250Ω

B. 268Ω

C. 29.15Ω

D. 291.5Ω

Answer: D

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39. As the frequency of an ac circuit increases, the current first increases and then decreases. What combination of circuit elements is most likely to comprise the circuit ?

A. Resistor and inductor

B. Resistor and capacitor

C. Resistor, inductor and capacitor

D. None of these

Answer: C

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40. A circuit consists of a resistance 10 ohm and a capacitance of $0.1\mu F$ If an alternating e.m.f. of 100 V. 50 Hz is applied, calculate the current in the circuit.

A. $3.14mA$

B. $6.28mA$

C. $1.51mA$

D. $7.36mA$

Answer: A

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41. 200 V ac source is fed to series LCR circuit having $X_L = 50\Omega$, $X_C = 50\Omega$ and $R = 25\Omega$. Potential drop across the inductor is

A. 100 V

B. 200 V

C. 400 V

D. 10 V

Answer: C

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42. A $100\mu F$ capacitor in series with a 40Ω resistor is connected to a 100 V, 60 Hz supply. The maximum current in the circuit is

A. $2.65A$

B. $2.75A$

C. $2.85A$

D. $2.95A$

Answer: D

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43. In the question number 42, the time lag between the current maximum and the voltage maximum is

A. $15.5 ms$

B. 155 ms

C. $1.55 ms$

D. $1.55 s$

Answer: C

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44. In series LCR circuit, the phase angle between supply voltage and current is

A. $\tan\phi = \frac{X_L - X_C}{R}$

B. $\tan\phi = \frac{R}{X_L - X_C}$

C. $\tan\phi = \frac{R}{X_L + X_C}$

D. $\tan\phi = \frac{X_L + X_C}{R}$

Answer: A

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45. In the question number 44, the phase difference between the voltage across the source and current is

A. 80.2°

B. 31°

C. 50.2°

D. 38.2°

Answer: B

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46. A sinusoidal voltage of peak value 293 V and frequency 50 Hz is applie to a series LCR circuit in which $R = 6\Omega, L = 25mH$ and $C = 750\mu F$. The impedance of the circuit is

A. 7.0Ω

B. 8.9Ω

C. 9.9Ω

D. 10.0Ω

Answer: A

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47. A pure resistive circuit element X when connected to an ac supply of peak voltage 200 V gives a peak current of 5 A which is in phase with the voltage. A second circuit element Y, when connected to the same ac supply also gives the same value of peak current but the current lags behind by 90°. If the series combination of X and Y is connected to the same suply, what will be the rms value of current?

A. $\dfrac{10}{\sqrt{2}}A$

B. $\dfrac{5}{\sqrt{2}}A$

C. $\dfrac{5}{2}A$

D. 5A

Answer: C

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48. An LCR series ac circuit is at resonance with 10 V each across L, C and R. If the resistance is halved, the respective voltage across L, C and R are

A. 10 V, 10 V and 5 V

B. 10 V, 10 V and 10 V

C. 20 V, 20 V and 5 V

D. 20 V, 20 V and 10 V

Answer: D

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49. In a series LCR circuit the voltage across an inductor, capacitor and resistor are 20 V, 20 V and 40 V respectively. The phase difference between the applied voltage and the current in the circuit is

A. 30°

B. 45°

C. 60°

D. 0°

Answer: D

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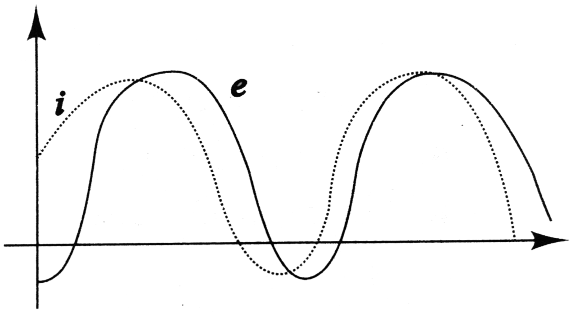
50. When an ac source of emf $e = E_0 \sin(100t)$ is connected across a circuit, the phase difference between emf e and currnet I in the circuit is observed to be $(\pi)/(4)$ as shown in fig. If the circuit consists possibly only of R-C or R-C of L-R series, find the relationship find the relationship between the two elements.



A. $R = 1k\Omega, C = 10\mu F$

B. $R = 1k\Omega, C = 1\mu F$

C. $R = 1k\Omega, L = 10mH$

D. $R = 10k\Omega, L = 10mH$

Answer: A

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51. In a circuit L, C and R are connected in series with an alternating voltage source of frequency f. The current lead the voltages by 45°. The value of C is :

A. $\dfrac{1}{\pi \upsilon (2\pi \upsilon L - R)}$

B. $\dfrac{1}{2\pi \upsilon (2\pi \upsilon L - R)}$

C. $\dfrac{1}{\pi \upsilon (2\pi \upsilon L + R)}$

D. $\dfrac{1}{2\pi \upsilon (2\pi \upsilon L + R)}$

Answer: D

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52. At resonance frequency the impedance in series LCR circuit is

A. maximum

B. minimum

C. zero

D. infinity

Answer: B

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53. An LCR series circuit is under resonance. If I_m is current amplitude, V_m is voltage amplitude, R is the resistance, Z is the impedance, X_L is the inductive reactance and X_C is the capacitive reactance, then

A. $I_m = \frac{Z}{V_m}$

B. $I_m = \frac{V_m}{X_L}$

C. $I_m = \frac{V_m}{X_C}$

D. $I_m = \frac{V_m}{R}$

Answer: D

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54. At resonant frequency the current amplitude in series LCR circuit is

A. maximum

B. minimum

C. zero

D. infinity

Answer: A

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55. The resonant frequency of a series LCR circuit with $L = 2.0H, C = 32\mu F$ and $R = 10\Omega$ is

A. 20 Hz

B. 30 Hz

C. 40 Hz

D. 50 Hz

Answer: A

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56. Obtain the resonant frequency (ω_r) of a series LCR circuit withL = 2.0 H, C = 32 μF and R = 10 ohm. What is the Q value of this circuit ?

A. 15

B. 20

C. 25

D. 30

Answer: C

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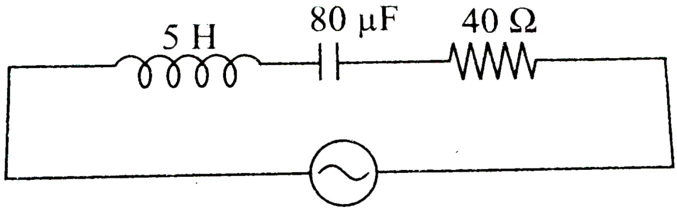
57. Figure shows a series LCR circuit connected to a variable frequency 230 V source.



The source frequency which drives the circuit

the circuit in resonance is

A. 4 Hz

B. 5 Hz

C. 6 Hz

D. 8 Hz

Answer: D

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58. A series LCR circuit has $R = 5\Omega, L = 40mH$ and $C = 1\mu F,$ the bandwidth of the circuit is

A. 10 Hz

B. 20 Hz

C. 30 Hz

D. 40 Hz

Answer: B

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59. In LCR - circuit if resistance increases, quality factor

A. increases finitely

B. decreases finitely

C. remains constant

D. None of these

Answer: B

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60. In a series LCR circuit having $L = 30mH, R = 8\Omega$ and the resonant frequency is 50 Hz. The quality factor of the circuit is

A. 0.118

B. 11.8

C. 118

D. 1.18

Answer: D

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61. A series resonant LCR circuit has a quality factor (Q-factor)=0.4. If $R = 2k\Omega, C = 0.1\mu F$ then the value of inductance is

A. $0.1H$

B. $0.064H$

C. 2 H

D. 5 H

Answer: B

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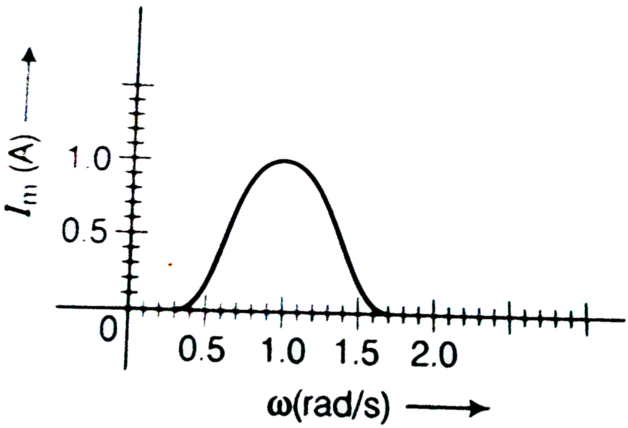
62. In series LCR circuit, the plot of $I_{\max}$ versus ω is shown in figure. Find the bandwith and mark in the figure.



A. zero

B. $0.1 \text{rad} \quad s^{-1}$

C. $0.2\text{rad} \quad s^{-1}$

D. $0.4\text{rad} \quad s^{-1}$

Answer: D

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63. Power dissipated in an $L - C - R$ series circuit connected to an AC source of emf ε is

A. $\dfrac{\varepsilon^2 \sqrt{R^2 + \left(\omega L - \frac{1}{\omega C}\right)^2}}{R}$

B. $\dfrac{\varepsilon^2\left[R^2+\left(\omega L-\frac{1}{\omega C}\right)^2\right]}{R}$

C. $\dfrac{\varepsilon^2 R}{\sqrt{R^2+\left(\omega L-\frac{1}{\omega C}\right)^2}}$

D. $\dfrac{\varepsilon^2 R}{\left[R^2+\left(\omega L-\frac{1}{\omega C}\right)^2\right]}$

Answer: D

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64. A series LCR circuit with $R=20\Omega,\, L=1.5H$ and $C=35\mu F$ is connected to a variable frequency $200V$ ac supply. When the frequency of the supply equals the natural frequency of the circuit, what is the average power in kW transferred to the circuit in one complete cycle?

A. 200 W

B. 2000 W

C. 100 W

D. 4000 W

Answer: B

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65. A series LCR circuit with $R = 22\Omega, L = 1.5H$ and $C = 40\mu F$ is connected to a variable frequency 220 V ac supply. When the frequency of the supply equals the natural frequency of the circuit, what is the average power transferred to the circuit in one complete cycle?

A. 2000 W

B. 2200 W

C. 2400 W

D. 2500 W

Answer: B

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66. An alternating supply of 220 V is applied across a circuit with resistance 22Ω and impedance 44Ω. The power dissipated in the circuit is

A. 1100 W

B. 550 W

C. 2200 W

D. (2200/3) W

Answer: B

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67. Quality factor and power factor both have the dimensions of

A. time

B. frequency

C. work

D. angle

Answer: D

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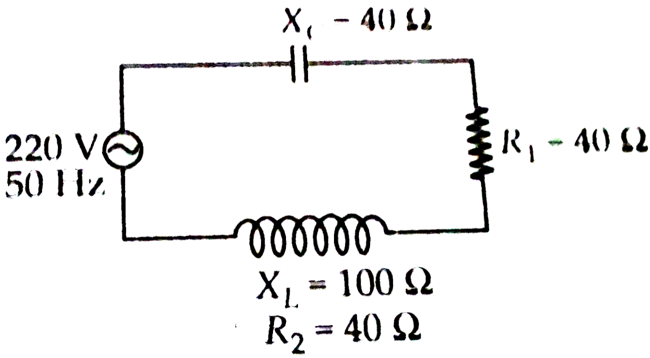
68. The power factor of the circuit as shown in figure is



A. 0.2

B. 0.4

C. 0.8

D. 0.6

Answer: C

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69. A resistor of 500Ω and an inductance of 0.5 H are in series with an ac source which is given by $V = 100\sqrt{2}\sin(1000t)$. The power factor of the combination is

A. $\dfrac{1}{\sqrt{2}}$

B. $\dfrac{1}{\sqrt{3}}$

C. 0.5

D. 0.6

Answer: A

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70. In a series LCR circuit, the phase difference between the voltage and the current is 45°. Then the power factor will be

A. 0.607

B. 0.707

C. 0.808

D. 1

Answer: B

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71. For an LCR circuit, the power transferred from the driving source to the driven oscillator is $P = I^2 Z \cos \phi$.

A. the power factor $\cos \phi \geq 0, P \geq 0$

B. the driving force can give no energy to the oscillator(P = 0) in some cases.

C. the driving force cannot syphon out $(P < 0)$ the energy out of oscillator.

D. all of these.

Answer: D

Watch Video Solution

72. An electrical device draws 2 kW power from ac mains voltage 223 V(rms). The current differs lags in phase by $\phi = \tan^{-1}\left(-\frac{3}{4}\right)$ as compared to valtage. The resistance R in the circuit is

A. 15Ω

B. 20Ω

C. 25Ω

D. 30Ω

Answer: B

Watch Video Solution

73. An inductor 200 mH, capacitor $500\mu F$ and resistor 10Ω are connected in series with a 100 V variable frequency ac source. What is the frequency at which the power factor of the circuit is unity?

A. $10.22Hz$

B. $12.4Hz$

C. $19.2Hz$

D. $15.9Hz$

Answer: D

Watch Video Solution

74. In an electrical circuit R, L, C and an AC voltage source are all connected in series. When L is removed from the circuit, the phase difference between the voltage and the current in the circuit is $\pi / 3$. If instead, C is removed from the circuit, difference the phase difference is again $\pi / 3$. The power factor of the circuit is

A. $\frac{1}{2}$

B. $\frac{1}{\sqrt{2}}$

C. 1

D. $\frac{\sqrt{3}}{2}$

Answer: C

Watch Video Solution

75. A voltage of peak value 283 V and varying frequency is applied to series LCR combination in which $R = 3\Omega, L = 25mH$ and $C = 400\mu F$. Then the frequency (in Hz) of the source at which maximum power is dissipated in the above is

A. 51.5

B. 50.7

C. 51.1

D. 50.3

Answer: D

Watch Video Solution

76. The natural frequency (ω_0) of oscillations in LC circuit is given by

A. $\frac{1}{2\pi}\frac{1}{\sqrt{LC}}$

B. $\frac{1}{\pi}\frac{1}{\sqrt{2LC}}$

C. $\frac{1}{\sqrt{LC}}$

D. $\sqrt{LC}$

Answer: C

Watch Video Solution

77. A fully charged capacitor C with initial charge q_0 is connected to a coil of self inductance L at t=0. The time at which the energy is stored equally between the electric and the magnetic fields is

A. $\frac{\pi}{4}\sqrt{LC}$

B. $2\pi\sqrt{LC}$

C. $\sqrt{LC}$

D. $\pi\sqrt{LC}$

Answer: A

Watch Video Solution

78. A charged 30 μF capacitor is connected to a 27 mH inductor. What is the angular frequency of free oscillations of the circuit ?

A. $1.1 \times 10^{3} \text{rad} \quad s^{-1}$

B. $2.1 \times 10^{3} \text{rad} \quad s^{-1}$

C. $3.1 \times 10^{3} \text{rad} \quad s^{-1}$

D. $4.1 \times 10^{3} \text{rad} \quad s^{-1}$

Answer: A

Watch Video Solution

79. An Lc circuit contains a 40 mH inductor and a $25 \mu F$ capacitor. The resistance of the circuit is negligible.The time is measured from the instant the circuit is closed. The energy stored in the circuit is completely magnetic at time (in milliseconds)

A. $0, 3.14, 6.28$

B. $0, 1.57, 4.71$

C. $1.57, 4.71, 7.85$

D. $1.57, 3.14, 4.71$

Answer: C

Watch Video Solution

80. An LC circuit contains a 20 mH inductor and a $50\mu F$ capacitor with an initial charge of 10 mC. The resistance of the circuit is negligible. Let the instant at which the circuit which is closed be t=0. At what time the energy stored is completely magnetic ?

A. t = 0

B. $t = 1.54ms$

C. $t = 3.14ms$

D. $t = 6.28ms$

Answer: B

Watch Video Solution

81. An LC circuit contains a 20 mH inductor and $25\mu F$ capacitor with an initial charge of 5 mC. The total energy stored in the circuit initially is

A. 5 J

B. $0.5J$

C. 50 J

D. 500 J

Answer: B

Watch Video Solution

82. A $1.5\mu F$ capacitor is charged of 60 V. The charging battery is then disconnected and a 15 mH coil is connected in series with the capacitor so that LC oscillations occur. Assuming that the circuit contains no resistance, the maximum current in this coil shall be close to

A. $1.4A$

B. $1.2A$

C. $0.8A$

D. $0.6A$

Answer: D

Watch Video Solution

83. A condenser of capacity C is charged to a potential difference of V_1. The plates of the condenser are then connected to an ideal inductor of inductance L. The current through the inductor when the potential difference across the condenser reduces to V_2 is

A. $\left(\frac{C(V_1 - V_2)^2}{L}\right)^{\frac{1}{2}}$

B. $\frac{C\left(V_1^2 - V_2^2\right)}{L}$

C. $\frac{C\left(V_1^2 + V_2^2\right)}{L}$

D. $\left(\frac{C\left(V_1^2 - V_2^2\right)}{L}\right)^{\frac{1}{2}}$

Answer: D

Watch Video Solution

84. What is the mechanical equivalent of spring constant k in LC oscillating circuit?

A. $\frac{1}{L}$

B. $\frac{1}{C}$

C. $\frac{L}{C}$

D. $\frac{1}{LC}$

Answer: B

Watch Video Solution

85. A transformer works on the principle of

A. self induction

B. electrical inertia

C. mutual induction

D. magnetic effect of the electricl current

Answer: C

Watch Video Solution

86. Transformer is used to

A. convert ac to dc voltage

B. convert dc to ac voltage

C. obtain desired dc power

D. obtain desired ac voltage and current

Answer: D

Watch Video Solution

87. For an ideal step-down transformer, the quantity which is constant for both the coils is

A. current in the coils

B. voltage across the coils

C. resistance of coils

D. power in the coils

Answer: D

Watch Video Solution

88. Quantity that remains unchanged in a transformer is

A. voltage

B. current

C. frequency

D. None of these

Answer: C

Watch Video Solution

89. The core of a transformer is laminated to reduce

A. flux leakage

B. hysteresis

C. copper loss

D. eddy current

Answer: D

Watch Video Solution

90. The loss of energy in the form of heat in the iron core of a transformer is

A. iron loss

B. copper loss

C. mechanical loss

D. None of these

Answer: A

Watch Video Solution

91. In a transformer the transformation ratio is 0.3. If 220 V ac is fed to the primary, then the voltage across the secondary is

A. 44 V

B. 55 V

C. 60 V

D. 66 V

Answer: D

Watch Video Solution

92. A transformer is used to light a 140 W, 24 V lamp from 240 V AC mains. The current in mains cable is 0.7 A, find the efficiency of transformer.

A. 63.8%

B. 74%

C. 83.3%

D. 48%

Answer: C

Watch Video Solution

93. in a step-up transformer, the turn ratio is $1:2$ leclanche cell (e.m.f. 1.5V) is connected across the primary. The voltage devloped in the secondary would be

A. 3 V

B. $1.5V$

C. $0.75V$

D. zero

Answer: A

Watch Video Solution

94. A transformer has 100 turns in the primary coil and carries $8A$ current. If input power is one kilowatt, the number of turns required in the secondary coil to have $500V$ output will be

A. 100

B. 200

C. 400

D. 300

Answer: C

Watch Video Solution

95. A 60 W load is connected to the secondary of a transformer whose primary draws line voltage. If a current of 0.54 A flows in the load, what is the current in the primary coil? Comment on the types of transformer being used.

A. $0.27mA$

B. $2.7A$

C. $0.27A$

D. $10A$

Answer: C

Watch Video Solution

96. A step down transformer converts transmission line voltage from 11000 V to 220 V. The primary of the transformer has 6000 turns and efficiency of the transformer is 60%.

If the output power is 9 kW, then the input power will be

A. 11 kW

B. 12 kW

C. 14 kW

D. 15 kW

Answer: D

Watch Video Solution

97. In the question number 96, the number of turns in the secondary is

A. 20

B. 80

C. 120

D. 160

Answer: C

View Text Solution

98. A power transmission line feeds input power at 2400 V to a step down transformer with its primary windings having 4000 turns. What should be the number of turns in the secondary windings in order to get output power at 240 V?

A. 400

B. 420

C. 424

D. 436

Answer: A

Watch Video Solution

99. Calculate current drawn by primary coil of a transformer, Which steps down 200 V to 20 V to operate a device of 20 ohm resistance. Assume efficiency of transformer 80 %.

A. $0.125A$

B. $0.225A$

C. $0.325A$

D. $0.425A$

Answer: A

Watch Video Solution

100. A small town with a demand of 800 kW of electric power at 220 V is situated 15 km away from an electric plant generating power at 440 V. The resistance of the two line wires carrying power is 0.5Ω per km. The town gets power from the lines through a 4000-220 V step down transformer at a substation in the town.

Estimate the line power loss in the form of heat.

(b) How much power must the plant supply. assuming there is negligible power loss due to leakage?

(c) Characterize the step up transformer at the plant.

A. 400 kW

B. 600 kW

C. 300 kW

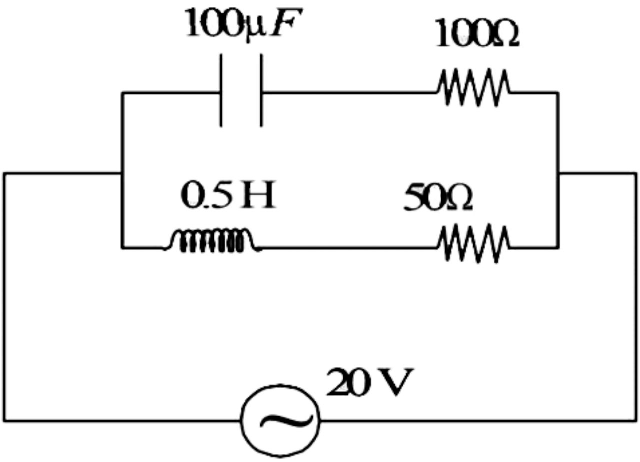
D. 800 W

Answer: B

Watch Video Solution

Hots

1. In the given circuit, the AC source has $(\omega) = 100 rad/s$. Considering the inductor and capacitor to be ideal, the correct choice(s) is (are)



A. the current throughh the circuit, I is 0.3

A.

B. the current through the circuit, I is

$0.3\sqrt{2}$ A.

C. the voltage across 100Ω resistor =10 V.

D. the voltage across 50Ω resistor =10 V.

Answer: A

Watch Video Solution

2. A series R-C combination is connected to an AC voltage of angular frequency $\omega = 500 radian / s$. If the impendance of the R-C circuit is $R\sqrt{1.25}$, the time constant (in millisecond) of the circuit is

A. 2

B. 3

C. 4

D. 5

Answer: C

Watch Video Solution

3. A series LCR circuit containing a resistance of 120Ω has angular resonance frequency $4 \times 10^5 rads^{-1}$. At resonance the vlotage across resistance and inductance are 60V and

40 V, repectively,

At what frequency, the current in the circuit lags the voltage bu 45° ?

A. $16 \times 10^{5}\text{rad} \quad s^{-1}$

B. $8 \times 10^{5}\text{rad} \quad s^{-1}$

C. $4 \times 10^{5}\text{rad} \quad s^{-1}$

D. $2 \times 10^{5}\text{rad} \quad s^{-1}$

Answer: B

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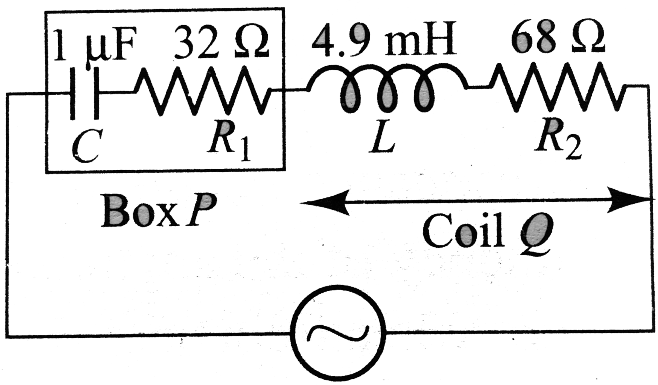
4. A box P and a coil Q are connected in series with an ac source of variable frequency. The emf of the source is constant at 10 V. Box P xontains a capacitance of 32Ω. Coil Q has a self inductance of 4.9 mH and a resistance of 68Ω in series. The frequency is adjusted so that maximum current flows in P and Q.



The impendance of Q at this frequency is

A. $9.76V, 8.92V$

B. $6.29V, 7.96V$

C. $7.70V, 10.92V$

D. $7.70V, 9.76V$

Answer: D

Watch Video Solution

5. A circuit draws a power of 550 watt from a source of 220 volt, $50Hz$. The power factor of the circuit is 0.8 and the current lags in phase behind the potential difference. To make the power factor of the circuit as 1.0, The capacitance should be connected in series with it is

A. $\dfrac{1}{42\pi} \times 10^{-2} F$

B. $\dfrac{1}{41\pi} \times 10^{-2} F$

C. $\dfrac{1}{5\pi} \times 10^{-2} F$

D. $\dfrac{1}{84\pi} \times 10^{-2} F$

Answer: A

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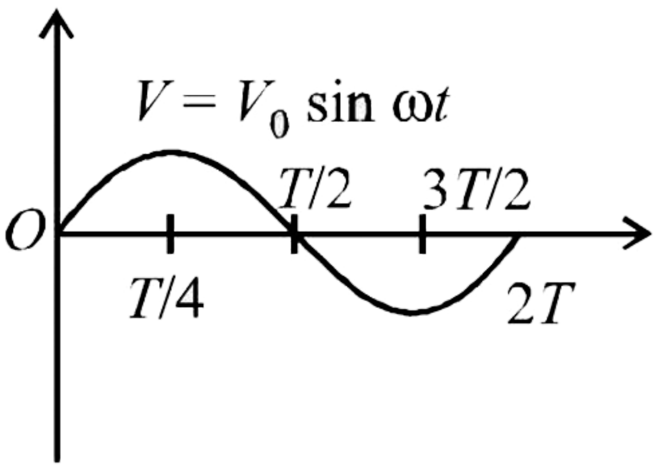
6. In a series L-R circuit $(L = 35mH \text{ and } R = 11\Omega)$, a variable emf source $(V = V_0 \sin \omega t)$ of $V_{rms} = 220V$ and frequency 50 Hz is applied. Find the current amplitude in the circuit and phase of current with respect to voltage. Draw current-time graph on given graph $\left(\pi = \frac{22}{7}\right)$.



A. $10A$

B. 20 A

C. 30 A

D. 40 A

Answer: B

Watch Video Solution

7. Alternating current of peak value $\left(\frac{2}{\pi}\right)$ ampere flows through the primary coil of the transformer. The coefficient of mutual inductance between primary and secondary coil is 1 henry. The peak e.m.f. induced in secondary coil is (Frequency of AC= 50 Hz)

A. 100 V

B. 200 V

C. 300 V

D. 400 V

Answer: B

Watch Video Solution

8. 1 MW power is to be delivered from a power station to a town 10 km away. One uses a pair of Cu wires of radius 0.5 cm for this purpose. Calculate the fraction of ohmic losses to power transimitted if (i) power is transformer is used to boost the voltage to 11000 V, power transmitted, then a step down transformer is used to bring voltages to 220 V. $(\rho_{Cu} = 1.7 \times 10^{-8} SI$unit)

A. $1.8\,\%$

B. 1.5%

C. 3.6%

D. 7.2%

Answer: C

Watch Video Solution

Ncert

1. If the rms current in a 50 Hz ac circuit is 5 A, the value of the current $1/300$ second after its value becomes zero is

A. $5\sqrt{2}A$

B. $5\sqrt{\frac{3}{2}}A$

C. $\frac{5}{6}A$

D. $\frac{5}{\sqrt{2}}A$

Answer: B

Watch Video Solution

2. An alternating current generator has an internal resistance R_g and an internal reactance X_g. It is used to supply power to a passive load consisting of a resistance R_g and a rectance X_L. For maximum power to be delivered from the generator to the load, the value of X_L is equal to

A. zero

B. X_g

C. $-X_g$

D. R_g

Answer: C

Watch Video Solution

3. When a voltage measuring device is connected to a.c. mains the meter shows the steady input voltage of $220V$. This means

A. input voltage cannot be ac voltage, but a dc voltage.

B. maximum input voltage is 220 V

C. the meter reads voltage not V but $< V^2 >$ and is calibrated to read $\sqrt{< V^2 >}$.

D. the pointer of the meter is stuck by some mechanical defect.

Answer: C

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4. To reduce the resonant frequency in an LCR series circuit with a generator

A. the generator frequency should be reduced.

B. another capacitor should be added in parallel to the first.

C. the iron core of the inductor should be removed.

D. dielectric in the capacitor should be removed.

Answer: B

Watch Video Solution

5. Which of the following combinations should be selected for better turning of an LCR circuit used for communication ?

A. $R = 20\Omega, L = 1.5H, C = 35\mu F$

B. $R = 25\Omega, L = 2.5H, C = 45\mu F$

C. $R = 15\Omega, L = 3.5H, C = 30\mu F$

D. $R = 25\Omega, L = 1.5H, C = 45\mu F$

Answer: C

Watch Video Solution

6. A inductor of reactance 1Ω and a resistor of 2Ω are connected in series to the terminals of a 6 V (rms) a.c. source. The power dissipated in the circuit is

A. 8 W

B. 12 W

C. $14.4W$

D. 18 W

Answer: C

Watch Video Solution

7. The output of a step-down transformer is measured to be $24V$ when connected to a 12 watt light bulb. The value of the peak current is

A. $\frac{1}{\sqrt{2}}A$

B. $\sqrt{2}A$

C. $2A$

D. $2\sqrt{2}A$

Answer: A

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Assertion Reason

1. Assertion : An alternating current does not show any magnetic effect.

Reason : Alternating current does not vary with time.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of

assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: C

Watch Video Solution

2. Assertion: Average value of AC over a complete cycle is always zero.

Reason: Average value of AC is always defined over half cycle.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: B

Watch Video Solution

3. Assertion : The capacitive reactance limits the amplitude of the current in a purely capacitive circuit.

Reason : Capacitive reactance is proportional to the frequency and the capacitance.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: C

Watch Video Solution

4. Assertion : The inductive reactance limits amplitude of the current in a purely inductive circuit.

Reason : The inductive reactance is independent of the frequency of the current.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of

assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: C

Watch Video Solution

5. Assertion : In series LCR resonance circuit, the impedance is equal to the ohmic resistance.

Reason : At resonance, the inductive reactance exceeds the capacitive reactance.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: C

Watch Video Solution

6. Assertion : In a purely inductive or capacitive circuit, the current is referred to as wattless currents.

Reason : No power is dissipated in a purely inductive or capacitive circuit even though a current is flowing in the circuit.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: A

Watch Video Solution

7. Assertion : The only element that dissipates energy in an ac circuit is the resistive element.

Reason : There are no power losses associated with pure capacitances and pure inductances in an ac circuit.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: A

Watch Video Solution

8. Assertion : The power in ac circuit is minimum if the circuit has only a resistor.

Reason : Power of a circuit is independent of the phase angle.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: D

Watch Video Solution

9. Assertion : Resonance is exhibited by a circuit only if both L and C are present in the circuit.

Reason : Only then the voltage across L and C cancel each other, both being out of phase.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: A

Watch Video Solution

10. Assertion : When a current flows in the coil of a transformer then its core becomes hot.

Reason : The core of transformer is made of softiron.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of

assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: B

Watch Video Solution

11. Assertion : An ideal transformer does not vary the power.

Reason : An transformer is used to step-up or step-down ac voltages.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: B

Watch Video Solution

12. Assertion : A step-up transformer changes a low voltage into a high voltage.

Reason : This violate the law of conservation of energy.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of

assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: C

Watch Video Solution

13. Assertion : A given transformer can be used to step-up ot step-down the voltage.

Reason : The output voltage depends upon the ratio of the number of turns of the two coils of the transformer.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: A

Watch Video Solution

14. Assertion : A laminated core is used in transformers to increase eddy currents.

Reason : The efficiency of a transformer increases with increase in eddy currents.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: D

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15. Assertion : A transformer cannot work on dc supply.

Reason : dc changes neither in magnitude nor in direction.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: A

Watch Video Solution

Ac Voltage Applied To A Resistor

1. Alternating voltage (V) is represented by the equation

whrere V_m is the peak voltage

A. $V_t = V_m e^{\omega t}$

B. $V_t = V_m \sin \omega t$

C. $V(t) = V_m \cot \omega t$

D. $V(t) = V_m \tan t\omega t$

Answer: B

Watch Video Solution

2. A 100Ω resistor is connected to a 220 V, 50 Hz ac supply.

(a) What is the rms value of current in the circuit?

(b) What is the net power consumed over a full cycle?

A. $1.56A$

B. $1.56mA$

C. $2.2A$

D. $2.2mA$

Answer: C

Watch Video Solution

3. The peak voltage of an ac supply is 440 V, then its rms voltage is

A. $31.11V$

B. $311.1V$

C. $41.11V$

D. $411.1V$

Answer: B

Watch Video Solution

4. In the question number 3, the net power consumed over a full cycle is

A. 586 W

B. 242 W

C. $48.4W$

D. 484 W

Answer: D

View Text Solution

5. The rms value of current in an ac circuit is 25 A, then peak current is

A. $35.36mA$

B. $35.36A$

C. $3.536A$

D. $49.38A$

Answer: B

Watch Video Solution

6. A alternating voltage given by $V = 140 \sin 314t$ is connected across a pure resistor of 50 ohm. Find the rms current through the resistor.

A. $1.98A$

B. $5.63A$

C. $3.536A$

D. $49.39A$

Answer: A

Watch Video Solution

Watch Video Solution

7. If V=100sin (100t)V and I =100sin $\left(100t+\frac{\pi}{3}\right)$ mA are the instantaneous values of voltage and current, respectively

A. $70.7V, 70.7mA$

B. $70.7V, 70.7A$

C. $141.4V, 141.4mA$

D. $100V, 100mA$

Answer: A

Watch Video Solution

8. The voltage over a cycle varies as

$$V = V_0 \sin \omega t \text{ for } 0 \leq t \leq \frac{\pi}{\omega}$$

$$= -V_0 \sin \omega t \text{ for } \frac{\pi}{\omega} \leq t \leq \frac{2\pi}{\omega}$$

The average value of the voltage one cycle is

A. $\dfrac{V_0}{\sqrt{2}}$

B. $\dfrac{V_0}{2}$

C. zero

D. $\dfrac{2V_0}{\pi}$

Answer: D

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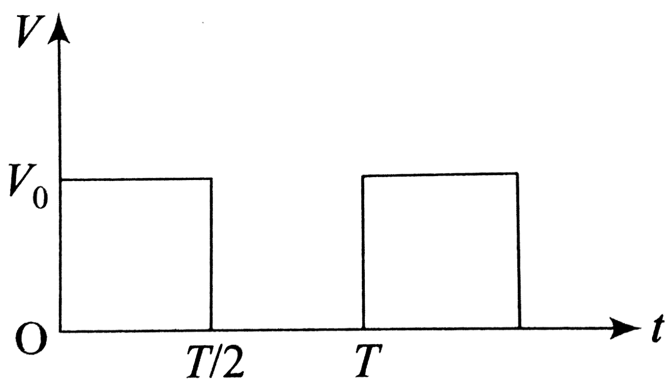
9. The rms value of potential difference V shown in the figure is



A. $\frac{V_0}{\sqrt{3}}$

B. V_0

C. $\frac{V_0}{\sqrt{2}}$

D. $\frac{V_0}{2}$

Answer: C

Watch Video Solution

10. The relation between an ac voltage source and time in SI units is $V = 120\sin(100\pi t)\cos(100\pi t)V$. The value of peak voltage and frequency will be respectively

A. 120 V and 100 Hz

B. $\frac{120}{\sqrt{2}}V$ and 100 Hz

C. 60 and 200 Hz

D. 60 V and 100 Hz

Answer: D

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11. A light bulb is rated at 100 W for a 220 V ac supply . The resistance of the bulb is

A. 284Ω

B. 384Ω

C. 484Ω

D. 584Ω

Answer: C

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12. V(rms)= 220volt , the peak voltage of the source is

A. 305 V

B. 310 V

C. 311 V

D. 315 V

Answer: C

Watch Video Solution

13. An ac source is of $\frac{200}{\sqrt{2}}$ V, 50 Hz. The value of voltage after $\frac{1}{600}s$ from the start is

A. 200 V

B. $\frac{200}{\sqrt{2}}V$

C. 100 V

D. 50 V

Answer: C

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14. The line that draws power supply to your house from street has

A. $220\sqrt{2}V$ average voltage.

B. 220 V average voltage.

C. Voltage and current out of phase by $\pi / 2$

.

D. Voltage and current possibly differing in phase ϕ such that $|\phi| < \frac{\pi}{2}$.

Answer: D

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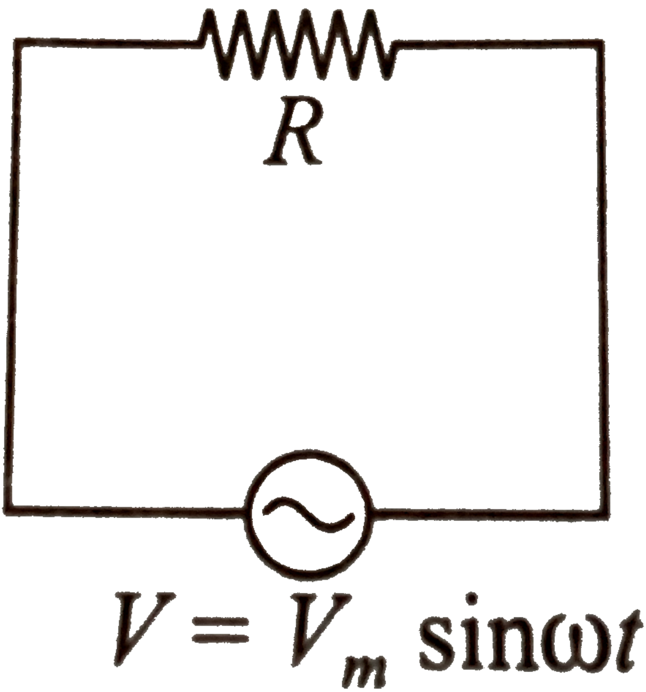
15. An ac source of voltage $V = V_m \sin \omega t$ is connected across the resistance R as shown in figure. The phase relation between current and voltage for this circuit is



A. both are in phase

B. both are out of phase by 90°

C. both are out of phase by 120°

D. both are out of phase by 180°

Answer: A

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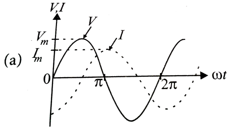
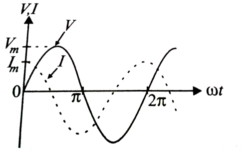
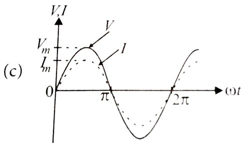
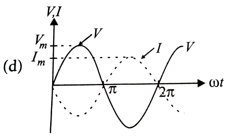
16. The phase relationship between current and voltage in a pure resistive circuit is best represented by

A. 

B. 

C. 

D. 

Answer: C

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17. In an circuit, V and I are given by $V = 150\sin(150t)V$ and $I = 150\sin\left(150t + \frac{\pi}{3}\right)A.$ The power dissipated in the circuit is

A. 106 W

B. 150 W

C. 5625 W

D. zero

Answer: C

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Ac Voltage Applied To A Inductor

1. In the case of an inductor

A. Voltage lags the current by $\frac{\pi}{2}$

B. Voltage leads the current by $\frac{\pi}{2}$

C. Voltage leads the current by $\frac{\pi}{3}$

D. Voltage leads the current by $\frac{\pi}{4}$

Answer: B

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2. An ideal inductor is in turn put across 220 V, 50 Hz and 220 V, 100 Hz supplies. The current flowing through it in the two cases will be

A. equal

B. different

C. zero

D. infinite

Answer: B

Watch Video Solution

3. An inductor of 30 mH is connected to a 220 V, 100 Hz ac source. The inductive reactance is

A. 10.58Ω

B. 12.64Ω

C. 18.85Ω

D. 22.67Ω

Answer: C

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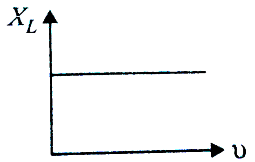
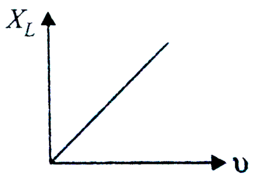
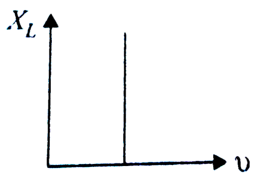
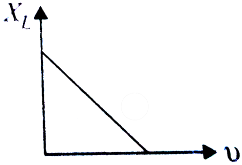
4. Which of the following graphs represent the correct variation of inductive reactance X_L with frequency υ?

A. 

B. 

C. 

D. 

Answer: B

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5. A 44 mH inductor is connected to 220 V, 50 Hz ac supply. The rms value of the current in the circuit is

A. $12.8A$

B. $13.6A$

C. $15.9A$

D. $19.5A$

Answer: C

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Ac Voltage Applied To A Capacitor

1. In a pure capacitive circuit if the frequency of ac source is doubled, then its capacitive reactance will be

A. remains same

B. doubled

C. halved

D. zero

Answer: C

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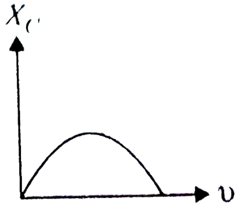
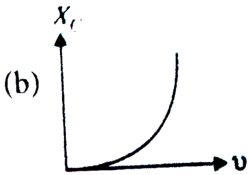
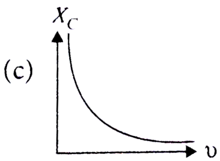
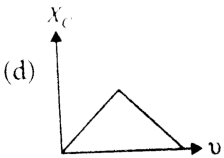
2. Identify the graph which correctly reperesents the variation of capacitive reactance X_C with frequency

A. 

B. 

C. 

D. 

Answer: C

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3. A $5\mu F$ capacitor is connected to a 200 V, 100 Hz ac source. The capacitive reactance is

A. 212Ω

B. 312Ω

C. 318Ω

D. 412Ω

Answer: C

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4. If a capacitor of $8\mu F$ is connected to a 220 V, 100 Hz ac source and the current passing through it is 65 mA, then the rms voltage across it is

A. $129.4V$

B. $12.94V$

C. $1.294V$

D. 15 V

Answer: B

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5. Phase difference between voltage and current in a capacitor in an ac circuit is

A. π

B. $\pi / 2$

C. 0

D. $\pi / 3$

Answer: B

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6. In an alternating current circuit consisting of elements in series, the current increases on increasing the frequency of supply. Which of the following elements are likely to consitute the circuit ?

A. Only resistor

B. Resistor and inductor

C. Resistor and capacitor

D. Only inductor

Answer: C

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7. A $30\mu F$ capacitor is connected to a 150 V, 60 Hz ac supply. The rms value of current in the circuit is

A. 17 A

B. $1.7A$

C. $1.7mA$

D. $2.7A$

Answer: B

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8. A $60\mu F$ capacitor is connected to a 110 V, 60 Hz a.c. supply Determine the r.m.s value of current in the circuit.

A. $1.49A$

B. $14.9A$

C. $2.49A$

D. $24.9A$

Answer: C

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9. In the question number 30, the net power absorbed by the circuit in one complete cycle is

A. 5 W

B. 10 W

C. 15 W

D. zero

Answer: D

View Text Solution

10. In which of following circuits the maximum power dissipation is observed?

A. Pure capacitive circuit

B. Pure inductive circuit

C. Pure resistive circuit

D. None of these

Answer: C

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11. When an AC voltage of 220 V is applied to the capacitor C

A. the maximum voltage between plates is 220 V.

B. the current is in phase with the applied voltage.

C. the charge on the plate is not in phase with the applied voltage.

D. power delivered to the capacitor per cycle is zero.

Answer: D

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12. An alternating voltage (in volts) given by $V = 200\sqrt{2}\sin(100t)$ is connected to $1\mu F$ capacitor through an ideal ac ammeter in series. The reading of the ammeter and the average power consumed in the circuit shall be

A. 20 mA, 0

B. 20 mA, 4W

C. $20\sqrt{2}mA, 8W$

D. $20\sqrt{2}mA, 4\sqrt{2}W$

Answer: A

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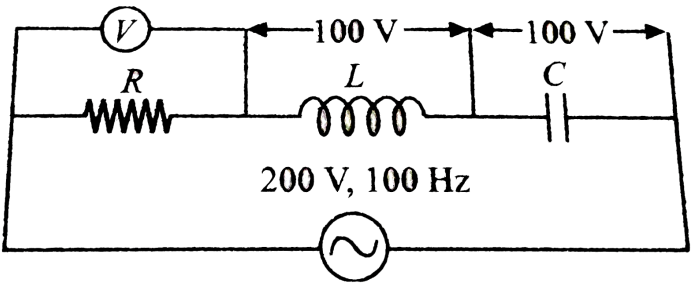
1. In the circuit shown in figure, what will be the reading of the voltmeter ?



A. 300 V

B. 900 V

C. 200 V

D. 400 V

Answer: C

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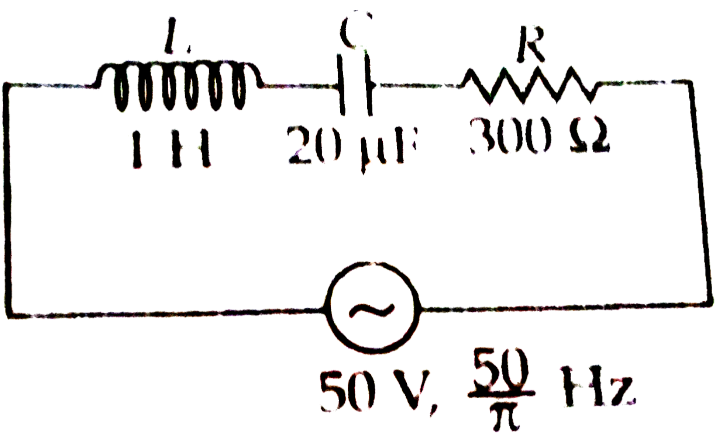
2. In the series LCR circuit shown the impedance is



A. 200Ω

B. 100Ω

C. 300Ω

D. 500Ω

Answer: D

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3. A circuit containing a 20Ω resistor and $0.1\mu F$ capacitor in series is connected to 320 V ac supply of angular frequency $100 \text{ rad } s^{-1}$. The impedance of the circuit is

A. $10^5\Omega$

B. $10^4\Omega$

C. $10^6\Omega$

D. $10^{10}\Omega$

Answer: A

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4. A $0.2k\Omega$ resistor and $15\mu F$ capacitor are connected in series to a 220 V, 50 Hz ac source. The impadance of the circuit is

A. 250Ω

B. 268Ω

C. 29.15Ω

D. 291.5Ω

Answer: D

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5. As the frequency of an ac circuit increases, the current first increases and then decreases.

What combination of circuit elements is most likely to comprise the circuit ?

A. Resistor and inductor

B. Resistor and capacitor

C. Resistor, inductor and capacitor

D. None of these

Answer: C

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6. A circuit consists of a resistance 10 ohm and a capacitance of $0.1\mu F$ If an alternating e.m.f. of 100 V. 50 Hz is applied, calculate the current in the circuit.

A. $3.14mA$

B. $6.28mA$

C. $1.51mA$

D. $7.36mA$

Answer: A

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7. 200 V ac source is fed to series LCR circuit having $X_L = 50\Omega$, $X_C = 50\Omega$ and $R = 25\Omega$. Potential drop across the inductor is

A. 100 V

B. 200 V

C. 400 V

D. 10 V

Answer: C

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8. A $100\mu F$ capacitor in series with a 40Ω resistor is connected to a 100 V, 60 Hz supply. The maximum current in the circuit is

A. $2.65A$

B. $2.75A$

C. $2.85A$

D. $2.95A$

Answer: D

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9. In the question number 42, the time lag between the current maximum and the voltage maximum is

A. $15.5ms$

B. 155 ms

C. $1.55ms$

D. $1.55s$

Answer: C

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10. In series LCR circuit, the phase angle between supply voltage and current is

A. $\tan\phi = \frac{X_L - X_C}{R}$

B. $\tan\phi = \frac{R}{X_L - X_C}$

C. $\tan\phi = \frac{R}{X_L + X_C}$

D. $\tan\phi = \frac{X_L + X_C}{R}$

Answer: A

11. In the question number 44, the phase difference between the voltage across the source and current is

A. 80.2°

B. 31°

C. 50.2°

D. 38.2°

Answer: B

View Text Solution

12. A sinusoidal voltage of peak value 293 V and frequency 50 Hz is applie to a series LCR circuit in which $R = 6\Omega, L = 25mH$ and $C = 750\mu F$. The impedance of the circuit is

A. 7.0Ω

B. 8.9Ω

C. 9.9Ω

D. 10.0Ω

Answer: A

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13. A pure resistive circuit element X when connected to an ac supply of peak voltage 200 V gives a peak current of 5 A which is in phase with the voltage. A second circuit element Y, when connected to the same ac supply also gives the same value of peak current but the current lags behind by 90°. If the series combination of X and Y is connected to the same suply, what will be the rms value of current?

A. $\frac{10}{\sqrt{2}}A$

B. $\frac{5}{\sqrt{2}}A$

C. $\frac{5}{2}A$

D. 5A

Answer: C

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14. An LCR series ac circuit is at resonance with 10 V each across L, C and R. If the resistance is halved, the respective voltage across L, C and R are

A. 10 V, 10 V and 5 V

B. 10 V, 10 V and 10 V

C. 20 V, 20 V and 5 V

D. 20 V, 20 V and 10 V

Answer: D

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15. In a series LCR circuit the voltage across an inductor, capacitor and resistor are 20 V, 20 V and 40 V respectively. The phase difference between the applied voltage and the current in the circuit is

A. 30°

B. 45°

C. 60°

D. 0°

Answer: D

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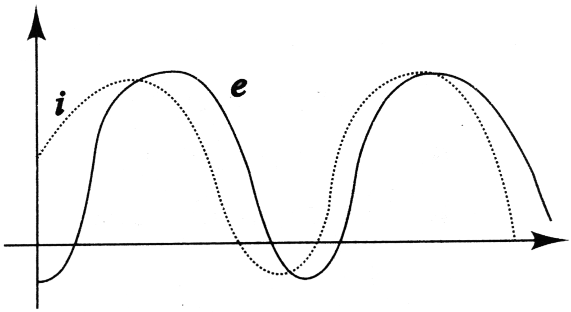
16. When an ac source of emf $e = E_0 \sin(100t)$ is connected across a circuit, the phase difference between emf e and currnet I in the circuit is observed to be $(\pi)/(4)$ as shown in fig. If the circuit consists possibly only of R-C or R-C of L-R series, find the relationship find the relationship between the two elements.



A. $R = 1k\Omega, C = 10\mu F$

B. $R = 1k\Omega, C = 1\mu F$

C. $R = 1k\Omega, L = 10mH$

D. $R = 10k\Omega, L = 10mH$

Answer: A

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17. In a circuit L, C and R are connected in series with an alternating voltage source of frequency f. The current lead the voltages by 45°. The value of C is :

A. $\frac{1}{\pi \upsilon(2\pi \upsilon L - R)}$

B. $\frac{1}{2\pi \upsilon(2\pi \upsilon L - R)}$

C. $\frac{1}{\pi \upsilon(2\pi \upsilon L + R)}$

D. $\frac{1}{2\pi \upsilon(2\pi \upsilon L + R)}$

Answer: D

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18. At resonance frequency the impedance in series LCR circuit is

A. maximum

B. minimum

C. zero

D. infinity

Answer: B

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19. An LCR series circuit is under resonance. If I_m is current amplitude, V_m is voltage amplitude, R is the resistance, Z is the impedance, X_L is the inductive reactance and X_C is the capacitive reactance, then

A. $I_m = \frac{Z}{V_m}$

B. $I_m = \frac{V_m}{X_L}$

C. $I_m = \frac{V_m}{X_C}$

D. $I_m = \frac{V_m}{R}$

Answer: D

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20. At resonant frequency the current amplitude in series LCR circuit is

A. maximum

B. minimum

C. zero

D. infinity

Answer: A

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21. The resonant frequency of a series LCR circuit with $L = 2.0H, C = 32\mu F$ and $R = 10\Omega$ is

A. 20 Hz

B. 30 Hz

C. 40 Hz

D. 50 Hz

Answer: A

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22. Obtain the resonant frequency (ω_r) of a series LCR circuit withL = 2.0 H, C = 32 μF and R = 10 ohm. What is the Q value of this circuit ?

A. 15

B. 20

C. 25

D. 30

Answer: C

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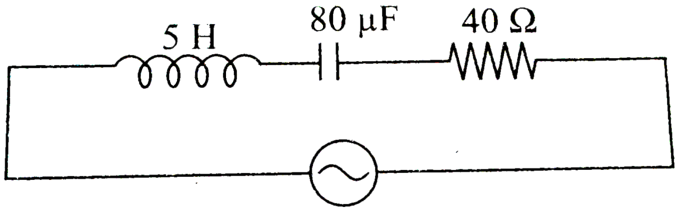
23. Figure shows a series LCR circuit connected to a variable frequency 230 V source.



The source frequency which drives the circuit

the circuit in resonance is

A. 4 Hz

B. 5 Hz

C. 6 Hz

D. 8 Hz

Answer: D

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24. A series LCR circuit has $R = 5\Omega, L = 40mH$ and $C = 1\mu F,$ the bandwidth of the circuit is

A. 10 Hz

B. 20 Hz

C. 30 Hz

D. 40 Hz

Answer: B

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25. In LCR - circuit if resistance increases, quality factor

A. increases finitely

B. decreases finitely

C. remains constant

D. None of these

Answer: B

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26. In a series LCR circuit having $L = 30mH, R = 8\Omega$ and the resonant frequency is 50 Hz. The quality factor of the circuit is

A. 0.118

B. 11.8

C. 118

D. 1.18

Answer: D

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27. A series resonant LCR circuit has a quality factor (Q-factor)=0.4. If $R = 2k\Omega, C = 0.1\mu F$ then the value of inductance is

A. $0.1H$

B. $0.064H$

C. 2 H

D. 5 H

Answer: B

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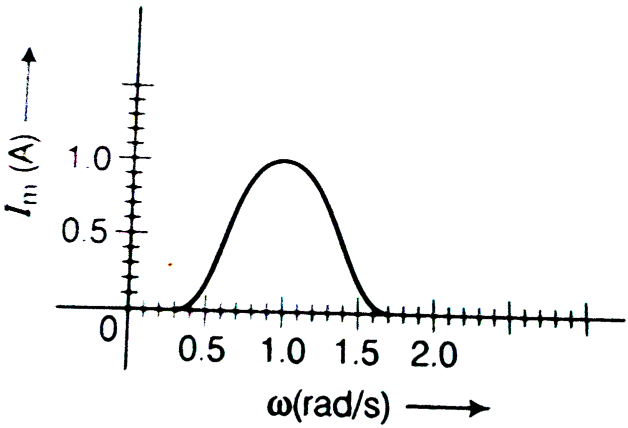
28. In series LCR circuit, the plot of $I_{\max}$ versus ω is shown in figure. Find the bandwith and mark in the figure.



A. zero

B. $0.1 \text{rad } s^{-1}$

C. $0.2\text{rad} \quad s^{-1}$

D. $0.4\text{rad} \quad s^{-1}$

Answer: D

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Power In Ac Circuit

1. Power dissipated in an $L - C - R$ series circuit connected to an AC source of emf ε is

A. $\dfrac{\varepsilon^2\sqrt{R^2+\left(\omega L-\frac{1}{\omega C}\right)^2}}{R}$

B. $\dfrac{\varepsilon^2\left[R^2+\left(\omega L-\frac{1}{\omega C}\right)^2\right]}{R}$

C. $\dfrac{\varepsilon^2 R}{\sqrt{R^2+\left(\omega L-\frac{1}{\omega C}\right)^2}}$

D. $\dfrac{\varepsilon^2 R}{\left[R^2+\left(\omega L-\frac{1}{\omega C}\right)^2\right]}$

Answer: D

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2. A series LCR circuit with $R = 20\Omega, L = 1.5H$ and $C = 35\mu F$ is connected to a variable frequency $200V$ ac supply. When the frequency of the supply equals the natural frequency of the circuit, what is the average power in kW transferred to the circuit in one complete cycle?

A. 200 W

B. 2000 W

C. 100 W

D. 4000 W

Answer: B

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3. A series LCR circuit with $R = 22\Omega, L = 1.5H$ and $C = 40\mu F$ is connected to a variable frequency 220 V ac supply. When the frequency of the supply equals the natural frequency of the circuit, what is the average power transferred to the circuit in one complete cycle?

A. 2000 W

B. 2200 W

C. 2400 W

D. 2500 W

Answer: B

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4. An alternating supply of 220 V is applied across a circuit with resistance 22Ω and impedance 44Ω. The power dissipated in the circuit is

A. 1100 W

B. 550 W

C. 2200 W

D. (2200/3) W

Answer: B

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5. Quality factor and power factor both have the dimensions of

A. time

B. frequency

C. work

D. angle

Answer: D

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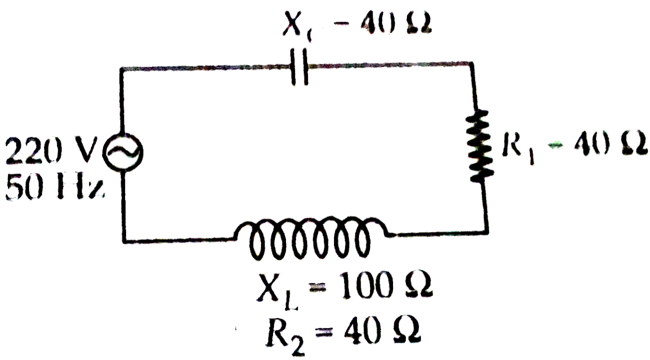
6. The power factor of the circuit as shown in figure is



A. 0.2

B. 0.4

C. 0.8

D. 0.6

Answer: C

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7. A resistor of 500Ω and an inductance of 0.5 H are in series with an ac source which is given by $V = 100\sqrt{2}\sin(1000t)$. The power factor of the combination is

A. $\frac{1}{\sqrt{2}}$

B. $\frac{1}{\sqrt{3}}$

C. 0.5

D. 0.6

Answer: A

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8. In a series LCR circuit, the phase difference between the voltage and the current is 45°. Then the power factor will be

A. 0.607

B. 0.707

C. 0.808

D. 1

Answer: B

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9. For an LCR circuit, the power transferred from the driving source to the driven oscillator is $P = I^2 Z \cos\phi$.

A. the power factor $\cos\phi \geq 0, P \geq 0$

B. the driving force can give no energy to the oscillator($P = 0$) in some cases.

C. the driving force cannot syphon out $(P < 0)$ the energy out of oscillator.

D. all of these.

Answer: D

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10. An electrical device draws 2 kW power from ac mains voltage 223 V(rms). The current differs lags in phase by $\phi = \tan^{-1}\left(-\frac{3}{4}\right)$ as compared to valtage. The resistance R in the circuit is

A. 15Ω

B. 20Ω

C. 25Ω

D. 30Ω

Answer: B

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11. An inductor 200 mH, capacitor $500\mu F$ and resistor 10Ω are connected in series with a 100 V variable frequency ac source. What is the frequency at which the power factor of the circuit is unity?

A. $10.22Hz$

B. $12.4Hz$

C. $19.2Hz$

D. $15.9Hz$

Answer: D

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12. In an electrical circuit R, L, C and an AC voltage source are all connected in series. When L is removed from the circuit, the phase difference between the voltage and the current in the circuit is $\pi/3$. If instead, C is removed from the circuit, difference the phase difference is again $\pi/3$. The power factor of the circuit is

A. $\frac{1}{2}$

B. $\frac{1}{\sqrt{2}}$

C. 1

D. $\frac{\sqrt{3}}{2}$

Answer: C

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13. A voltage of peak value 283 V and varying frequency is applied to series LCR combination in which $R = 3\Omega, L = 25mH$ and $C = 400\mu F$. Then the frequency (in Hz) of the source at which maximum power is dissipated in the above is

A. 51.5

B. 50.7

C. 51.1

D. 50.3

Answer: D

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Lc Oscillations

1. The natural frequency (ω_0) of oscillations in LC circuit is given by

A. $\frac{1}{2\pi}\frac{1}{\sqrt{LC}}$

B. $\frac{1}{\pi}\frac{1}{\sqrt{2LC}}$

C. $\frac{1}{\sqrt{LC}}$

D. $\sqrt{LC}$

Answer: C

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2. A fully charged capacitor C with initial charge q_0 is connected to a coil of self inductance L at t=0. The time at which the energy is stored equally between the electric and the magnetic fields is

A. $\frac{\pi}{4}\sqrt{LC}$

B. $2\pi\sqrt{LC}$

C. $\sqrt{LC}$

D. $\pi\sqrt{LC}$

Answer: A

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3. A charged 30 μF capacitor is connected to a 27 mH inductor. What is the angular frequency of free oscillations of the circuit ?

A. $1.1 \times 10^3 \text{rad} \quad s^{-1}$

B. $2.1 \times 10^3 \text{rad} \quad s^{-1}$

C. $3.1 \times 10^3 \text{rad} \quad s^{-1}$

D. $4.1 \times 10^3 \text{rad} \quad s^{-1}$

Answer: A

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4. An Lc circuit contains a 40 mH inductor and a $25 \mu F$ capacitor. The resistance of the circuit is negligible.The time is measured from the instant the circuit is closed. The energy stored in the circuit is completely magnetic at time (in milliseconds)

A. $0, 3.14, 6.28$

B. $0, 1.57, 4.71$

C. $1.57, 4.71, 7.85$

D. $1.57, 3.14, 4.71$

Answer: C

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5. An LC circuit contains a 20 mH inductor and a $50 \mu F$ capacitor with an initial charge of 10 mC. The resistance of the circuit is negligible. Let the instant at which the circuit which is closed be t=0. At what time the energy stored is completely magnetic ?

A. t = 0

B. $t = 1.54 ms$

C. $t = 3.14 ms$

D. $t = 6.28 ms$

Answer: B

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6. An LC circuit contains a 20 mH inductor and $25\mu F$ capacitor with an initial charge of 5 mC. The total energy stored in the circuit initially is

A. 5 J

B. $0.5J$

C. 50 J

D. 500 J

Answer: B

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7. A $1.5\mu F$ capacitor is charged of 60 V. The charging battery is then disconnected and a 15 mH coil is connected in series with the capacitor so that LC oscillations occur. Assuming that the circuit contains no resistance, the maximum current in this coil shall be close to

A. $1.4A$

B. $1.2A$

C. $0.8A$

D. $0.6A$

Answer: D

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8. A condenser of capacity C is charged to a potential difference of V_1. The plates of the condenser are then connected to an ideal inductor of inductance L. The current through the inductor when the potential difference across the condenser reduces to V_2 is

A. $\left(\frac{C(V_1 - V_2)^2}{L}\right)^{\frac{1}{2}}$

B. $\frac{C(V_1^2 - V_2^2)}{L}$

C. $\frac{C(V_1^2 + V_2^2)}{L}$

D. $\left(\frac{C(V_1^2 - V_2^2)}{L}\right)^{\frac{1}{2}}$

Answer: D

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9. What is the mechanical equivalent of spring constant k in LC oscillating circuit?

A. $\frac{1}{L}$

B. $\frac{1}{C}$

C. $\frac{L}{C}$

D. $\frac{1}{LC}$

Answer: B

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1. A transformer works on the principle of

A. self induction

B. electrical inertia

C. mutual induction

D. magnetic effect of the electricl current

Answer: C

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2. Transformer is used to

A. convert ac to dc voltage

B. convert dc to ac voltage

C. obtain desired dc power

D. obtain desired ac voltage and current

Answer: D

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3. For an ideal step-down transformer, the quantity which is constant for both the coils is

A. current in the coils

B. voltage across the coils

C. resistance of coils

D. power in the coils

Answer: D

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4. Quantity that remains unchanged in a transformer is

A. voltage

B. current

C. frequency

D. None of these

Answer: C

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5. The core of a transformer is laminated to reduce

A. flux leakage

B. hysteresis

C. copper loss

D. eddy current

Answer: D

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6. The loss of energy in the form of heat in the iron core of a transformer is

A. iron loss

B. copper loss

C. mechanical loss

D. None of these

Answer: A

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7. In a transformer the transformation ratio is 0.3. If 220 V ac is fed to the primary, then the voltage across the secondary is

A. 44 V

B. 55 V

C. 60 V

D. 66 V

Answer: D

Watch Video Solution

8. A transformer is used to light a 140 W, 24 V lamp from 240 V AC mains. The current in mains cable is 0.7 A, find the efficiency of transformer.

A. 63.8%

B. 74%

C. 83.3%

D. 48%

Answer: C

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9. in a step-up transformer, the turn ratio is $1:2$ leclanche cell (e.m.f. 1.5V) is connected across the primary. The voltage devloped in the secondary would be

A. 3 V

B. $1.5V$

C. $0.75V$

D. zero

Answer: A

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10. A transformer has 100 turns in the primary coil and carries $8A$ current. If input power is one kilowatt, the number of turns required in the secondary coil to have $500V$ output will be

A. 100

B. 200

C. 400

D. 300

Answer: C

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11. A 60 W load is connected to the secondary of a transformer whose primary draws line voltage. If a current of 0.54 A flows in the load, what is the current in the primary coil? Comment on the types of transformer being used.

A. $0.27 mA$

B. $2.7 A$

C. $0.27 A$

D. $10 A$

Answer: C

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12. A step down transformer converts transmission line voltage from 11000 V to 220 V. The primary of the transformer has 6000

turns and efficiency of the transformer is 60%.

If the output power is 9 kW, then the input power will be

A. 11 kW

B. 12 kW

C. 14 kW

D. 15 kW

Answer: D

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13. In the question number 96, the number of turns in the secondary is

A. 20

B. 80

C. 120

D. 160

Answer: C

View Text Solution

14. A power transmission line feeds input power at 2400 V to a step down transformer with its primary windings having 4000 turns. What should be the number of turns in the secondary windings in order to get output power at 240 V?

A. 400

B. 420

C. 424

D. 436

Answer: A

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15. Calculate current drawn by primary coil of a transformer, Which steps down 200 V to 20 V to operate a device of 20 ohm resistance. Assume efficiency of transformer 80 %.

A. $0.125A$

B. $0.225A$

C. $0.325A$

D. $0.425A$

Answer: A

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16. A small town with a demand of 800 kW of electric power at 220 V is situated 15 km away from an electric plant generating power at 440 V. The resistance of the two line wires carrying power is 0.5Ω per km. The town gets power from the lines through a 4000-220 V step down transformer at a substation in the town.

Estimate the line power loss in the form of heat.

(b) How much power must the plant supply. assuming there is negligible power loss due to leakage?

(c) Characterize the step up transformer at the plant.

A. 400 kW

B. 600 kW

C. 300 kW

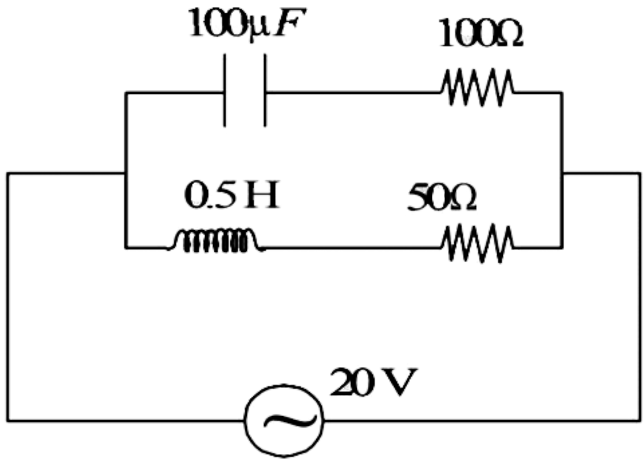
D. 800 W

Answer: B

Watch Video Solution

Higher Order Thinking Skills

1. In the given circuit, the AC source has $(\omega) = 100 rad/s$. Considering the inductor and capacitor to be ideal, the correct choice(s) is (are)



A. the current throughh the circuit, I is 0.3

A.

B. the current through the circuit, I is

$0.3\sqrt{2}$ A.

C. the voltage across 100Ω resistor =10 V.

D. the voltage across 50Ω resistor =10 V.

Answer: A

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2. A series R-C combination is connected to an AC voltage of angular frequency $\omega = 500 radian/s$. If the impendance of the R-C circuit is $R\sqrt{1.25}$, the time constant (in millisecond) of the circuit is

A. 2

B. 3

C. 4

D. 5

Answer: C

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3. A series LCR circuit containing a resistance of 120Ω has angular resonance frequency $4 \times 10^5 rads^{-1}$. At resonance the vlotage across resistance and inductance are 60V and

40 V, repectively,

At what frequency, the current in the circuit lags the voltage bu 45° ?

A. $16 \times 10^5 \text{rad} \quad s^{-1}$

B. $8 \times 10^5 \text{rad} \quad s^{-1}$

C. $4 \times 10^5 \text{rad} \quad s^{-1}$

D. $2 \times 10^5 \text{rad} \quad s^{-1}$

Answer: B

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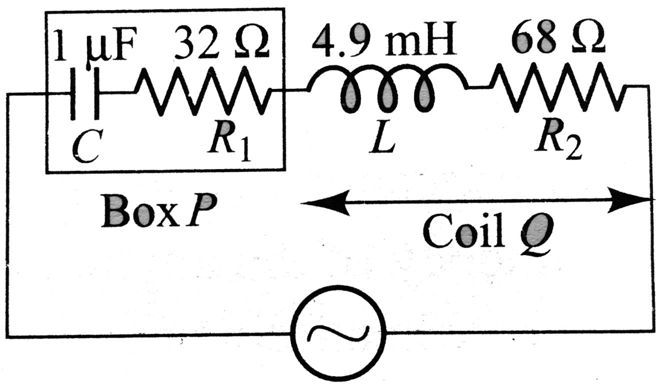
4. A box P and a coil Q are connected in series with an ac source of variable frequency. The emf of the source is constant at 10 V. Box P xontains a capacitance of 32Ω. Coil Q has a self inductance of 4.9 mH and a resistance of 68Ω in series. The frequency is adjusted so that maximum current flows in P and Q.



The impendance of Q at this frequency is

A. $9.76V, 8.92V$

B. $6.29V, 7.96V$

C. $7.70V, 10.92V$

D. $7.70V, 9.76V$

Answer: D

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5. A circuit draws a power of 550 watt from a source of 220 volt, $50Hz$. The power factor of the circuit is 0.8 and the current lags in phase behind the potential difference. To make the power factor of the circuit as 1.0, The capacitance should be connected in series with it is

A. $\frac{1}{42\pi} \times 10^{-2} F$

B. $\frac{1}{41\pi} \times 10^{-2} F$

C. $\frac{1}{5\pi} \times 10^{-2} F$

D. $\frac{1}{84\pi} \times 10^{-2} F$

Answer: A

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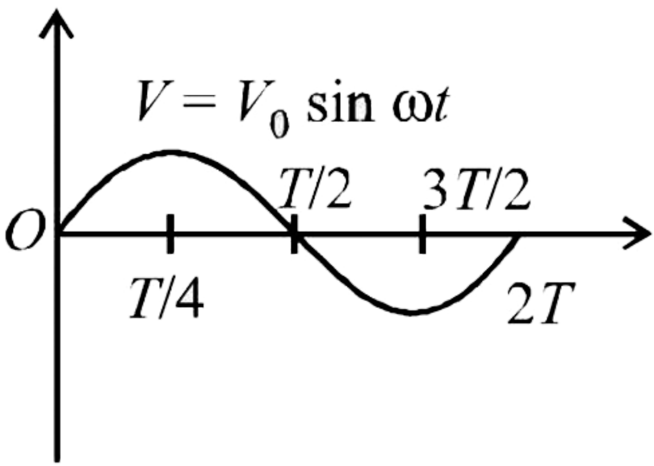
6. In a series L-R circuit $(L = 35mH$ and $R = 11\Omega)$, a variable emf source $(V = V_0 \sin \omega t)$ of $V_{rms} = 220V$ and frequency 50 Hz is applied. Find the current amplitude in the circuit and phase of current with respect to voltage. Draw current-time graph on given graph $\left(\pi = \frac{22}{7}\right)$.



A. $10A$

B. 20 A

C. 30 A

D. 40 A

Answer: B

Watch Video Solution

7. Alternating current of peak value $\left(\frac{2}{\pi}\right)$ ampere flows through the primary coil of the transformer. The coefficient of mutual inductance between primary and secondary coil is 1 henry. The peak e.m.f. induced in secondary coil is (Frequency of AC= 50 Hz)

A. 100 V

B. 200 V

C. 300 V

D. 400 V

Answer: B

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8. 1 MW power is to be delivered from a power station to a town 10 km away. One uses a pair of Cu wires of radius 0.5 cm for this purpose. Calculate the fraction of ohmic losses to power transimitted if (i) power is transformer is used to boost the voltage to 11000 V, power transmitted, then a step down transformer is used to bring voltages to 220 V. $(\rho_{Cu} = 1.7 \times 10^{-8} SI$unit)

A. $1.8\,\%$

B. $1.5\ \%$

C. $3.6\ \%$

D. $7.2\ \%$

Answer: C

Watch Video Solution

Ncert Exemplar

1. If the rms current in a 50 Hz ac circuit is 5 A, the value of the current $1/300$ second after its value becomes zero is

A. $5\sqrt{2}A$

B. $5\sqrt{\frac{3}{2}}A$

C. $\frac{5}{6}A$

D. $\frac{5}{\sqrt{2}}A$

Answer: B

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2. An alternating current generator has an internal resistance R_g and an internal reactance X_g. It is used to supply power to a passive load consisting of a resistance R_g and a rectance X_L. For maximum power to be delivered from the generator to the load, the value of X_L is equal to

A. zero

B. X_g

C. $-X_g$

D. R_g

Answer: C

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3. When a voltage measuring device is connected to a.c. mains the meter shows the steady input voltage of $220V$. This means

A. input voltage cannot be ac voltage, but a dc voltage.

B. maximum input voltage is 220 V

C. the meter reads voltage not V but $< V^2 >$ and is calibrated to read $\sqrt{< V^2 >}$.

D. the pointer of the meter is stuck by some mechanical defect.

Answer: C

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4. To reduce the resonant frequency in an LCR series circuit with a generator

A. the generator frequency should be reduced.

B. another capacitor should be added in parallel to the first.

C. the iron core of the inductor should be removed.

D. dielectric in the capacitor should be removed.

Answer: B

Watch Video Solution

5. Which of the following combinations should be selected for better turning of an LCR circuit used for communication ?

A. $R = 20\Omega, L = 1.5H, C = 35\mu F$

B. $R = 25\Omega, L = 2.5H, C = 45\mu F$

C. $R = 15\Omega, L = 3.5H, C = 30\mu F$

D. $R = 25\Omega, L = 1.5H, C = 45\mu F$

Answer: C

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6. A inductor of reactance 1Ω and a resistor of 2Ω are connected in series to the terminals of a 6 V (rms) a.c. source. The power dissipated in the circuit is

A. 8 W

B. 12 W

C. $14.4W$

D. 18 W

Answer: C

Watch Video Solution

7. The output of a step-down transformer is measured to be $24V$ when connected to a 12 watt light bulb. The value of the peak current is

A. $\frac{1}{\sqrt{2}}A$

B. $\sqrt{2}A$

C. $2A$

D. $2\sqrt{2}A$

Answer: A

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Assertion And Reason

1. Assertion : An alternating current does not show any magnetic effect.

Reason : Alternating current does not vary with time.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of

assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: C

Watch Video Solution

2. Assertion: Average value of AC over a complete cycle is always zero.

Reason: Average value of AC is always defined over half cycle.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: B

Watch Video Solution

3. Assertion : The capacitive reactance limits the amplitude of the current in a purely capacitive circuit.

Reason : Capacitive reactance is proportional to the frequency and the capacitance.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: C

Watch Video Solution

4. Assertion : The inductive reactance limits amplitude of the current in a purely inductive circuit.

Reason : The inductive reactance is independent of the frequency of the current.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of

assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: C

Watch Video Solution

5. Assertion : In series LCR resonance circuit, the impedance is equal to the ohmic resistance.

Reason : At resonance, the inductive reactance exceeds the capacitive reactance.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: C

Watch Video Solution

6. Assertion : In a purely inductive or capacitive circuit, the current is referred to as wattless currents.

Reason : No power is dissipated in a purely inductive or capacitive circuit even though a current is flowing in the circuit.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: A

Watch Video Solution

7. Assertion : The only element that dissipates energy in an ac circuit is the resistive element.

Reason : There are no power losses associated with pure capacitances and pure inductances in an ac circuit.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: A

Watch Video Solution

8. Assertion : The power in ac circuit is minimum if the circuit has only a resistor.

Reason : Power of a circuit is independent of the phase angle.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: D

Watch Video Solution

9. Assertion : Resonance is exhibited by a circuit only if both L and C are present in the circuit.

Reason : Only then the voltage across L and C cancel each other, both being out of phase.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: A

Watch Video Solution

10. Assertion : When a current flows in the coil of a transformer then its core becomes hot.

Reason : The core of transformer is made of softiron.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of

assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: B

Watch Video Solution

11. Assertion : An ideal transformer does not vary the power.

Reason : An transformer is used to step-up or step-down ac voltages.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: B

Watch Video Solution

12. Assertion : A step-up transformer changes a low voltage into a high voltage.

Reason : This violate the law of conservation of energy.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of

assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: C

Watch Video Solution

13. Assertion : A given transformer can be used to step-up ot step-down the voltage.

Reason : The output voltage depends upon the ratio of the number of turns of the two coils of the transformer.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: A

Watch Video Solution

14. Assertion : A laminated core is used in transformers to increase eddy currents.

Reason : The efficiency of a transformer increases with increase in eddy currents.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: D

Watch Video Solution

15. Assertion : A transformer cannot work on dc supply.

Reason : dc changes neither in magnitude nor in direction.

A. If both assertion ans reason are true ans reaason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion istrue but reason is false.

D. If both assertion and reason are false.

Answer: A

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