PHYSICS

BOOKS - UNIVERSAL BOOK DEPOT 1960

PHYSICS (HINGLISH)

ALTERNATING CURRENT

Exercise

1. The power is transmitted from a power house on a voltage AC because

A. Electric current travels faster at higher volts

B. It is more economical due to less power wastage

C. It is difficult to generate power at low voltage

D. Chances of stealing transmission lines are minimized

Answer: B

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2. The potential differences V and the current i flowing through an instrument in an AC circuit of frequency f are given by $V = 5\cos\omega t$ and $I = 2\sin\omega t$ amperes (where $\omega = 2\pi f$). The power dissipated in the instrument is

A. Zero

B. 10 W

C. 5 W

D. 2.5 W

Answer: A

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3. In an AC circuit, V and I are given by $V = 100\sin(100t)vo < s, I = 100\sin\left(100t + \frac{\pi}{3}\right)mA.$

The power dissipated in circuit is

A. 10^4 watt

B. 10 watt

C. 2.5 watt

D. 5 watt

Answer: C

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4. Alternating current can not be measured by D.C. Ammeter because

A. ac cannot pass through dc ammeter

B. Average value of complete cycle is zero

C. ac is virtual

D. ac changes its direction

Answer: B

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5. The resistance of a coil for DC is in ohms. In AC, the resistance

A. Will remain same

B. Will increase

C. Will decrease

D. Will be zero

Answer: b

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6. If instantaneous current is given by $i = 4\cos(\omega t + \varphi)$ amperes, then the $r.\ m.\ s.$ value of current is

A. 4 amperes

B. $2\sqrt{2}$ amperes

C. $4\sqrt{2}$ amperes

D. Zero amperes

Answer: B

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7. In an AC circuit, peak value of voltage is 423 volts. Its effective voltage is

A. 400 volts

B. 323 volts

C. 300 volts

D. 340 volts

Answer: c

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8. In an ac circuit $I = 100 \sin 200\pi t$. The time required for the current to achieve its peak value will be

A. $\frac{1}{100}\text{sec}$

B. $\frac{1}{200}\text{sec}$

C. $\frac{1}{300}\text{sec}$

D. $\frac{1}{400}\text{sec}$

Answer: D

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9. The peak value of Alternating current is 6amp, then r.m.s. value of current will be

A. $3A$

B. $3\sqrt{3}A$

C. $3\sqrt{2}A$

D. $2\sqrt{3}A$

Answer: C

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10. A generator produces a time varying voltage given by $V = 240 \sin 120t,$ where t is in second. The rms voltage and frequency are

A. 60 Hz and 240 V

B. 19 Hz and 120 V

C. 19 Hz and 170 V

D. 754 Hz and 70 V

Answer: C

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11. If E_0 represents the peak value of the voltage in an ac circuit, the r.m.s. value of the voltage will be

A. $\frac{E_0}{\pi}$

B. $\frac{E_0}{2}$

C. $\frac{E_0}{\sqrt{\pi}}$

D. $\frac{E_0}{\sqrt{2}}$

Answer: D

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12. The peak value of AC mains (in volt) is

A. 155.6 volts

B. 220.0 volts

C. 311.0 volts

D. 440 volts

Answer: c

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13. A sinusoidal ac current flows through a resistor of resistance R . If the peak current is I_p , then the power dissipated is

A. $I_p^2 R \cos\theta$

B. $\frac{1}{2} I_p^2 R$

C. $\frac{4}{\pi} I_p^2 R$

D. $\frac{1}{\pi} I_p^2 R$

Answer: B

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14. A 40Ω electric heater is connected to a 200 V , 50 Hz mains supply. The peak value of electric current flowing in the circuit is approximately

A. 2.5 A

B. 5.0 A

C. $7A$

D. $10A$

Answer: c

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15. The frequency of ac mains in India is

A. 30 c/s or Hz

B. 50 c/s or Hz

C. 60 c/s or Hz

D. 120 c/s or Hz

Answer: b

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16. The r.m.s value of an a.c of $59Hz$ is $10A$. The time taken by the alternating current in reaching from zero to maximum value and the peak value of current will be

A. 2×10^{-2} sec and 14.14 amp

B. 1×10^{-2} sec and 7.07 amp

C. 5×10^{-3} sec and 7.07 amp

D. 5×10^{-3} sec and 14.14 amp

Answer: D

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17. The root mean square value of the alternating current is equal to

A. Twice the peak value

B. Half the peak value

C. $\frac{1}{\sqrt{2}}$ times the peak value

D. Equal to the peak value

Answer: C

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18. The peak value of an alternating emf E given by

$E = (E_0)\cos \omega t$

is 10V and frequency is 50 Hz. At time $t = (1/600)s$ the instantaneous value of emf is

A. 10 V

B. $5\sqrt{3}V$

C. 5 V

D. 1 V

Answer: B

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19. In an AC circuit the voltage applied is $E = E_0 \sin \omega t$. The resulting current in the circuit is $I = I_0 \sin\left(\omega t - \frac{\pi}{2}\right)$. The power consumption in the circuit is given by

A. $P = \frac{E_0 I_0}{\sqrt{2}}$

B. $P = \sqrt{2} E_0 I_0$

C. $P = \frac{E_0 I_0}{2}$

D. $P = 0$

Answer: D

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20. In an AC circuit, the instantaneous values of e.m.f and current are $e = 200 \sin 314t$ volt and $i = \sin\left(314t + \frac{\pi}{3}\right)$ ampere. The average power consumed in watt is

A. 200

B. 100

C. 50

D. 25

Answer: C

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21. An AC generator produced an output voltage $E = 170 \sin 377t$ volts , where t is in seconds. The frequnecy of AC voltage is

A. 50 Hz

B. 110 Hz

C. 60 Hz

D. 230 Hz

Answer: C

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22. In general in an alternating current circuit

A. The average value of current is zero

B. The average value of square of the current is zero

C. Average power dissipation is zero

D. The phase difference between voltage and current is zero

Answer: A

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23. An AC is given by the equation $i = i_1 \cos \omega t + i_2 \sin \omega t$. The r.m.s. current is given by

A. $\frac{1}{\sqrt{2}}(i_1 + i_2)$

B. $\frac{1}{\sqrt{2}}(i_1 + i_2)^2$

C. $\frac{1}{\sqrt{2}}\left(i_1^2 + i_2^2\right)^{1/2}$

D. $\frac{1}{2}\left(i_1^2 + i_2^2\right)^{1/2}$

Answer: C

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24. In an AC circuit, the current is given by $i = 5\sin\left(100t - \frac{\pi}{2}\right)$ and the AC potential is $V = 200\sin(100t)$ volt. Then the power consumption is

A. 20 watt

B. 40 watt

C. 1000 watt

D. 0 watt

Answer: D

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25. An electron lamp is conected to $220V, 50Hz$ supply. Then the peak value of voltage is

A. 210 V

B. 211 V

C. 311 V

D. 320 V

Answer: C

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26. In a circuit, the value of the alternating current is measured by hot wire ammeter as 10 ammeter. Its peak

value will be

A. $10A$

B. 20 A

C. 14.14 A

D. 7.07 A

Answer: c

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27. The voltage of domestic ac is 220 volt . What does this represent

A. Mean voltage

B. Peak voltage

C. Root mean voltage

D. Root mean square voltage

Answer: d

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28. The r.m.s. voltage of domestic electricity supply is 220 volt. Electrical appliances should be designed to withstand an instantaneous voltage of

A. 220 V

B. 310 V

C. 330 V

D. 440 V

Answer: b

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29. The process of converting alternating current into direct current is known as

A. Purification

B. Amplification

C. Rectification

D. Current amplification

Answer: c

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30. In an AC circuit with voltage V and current I, the power dissipated is

A. VI

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

C. $\frac{1}{\sqrt{2}}VI$

D. Depends on the phase between V and I

Answer: d

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31. For an ac circuit $V = 15 \sin \omega t$ and $I = 20 \cos \omega t$ the average power consumed in this circuit is

A. 300 watt

B. 150 watt

C. 75 watt

D. zero

Answer: D

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32. A bulb is connected first with DC and the then AC of same voltage then it will shine brightly with

A. AC

B. DC

C. Brightness will be in ratio 1/1.4

D. Equally with both

Answer: D

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33. An AC supply gives $30V_{rms}$ which passes through a 10Ω resistance. The power dissipated in it is

A. $90\sqrt{2}W$

B. $90W$

C. $45\sqrt{2}W$

D. $45W$

Answer: B

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34. The frequency of an alternating voltage is 50 cycles/sec and its amplitude is $120V$. Then the r.m.s value of voltage is

A. 101.3 V

B. 84.8 V

C. 70.7 V

D. 56.5 V

Answer: b

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35. A resistance of 20Ω is connected to a source of an alternating potential $V = 220\sin(100\pi t)$. The time taken by the current to change from the peak value to rms value is

A. 0.2 sec

B. 0.25 sec

C. 25×10^{-3} sec

D. 2.5×10^{-3} sec

Answer: d

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36. Voltage and current in an ac circuit are given by

$V = 5\sin\left(100\pi t - \frac{\pi}{6}\right)$ and $I = 4\sin\left(100\pi t + \frac{\pi}{6}\right)$

A. Voltage leads the current by 30°

B. Current leads the voltage by 30°

C. Current leads the voltage by 60°

D. Voltage leads the current by 60°

Answer: C

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37. If an AC main supply is given to be $220V$. What would be the average e.m.f during a positive half cycle?

A. 198 V

B. 386 V

C. 256 V

D. None of these

Answer: a

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38. In an AC circuit, the mass value of the current I_{rms} is related to the peak current I_0 as

A. $I_{rms} = \frac{1}{\pi} I_0$

B. $I_{rms} = \frac{1}{\sqrt{2}} I_0$

C. $I_{rms} = \sqrt{2} I_0$

D. $I_{rms} = \pi I_0$

Answer: b

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39. An alternating voltage is represented as $E = 20 \sin 300t$. The average value of voltage over one cycle will be

A. Zero

B. 10 volts

C. $20\sqrt{2}$ volt

D. $\frac{20}{\sqrt{2}}$ volt

Answer: a

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40. The ratio of peak value and r.m.s value of an alternating current is

A. 1

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

C. $\sqrt{2}$

D. $1/\sqrt{2}$

Answer: C

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41. A 280 ohm electric bulb is connected to $200V$ electric line. The peak value of current in the bulb will be

A. About one ampere

B. Zero

C. About two ampere

D. About four ampere

Answer: a

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42. An AC source is rated at $220V, 50Hz$. The time taken for voltage to change from its peak value to zero is

A. 50 sec

B. 0.02 sec

C. 5 sec

D. 5×10^{-3} sec

Answer: d

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43. If the value of potential in an ac, circuit is $10V$, then the peak value of potential is

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

B. $10\sqrt{2}$

C. $20\sqrt{20}$

D. $\frac{20}{\sqrt{2}}$

Answer: b

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44. A lamp consumes only $50\,\%$ of peak power in an $a.c.$ circuit. What is the phase difference between the applied voltage and the circuit current

A. $\frac{\pi}{6}$

B. $\frac{\pi}{3}$

C. $\frac{\pi}{4}$

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

Answer: b

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45. If an alternating voltage is represented as $E = 141\sin(628t)$, then the rms value of the voltage and the frequency are respectively

A. 141V, 628 Hz

B. 100V, 50 Hz

C. 100 V, 100 Hz

D. 141 V, 100 Hz

Answer: C

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46. The maximum value of a.c. voltage in a circuit is 707 V . Its rms value is

A. 70.7 V

B. 100 V

C. 500 V

D. 707 V

Answer: C

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47. Choke coil works on the principle of

A. Transient current

B. Self induction

C. Mutual induction

D. Wattless current

Answer: B

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48. A choke coil has.

A. High inductance and low resistance

B. Low inductance and high resistance

C. High inductance and high resistance

D. Low inductance and low resistance

Answer: a

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49. Choke coil is used to control

A. ac

B. dc

C. Both ac and dc

D. Neither ac nor dc

Answer: a

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50. Current in the circuit is wattless, if

A. Inductance in the circuit is zero

B. Resistance in the circuit is zero

C. Current is alternating

D. Resistance and inductance both are zero

Answer: B

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51. The phase angle between e.m.f. and current in LCR series ac circuit is

A. 0 to $\pi/2$

B. $\pi/4$

C. $\pi/2$

D. π

Answer: A

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52. A choke coil is preferred to a rheostate in AC circuit as

A. It consumes almost zero power

B. It increases current

C. It increases power

D. It increases voltage

Answer: a

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53. An alternating e.m.f. is applied to purely capacitive circuit. The phase relation between e.m.f. and current flowing in the circuit is or in a circuit containing capacitance only

A. e.m.f. is ahead of current by $\pi/2$

B. Current is ahead of e.m.f. by $\pi/2$

C. Current lags behind e.m.f. by π

D. Current is ahead of e.m.f. by π

Answer: B

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54. An ac source is connected to a resistive circuits. Which of the following statements are false ?

A. Current leads the voltage and both are in same phase

B. Current lags behind the voltage and both are in same phase

C. Current and voltage are in same phase

D. Any of the above may be true depending upon the value of resistance

Answer: c

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55. Average energy stored in a pure inductance L when current i flows through it, is

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

B. $\frac{1}{4}LI^2$

C. $2Li^2$

D. Zero

Answer: d

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56. An alternating current of frequency $'f'$ is flowing in a circuit containing a resistance R and a choke L in series. The impedence of this circuit is

A. $R + 2\pi fL$

B. $\sqrt{R^2 + 4\pi^2 f^2 L^2}$

C. $\sqrt{R^2 + L^2}$

D. $\frac{10}{2\pi} Hz$

Answer: b

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57. A resonant AC circuit contains a capacitor of capacitance $10^{-6} F$ and an inductor of $10^{-4} H$. The frequency of electrical oscillation will be

A. $10^5 Hz$

B. $10 Hz$

C. $\frac{10^5}{2\pi} Hz$

D. $\frac{10}{2\pi} Hz$

Answer: C

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58. Power delivered by an ac source of angular frequency ω_0 to an LCR series circuit is maximum when .

A. $\omega L = \omega C$

B. $\omega L = \frac{1}{\omega C}$

C. $\omega L = -\left(\frac{1}{\omega C}\right)^2$

D. $\omega L = \sqrt{\omega C}$

Answer: B

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59. An alternating voltage is connected in series with a resistance R and inductance L if the potential drop across the resistance is $200V$ and across the inductance is $150V$, then the applied voltage is

A. 350 V

B. 250 V

C. 500 V

D. 300 V

Answer: b

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60. An inductive circuit a resistance of $10ohm$ and an inductance of 2.0 henry. If an AC voltage of 120volt and frequency of $60Hz$ is applied to this circuit, the current in the circuit would be nearly

A. 0.32 amp

B. 0.016 amp

C. 0.48 amp

D. 0.80 amp

Answer: b

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61. Same current is flowing in two alternating circuits. The first circuit contains only inductances and the other contains only a capacitor, if the frequency of the e.m.f of AC is increased, the effect on the value of the current will be

A. Increases in the first circuit and decreases in the other

B. Increases in both the circuits

C. Decreases in both the circuits

D. Decreases in the first circuit and increases in the other

Answer: D

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62. A capacitor becomes a perfect insulator for

A. Alternating currents

B. Direct currents

C. Both ac and dc

D. None of these

Answer: b

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63. In a circuit containing an inductance of zero resistances, the e.m.f of the applied AC voltage leads the current by

A. 90°

B. 45°

C. 30°

D. 0°

Answer: a

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64. In a pure inductive circuit or In an ac circuit containing inductance only, the current

A. Leads the e.m.f. by 90°

B. Lags behind the e.m.f. by 90°

C. Sometimes leads and sometime lags behind the e.m.f.

D. Is in phase with the e.m.f.

Answer: B

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65. A 20volts AC is applied to a circuit consisting of a resistance and a coil with negligible resistance. If the voltage across the resistance is $12V$, the voltage across the coil is

A. 16 volts

B. 10 volts

C. 8 volts

D. 6 volts

Answer: a

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66. A resistance of 300Ω and an inductance of $\frac{1}{\pi}$ henry are connected in series to an AC voltage of 20volts and $200Hz$ frequency. The phase angle between the voltage and current is

A. $\tan^{-1}\frac{4}{3}$

B. $\tan^{-1}\frac{3}{4}$

C. $\tan^{-1}\frac{3}{2}$

D. $\tan^{-1}\frac{2}{5}$

Answer: a

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67. The power factor of LCR circuit at resonance is-

A. 0.707

B. 1

C. Zero

D. 0.5

Answer: B

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68. An inductance of 1 mH a condenser of $10\mu F$ and a resistance of 50Ω are connected in series. The

reactances of inductor and condensers are same. The reactance of either of them will be

A. 100Ω

B. 30Ω

C. 3.2Ω

D. 10Ω

Answer: d

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69. The natural frequency of a L - C circuit is equal to

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

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

C. $\frac{1}{2\pi}\sqrt{\frac{L}{C}}$

D. $\frac{1}{2\pi}\sqrt{\frac{C}{L}}$

Answer: b

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70. An alternating voltage $E = 200\sqrt{2}\sin(100t)$ is connected to a 1 microfarad capacitor through an AC ammeter. The reading of the ammeter shall be

A. 10 mA

B. 20 mA

C. 40 mA

D. 80 mA

Answer: b

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71. An AC circuit consists of an inductor of inductance $0.5H$ and a capacitor of capacitance $8\mu F$ in series. The current in the circuit is maximum when the angular frequency of AC source is

A. 500 rad/sec

B. 2×10 rad/sec

C. 4000 rad/sec

D. 5000 rad/sec

Answer: a

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72. The average power dissipation in a pure capacitance in AC circuit is

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

B. CV^2

C. $\frac{1}{4}CV^2$

D. Zero

Answer: D

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73. In a region of uniform magnetic induction $B = 10^2$ tesla, a circular coil of radius $30cm$ and resistance π^2 ohm is rotated about an axis which is perpendicular to the directon of B and which form a diameter of the coil. If the coil rotates at $200\mathrm{rpm}$ the amplitude of the alternating current induced in the coil is

A. $4\pi mA$

B. $30mA$

C. $6mA$

D. $200mA$

Answer: c

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74. An inductive circuit a resistance of $10ohm$ and an inductance of 2.0 henry. If an AC voltage of 120volt and frequency of $60Hz$ is applied to this circuit, the current in the circuit would be nearly

A. 0.32 amp

B. 0.16 amp

C. 0.48 amp

D. 0.80 amp

Answer: b

75. In a LCR circuit having $L = 8.0$ henry, $C = 0.5\mu F$ and $R = 100$ ohm in series. The resonance frequency in per second is

A. 600 radian

B. 600 Hz

C. 500 radian

D. 500 Hz

Answer: c

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76. in a LCR circuit capacitance is chagned from C to 2C. For the resomat frequency to remain unchaged, the inductance should be chagned from L to

A. 2L

B. $L/2$

C. $L/4$

D. $4L$

Answer: c

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77. A 120 volt AC source is connected across a pure inductor of inductance 0.70 henry. If the frequency of the source is $60Hz$, the current passing through the inductor is

A. 4.55 amps

B. 0.355 amps

C. 0.455 amps

D. 3.55 amps

Answer: c

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78. The impedence of a circuit consists of $3ohm$ resistance and $4ohm$ reactance. The power factor of the circuit is

A. 0.4

B. 0.6

C. 0.8

D. 1

Answer: b

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79. L, C and R represent the physical quantities, inductance, capacitance and resistance respectively. The combination(s) which have the dimensions of frequency are

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

B. $\frac{R}{L}$

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

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

Answer: d

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80. The power factor of a good choke coil is

A. Nearly zero

B. Exactly zero

C. Nearly one

D. Exactly one

Answer: a

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81. If resistance of 100Ω , inductance of 0.5 henry and capacitor of $10 \times 10^{-6}F$ are connected in series through $50Hz$ AC supply, then impedence is

A. 1.876

B. 18.76

C. 189.72

D. 101.3

Answer: c

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82. An alternating current source of frequency $100Hz$ is joined to a combination of a resistance, a capacitance and a coil in series. The potential difference across the coil, the resistance and the capacitor is $46, 8 \text{ and } 40$

volt respectively. The electromotive force of alternating current source in volt is

A. 94

B. 14

C. 10

D. 76

Answer: c

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83. A 10 ohm resistance, $5mH$ coil and $10\mu F$ capacitor are joined in series. When a suitable frequency alternating current source is joined to this combination,

the circuit resonates. If the resistance is halved, the resonance frequency

A. Is halved

B. Is doubled

C. Remains unchanged

D. In quadrupled

Answer: C

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84. L,C and R represent the physical quantities inductance, capacitance and resistance respectively.

Which of the following combinations have dimensions of frequency?

A. LC

B. $(LC)^{-1/2}$

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

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

Answer: b

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85. In a series circuit $R = 300\Omega, L = 0.9H, C = 2.0\mu F$ and $\omega = 1000 rad/\sec$. The impedence of the circuit is

A. 1300Ω

B. 900Ω

C. 500Ω

D. 400Ω

Answer: C

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86. In a $L-R$ circuit, the value of L is $\left(\frac{0.4}{\pi}\right)$ henry and the value of R is 30 ohm. If in the circuit, an alternating e.m.f of 200 vol at 50 cycles per sec is connected, the impendence of the circuit will be

A. 11.4Ω, $17.5A$

B. 30.7Ω, $6.5A$

C. 40.4Ω, $5A$

D. 50Ω, $4A$

Answer: d

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87. The reactance of a coil when used in the domestic AC power supply $(220V, 50cycles)$ is $100ohm$. The selfinductance of the coil is nearly

A. 3.2 henry

B. 0.32 henery

C. 2.2 henry

D. 0.22 henry

Answer: b

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88. In a series LCR circuit, operated with an ac of angular frequency ω, the total impedance is

A. $\left[R^2+(L\omega-C\omega)^2\right]^{1/2}$

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

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

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

Answer: B

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89. The reactance of a $25\mu F$ capacitor at the AC frequency of $4000Hz$ is

A. $\frac{5}{\pi}ohm$

B. $\sqrt{\frac{5}{\pi}}ohm$

C. $10ohm$

D. $\sqrt{10}ohm$

Answer: A

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90. The frequency for which a $5\mu F$ capacitor has a reactance of $\frac{1}{100}$ ohm is given by

A. $\frac{100}{\pi} MHz$

B. $\frac{1000}{\pi} Hz$

C. $\frac{1}{1000} Hz$

D. $1000 Hz$

Answer: a

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91. An e.m.f. $E = 4\cos(1000t)$volt is applied to an LR circuit of inductance $3mH$ and resistance $4ohm$. The amplitude of current in the circuit is

A. $\frac{4}{\sqrt{7}}A$

B. $1.0A$

C. $\frac{4}{7}A$

D. $0.8A$

Answer: d

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92. In an AC circuit, a resistance of $Rohm$ is connected is series with an inductance L. If phase angle between volage and current be 45°, the value of inductive reactance will be

A. $\frac{R}{4}$

B. $\frac{R}{2}$

C. R

D. Cannot be found with the given data

Answer: c

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93. A coil of inductance L has an inductive reactance of X_L in an AC circuit in which the effective current is I. The coil is made from a super-conducting material and has no resistance. The rate at which power is dissipated in the coil is

A. 0

B. IX_L

C. I^2X_L

D. IX_L^2

Answer: a

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94. The phase difference between the current and voltage of LCR circuit in series combination at resonance is

A. 0

B. $\pi/2$

C. π

D. $-\pi$

Answer: a

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95. In a series resonant circuit, the AC voltage across resistance R, inductance L, and capacitance C are $5V$, $10V$ and $10V$ respectively. The AC voltage applied to the circuit will be

A. 20 V

B. 10 V

C. 5 V

D. 25 V

Answer: c

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96. When 100volts DC is applied across a coil, a current of $1amp$ flows through it. When 100 volt AC at 50 cycles s^{-1} is applied to the same coil, only 0.5 ampere current follows.then the impedence of the coil is

A. 100Ω

B. 200Ω

C. 300Ω

D. 400Ω

Answer: b

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97. The coefficient of induction of a choke coil is $0.1H$ and resistance is 12Ω. If it is connected to an alternating current source of frequency $60Hz$, then power factor will be

A. 0.32

B. 0.30

C. 0.28

D. 0.24

Answer: b

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98. For series LCR circuit, correct statements are

A. Applied e.m.f. and potential difference across resistance are in same phase

B. Applied e.m.f. and potential difference at inductor coil have phase difference of $\pi/2$

C. Potential difference at capacitor and inductor have phase difference of $\pi/2$

D. Potential difference across resistance and capacitor have phase difference of $\pi/2$

Answer: c

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99. In a purely resistive ac circuit, the current

A. Lags behind the e.m.f. in phase

B. Is in phase with the e.m.f.

C. Leads the e.m.f. in phase

D. Leads the e.m.f. in half the cycle and lags behind it in the other half

Answer: B

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100. If an 8Ω resistance and 6Ω reactance are present in an AC series circuit then the impedence of the circuit will be

A. 20 ohm

B. 14 ohm

C. 10 ohm

D. $14\sqrt{2}$ ohm

Answer: C

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101. A $12ohm$ resistor and a 0.21 henry inductor are connected in series to an AC source operating at 20volts,50 cycle/second. The phase angle between the current and the source voltage is

A. 30°

B. 40°

C. 80°

D. 90°

Answer: c

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102. What will be the phase difference between virtual voltage and virtual current, when the current in the circuit is wattless

A. 90°

B. 45°

C. 180°

D. 60°

Answer: a

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103. The resonant frequency of a circuit is f. If the capacitance is made 4 times the initial values, then the resonant frequecy will become

A. $f/2$

B. $2f$

C. f

D. $f/4$

Answer: a

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104. In the non-resonant circuit, what will be the nature of the circuit for frequencies heigher than the resonant frequency?

A. Resistive

B. Capacitive

C. Inductive

D. None of the above

Answer: b

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105. In an ac circuit the potential differences across an inductance and resistance joined in series are, respectively, 16 V and 20 V. The total potential difference across the circuit is

A. 20.0 V

B. 25.6 V

C. 31.9 V

D. 53.5 V

Answer: b

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106. A 220 V , 50 Hz ac source is connected to an inductance of 0.2 H and a resistance of 20 ohm in series. What is the current in the circuit

A. $10A$

B. $5A$

C. 33.3 A

D. 3.33 A

Answer: d

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107. An LCR circuit contains $R = 50\Omega$, $L = 1mH$ and $C = 0.1\mu F$. The impedence of the circuit will be minimum for a frequency of

A. $\frac{10^5}{2\pi} s^{-1}$

B. $\frac{10^6}{2\pi} s^{-1}$

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

D. $2\pi \times 10^6 s^{-1}$

Answer: A

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108. In a series LCR circuit, resistance $R = 10\Omega$ and the impedence $Z = 20\Omega$ the phase difference between the current and the voltage is

A. 30°

B. 45°

C. 60°

D. 90°

Answer: C

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109. A series AC circuit consists of an inductor and a capacitor. The inductance and capacitance is respectively 1henry and $25\mu F$ if the current is maximum in circuit then angular frequency will be

A. 200

B. 100

C. 50

D. $200/2\pi$

Answer: a

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110. An alternating EMF of frequency $\frac{1}{2\pi\sqrt{LC}}$ is applied to a series LCR circuit. For this frequency of the applied EMF,

A. The circuit is at resonance and its impedance is made up only of a reactive part

B. The current in the circuit is in phase with the applied e.m.f. and the voltage across R equals this applied emf

C. The sum of the p.d.'s across the inductance and capacitance equals the applied e.m.f. which is 180° ahead of phase of the current in the circuit

D. The quality factor of the circuit is $\omega L/R$ or $1/\omega CR$ and this is a measure of the voltage magnification (produced by the circuit at resonance) as well as the sharpness of resonance of the circuit

Answer: bd

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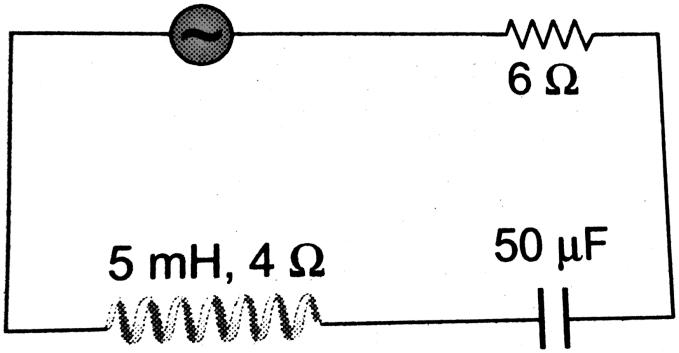
111. In the circuit below, the AC source the voltage $V = 20\cos(\omega t)$ volts with $\omega = 2000 rad/\sec.$ The

amplitude of the current will be nearest to



A. $2A$

B. $3.3A$

C. $2/\sqrt{5}A$

D. $\sqrt{5}A$

Answer: a

Watch Video Solution

112. The value of the current through an inductance of 1 H and of negligible resistance, when connected through an ac source of 200 V and 50 Hz , is

A. 0.637 A

B. 1.637 A

C. 2.637 A

D. 3.637

Answer: a

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113. The quality factor of LCR circuit having resistance (R) and inductance (L) at resonance frequency (ω) is given by

A. $\frac{\omega L}{R}$

B. $\frac{R}{\omega L}$

C. $\left(\frac{\omega L}{R}\right)^{1/2}$

D. $\left(\frac{\omega L}{R}\right)^{2}$

Answer: a

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114. Power factor is maximum in an LCR circuit when

A. $X_L = X_C$

B. $R = 0$

C. $X_L = 0$

D. $X_C = 0$

Answer: a

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115. In an AC circuit the reactance of a coil is $\sqrt{3}$ times its resistance, the phase difference between the voltage across the current through the coil will be

A. $\pi / 3$

B. $\pi/2$

C. $\pi/4$

D. $\pi/6$

Answer: a

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116. The capacitance of a pure capacitance is 1 farad. In DC circuits, its effective resistance will be

A. Zero

B. Infinite

C. 1 ohm

D. 1/2 ohm

Answer: b

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117. In an ac circuit, the current lags behind the voltage by $\pi / 3$. The components in the circuit are

A. R and L

B. R and C

C. L and C

D. Only R

Answer: A

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118. The reactance of a coil when used in the domestic AC power supply $(220V, 50cycles)$ is $50ohm$. The inductance of the coil is nearly

A. 2.2 henry

B. 0.22 henry

C. 1.6 henry

D. 0.16 henry

Answer: d

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119. In an AC circuit, the power factor

A. Is zero when the circuit contains an ideal resistance only

B. Is unity when the circuit contains an ideal resistance only

C. Is zero when the circuit contains an ideal inductance only

D. Is unity when the circuit contains an ideal inductance only

Answer: bc

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120. A resistance of 40 ohms and an inductance of 95.5 millihenry are connected in series in a 50 cycle/sec AC circuit. The impedence of this combination is very nearly

A. 30 ohm

B. 40 ohm

C. 50 ohm

D. 60 ohm

Answer: c

Watch Video Solution

121. For high frequency, a capacitor offers

A. More reactance

B. Less reactance

C. Zero reactance

D. Infinite reactance

Answer: b

Watch Video Solution

122. The coil of choke in a circuit

A. Increases the current

B. Decreases the current

C. Does not change the current

D. Has high resistance to dc circuit

Answer: b

Watch Video Solution

123. In a circuit, the current lags behind the voltage by a phase difference of $\pi / 2$, the circuit will contain which of the following ?

A. Only R

B. Only L

C. Only C

D. R and C

Answer: b

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124. Reactance of an inductor of $\frac{1}{\pi}$ henry at $50Hz$ frequency is

A. $\frac{50}{\pi}ohm$

B. $\frac{\pi}{50}ohm$

C. $100ohm$

D. $50ohm$

Answer: c

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125. An oscillator circuit consists of an inductance of $0.5mH$ and a capacitor of $20\mu F$. The resonant frequency of the circuit is nearly

A. 15.92 Hz

B. 159.2 Hz

C. 1592 Hz

D. 15910 Hz

Answer: c

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126. Reactance of a capacitor of capacitance $C\mu F$ for ac frequency $\frac{400}{\pi}Hz$ is 25Ω . The value C is

A. $50\mu F$

B. $25\mu F$

C. $100\mu F$

D. $75\mu F$

Answer: a

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127. The power factor of an AC circuit having resistance (R) and inductance (L) connected in series and an angular velocity ω is

A. $R/\omega L$

B. $R/\left(R^2+\omega^2L^2\right)^{1/2}$

C. $\omega L/R$

D. $R/\left(R^2-\omega^2L^2\right)^{1/2}$

Answer: B

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128. A circuit has a resistance of 11Ω, an inductive reactance of 25Ω, and a capacitive resistance of 18Ω. It is connected to an AC source of $260V$ and $50Hz$. The current through the circuit (in amperes) is

A. 11

B. 15

C. 18

D. 20

Answer: d

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129. A 0.7 henry inductor is connected across a $120V - 60HzAC$ source. The current in the inductor will be very nearly

A. 4.55 amp

B. 0.355 amp

C. 0.455 amp

D. 3.55 amp

Answer: C

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130. There is a 5Ω resistance in an AC, circuit. Inductance of $0.1H$ is connected with it in series. If equation of AC emf is $5\sin 50t$ then the phase difference between current and e.m.f. is

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

B. $\frac{\pi}{6}$

C. $\frac{\pi}{4}$

D. 0

Answer: c

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131. An inductor of inductance L and ressistor of resistance R are joined in series and connected by a source of frequency ω. Power dissipated in the circuit is

A. $\frac{\left(R^2+\omega^2L^2\right)}{V}$

B. $\frac{V^2R}{(R^2+\omega^2L^2)}$

C. $\frac{V}{(R^2+\omega^2L^2)}$

D. $\frac{\sqrt{R^2+\omega^2L^2}}{V^2}$

Answer: b

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132. In a ac circuit of capacitance the current from potential is

A. Forward

B. Backward

C. Both are in the same phase

D. None of these

Answer: a

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133. A coil of 200Ω resistance and $1.0H$ inductance is conneted to an AC source of frequency $200/2\pi Hz$.

Phase angle between potential and current will be

A. 30

B. 90

C. 45

D. 0

Answer: c

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134. In a LCR circuit the $P.D$ between the terminals of the inductance is $60V$, between the terminals of the capacitor is $30V$ and that between the terminals of resistance is $40V$. The supply voltage will be equal to.....

A. 50 V

B. 70 V

C. 130 V

D. 10 V

Answer: a

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135. Radio frequency choke uses core of

A. Air

B. Iron

C. Air and iron

D. None of these

Answer: a

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136. in a LCR circuit capacitance is chagned from C to 2C. For the resomat frequency to remain unchaged, the inductance should be chagned from L to

A. 4L

B. 2 L

C. $L/2$

D. $L/4$

Answer: c

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137. In an LCR series a.c. Circuit the voltage across each of hte components L,C and R is 50V. The voltage across the LC combination will be

A. 50 V

B. $50\sqrt{2}V$

C. $100V$

D. $0V$ (zero)

Answer: d

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138. A coil has $L = 0.04H$ and $R = 12\Omega$. When it is connected to $220V, 50Hz$ supply the current flowing through the coil, in ampere is

A. 10.7

B. 11.7

C. 14.7

D. 12.7

Answer: d

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139. The current in series LCR circuit will be the maximum when ω is

A. As large as possible

B. Equal o natural frequency of LCR system

C. $\sqrt{LC}$

D. $\sqrt{1/LC}$

Answer: d

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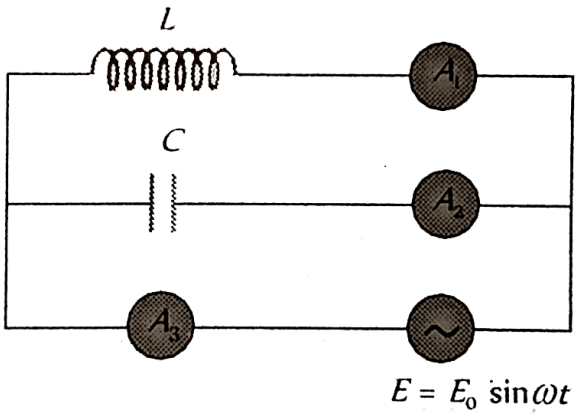
140. An inductor L and a capacitor C are connected in the circuit as shown in the figure. The frequency of the

power supply is equal to the resonant frequency of the circuit. Which ammeter will read zero ampere



A. A_1

B. A_2

C. A_3

D. None of these

Answer: c

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141. Which of the following components of a LCR circuit, with ac supply, dissipates energy

A. LCR

B. R

C. C

D. All of these

Answer: b

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142. 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. $\frac{1}{2\pi f(2\pi fL + R)}$

B. $\frac{1}{\pi f(2\pi fL + R)}$

C. $\frac{1}{2\pi f(2\pi fL - R)}$

D. $\frac{1}{\pi f(2\pi fL - R)}$

Answer: a

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143. In an A.C. circuit the current

A. Always leads the voltage

B. Always lags behind the voltage

C. Is always in phase with the voltage

D. May lead or lag behind or be in phase with the voltage

Answer: D

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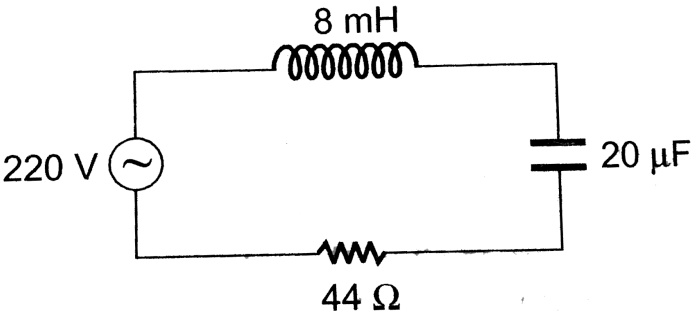
144. For the series LCR circuit shown in the figure, what is the resonance frequency and the amplitude of

the current at the resonating frequency



A. $2500 rad - s^{-1}$ and $5\sqrt{2}A$

B. $2500 rad - s^{-1}$ and $5A$

C. $2500 rad - s^{-1}$ and $\frac{5}{\sqrt{2}}A$

D. $25 rad - s^{-1}$ and $5\sqrt{2}A$

Answer: B

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145. When $100V$ DC is applied across a solenoid, a current of $1.0A$ flows in it. When $100V$ AC is applied across the same coil. The current drops to $0.5A$. If the frequency of the ac source is $50Hz$, the impedance and inductance of the solenoid are

A. 200Ω and 0.55 henry

B. 100Ω and 0.86 henry

C. 200Ω and 1.0 henry

D. 100Ω and 0.93 henry

Answer: a

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146. In an LR-circuit, the inductive reactance is equal to the resistance R of the circuit. An e.m.f $E = E_0 \cos(\omega t)$ applied to the circuit. The power consumed in the circuit is

A. $\frac{E_0^2}{R}$

B. $\frac{E_0^2}{2R}$

C. $\frac{E_0^2}{4R}$

D. $\frac{E_0^2}{8R}$

Answer: c

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147. One $10V, 60W$ bulb is to be connected to $100V$ line. The required inductance coil has self-inductance of value $(f = 50Hz)$

A. 0.052 H

B. 2.42 H

C. 16.2 mH

D. 1.62 mH

Answer: a

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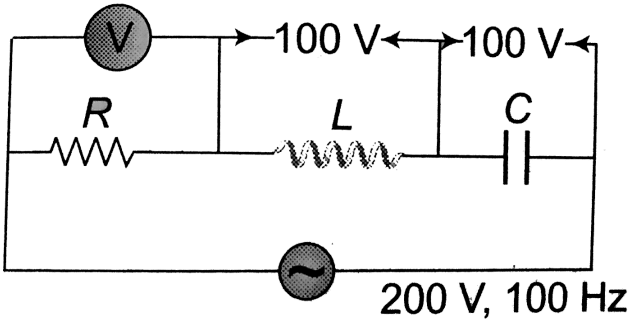
148. In the circuit given below, what will be the reading of the voltmeter?



A. 300 V

B. 900 V

C. 200 V

D. 400 V

Answer: c

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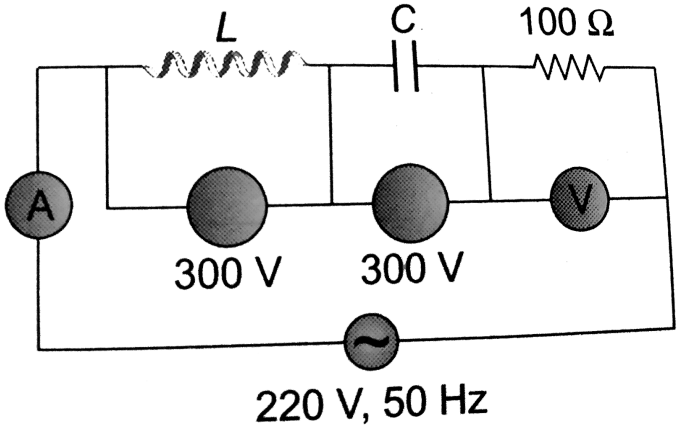
149. In the circuit shown below, what will be the reading of the voltmeter and ammeter?



A. 800 V, 2A

B. 300 V, 2A

C. 220 V, 2.2 A

D. 100 V, 2A

Answer: c

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150. A bulb and a capacitor are connected in series to a source of alternating current. If its frequency is increased, while keeping the voltage of the source constant, then

A. Bulb will give more intense light

B. Bulb will give less intense light

C. Bulb will give light of same intensity as before

D. Bulb will stop radiating light

Answer: a

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151. An alternating e.m.f. of angular frequency ω is applied across an inductance. The instantaneous power developed in the circuit has an angular frequency

A. $\frac{\omega}{4}$

B. $\frac{\omega}{2}$

C. ω

D. 2ω

Answer: d

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152. The voltage of an ac source varies with time according to the equation $V = 100 \sin 100\pi t \cos 100\pi t$ where t is in seconds and V is in volt. Then

A. The peak voltage of the source is 100 volts

B. The peak voltage of the source is 50 volt

C. The peak voltage of the source is $100/\sqrt{2}$ volts

D. The frequency of the source is 50 Hz

Answer: b

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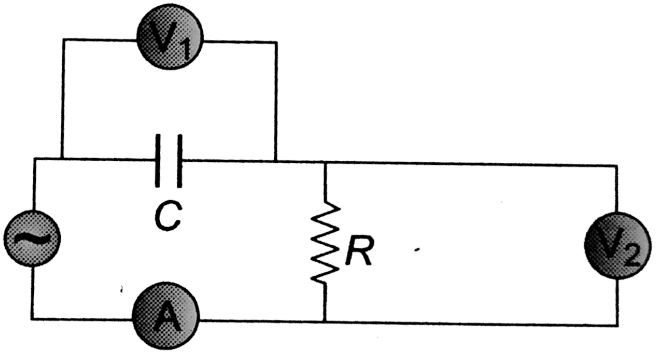
153. The diagram shows a capacitor C and a resistor R connected in series to an AC source. V_1 and V_2 are voltmeters and A is ammeter



Now, consider the following statemensts :

(I) Reading in A and V_2 are always in phase.

(II) Reading in V_1 is ahead in phase with reading in V_2,

(III) Reading in A and V_1 are always in phase. Which of these statements are/is correct

A. I only

B. II only

C. I and II only

D. II and III only

Answer: b

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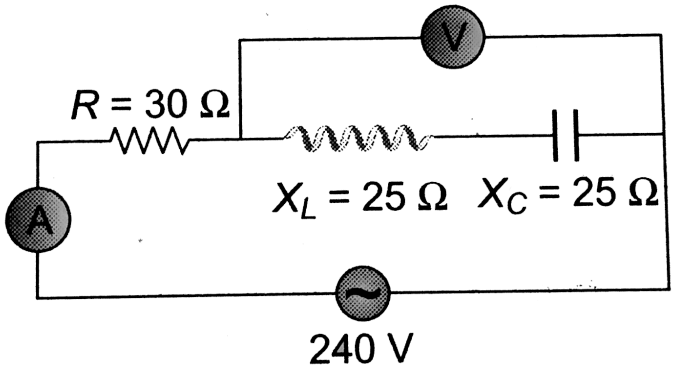
154. In the circuit shown in figure neglecting source resistance the voltmeter and ammeter reading will

respectively, will be



A. 0 V, 3A

B. 150 V, 3A

C. 150 V, 6A

D. 0 V, 8A

Answer: d

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155. The voltage of an AC source varies with time according to the relation: $E = 120 \sin 100\pi t \cos 100\pi t V$. What is the peak voltage of the source?

A. 120 volts, 100 Hz

B. $\frac{120}{\sqrt{2}}$volts, 100 Hz

C. 60 volts, 200 Hz

D. 60 volts, 100 Hz

Answer: d

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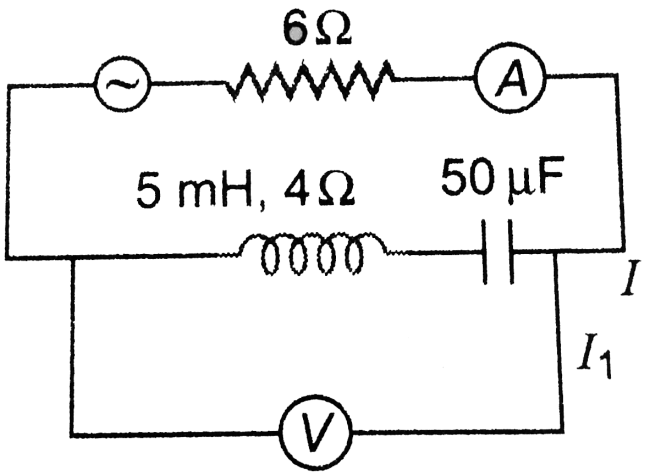
156. In the circuit shown in figureure the AC source gives a voltage $V = 20\cos(2000t)$. Neglecting source resistance, the voltmeter and and ammeter readings will be



A. 0 V, 0.47 A

B. 1.68 V, 0.47 A

C. 0 V, 1.4 A

D. 5.6 V, 1.4 A

Answer: d

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157. A telephone wire of length $200km$ has a capacitance of $0.014\mu Fperkm$. If it carries an AC of frequency $5kHz$ what should be the value of an inductor required to be connected in series so that impedence of the circuit is minimum ?

A. 0.35 mH

B. 35 mH

C. 3.5 mH

D. Zero

Answer: a

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158. In a certain circuit current changes with time accroding to $i = 2\sqrt{t}$. r.m.s. value of current between $t = 2$ to $t = 4s$ will be

A. $3A$

B. $3\sqrt{3}A$

C. $2\sqrt{3}A$

D. $\left(2 - \sqrt{2}\right)A$

Answer: c

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159. Match the following

	Currents		r.m.s. values
(1)	$x_0 \sin \omega t$	(i)	x
(2)	$x_0 \sin \omega t \cos \omega t$	(ii)	$\frac{x_0}{\sqrt{2}}$
(3)	$x_0 \sin \omega t + x_0 \cos \omega t$	(iii)	$\frac{x_0}{\left(2\sqrt{2}\right)}$

A. 1. (i), 2. (ii), 3. (iii)

B. 1. (ii), 2. (iii), 3. (i)

C. 1. (i), 2. (iii), 3. (ii)

D. None of these

Answer: b

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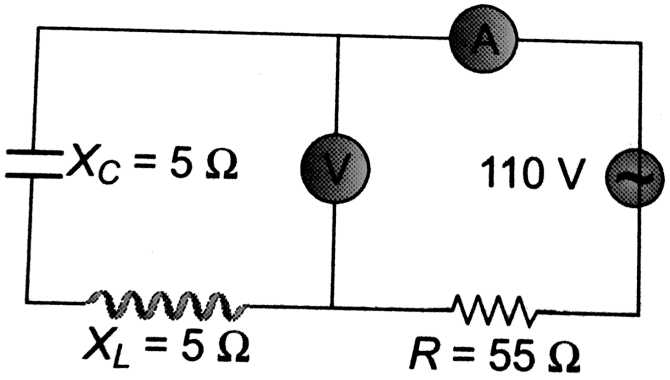
160. The reading of ammeter in the circuit shown will be



A. $2A$

B. $2.4A$

C. Zero

D. $1.7A$

Answer: c

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161. An AC source of angular frequency ω is fed across a resistor R and a capacitor C in series. The current registered is I. If now the frequency of source is changed to $\omega/3$ (but maintaining the same voltage), the current in the circuit is found to be halved. The ratio of reactance to resistance at the original frequency ω will be.

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

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

C. $\sqrt{\frac{1}{5}}$

D. $\sqrt{\frac{4}{5}}$

Answer: a

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162. An $L-C-R$ series circuit with 100Ω resistance is connected to an AC source of $200V$ and angular frequency $300rad/s$. When only the capacitance is removed, the current lags behind the voltage by 60°. When only the inductance is removed the current leads the voltage by 60°. Calculate the current and the power dissipated in the $L-C-R$ circuit

A. 50 W

B. 100 W

C. 200 W

D. 400 W

Answer: d

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163. A virtual current of $4A$ and $50Hz$ flows in an AC circuit contaning a coil. The power consumed in the coil is $240W$.If the virtual voltage across the coil is 100v then its inductance will be

A. $\frac{1}{3\pi}H$

B. $\frac{1}{5\pi}H$

C. $\frac{1}{7\pi}H$

D. $\frac{1}{9\pi}H$

Answer: b

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164. For a series RLC circuit $R = X_L = 2X_C$. The impedence of the current and phase different (between) V and i will be

A. $\frac{\sqrt{5}R}{2}, \tan^{-1}(2)$

B. $\frac{\sqrt{5}R}{2}, \tan^{-1}\left(\frac{1}{2}\right)$

C. $\sqrt{5}X_C, \tan^{-1}(2)$

D. $\sqrt{5}R, \tan^{-1}\left(\frac{1}{2}\right)$

Answer: b

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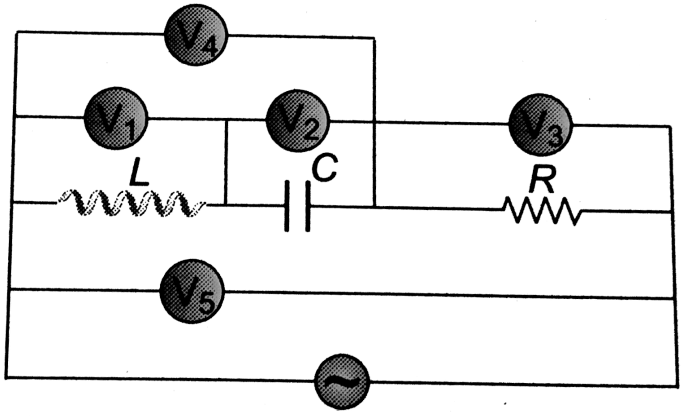
165. In the adjoining AC circuit the voltmeter whose reading will be zero at resonance is



A. V_1

B. V_2

C. V_3

D. V_4

Answer: d

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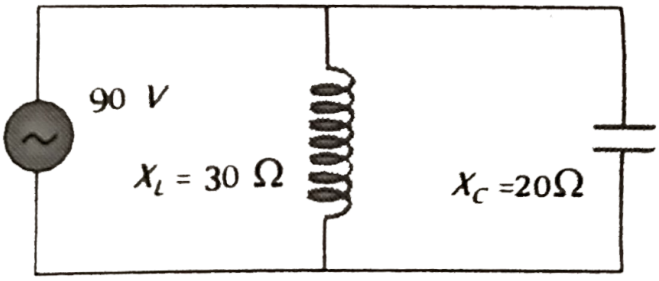
166. In the adjoining figure the impedance of the circuit will be



A. 120 ohm

B. 50 ohm

C. 60 ohm

D. 90 ohm

Answer: c

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167. If $i = t^2, 0 < t < T$ then $r.m.s.$ value of current is

A. $\frac{T^2}{\sqrt{2}}$

B. $\frac{T^2}{2}$

C. $\frac{T^2}{\sqrt{5}}$

D. None of these

Answer: c

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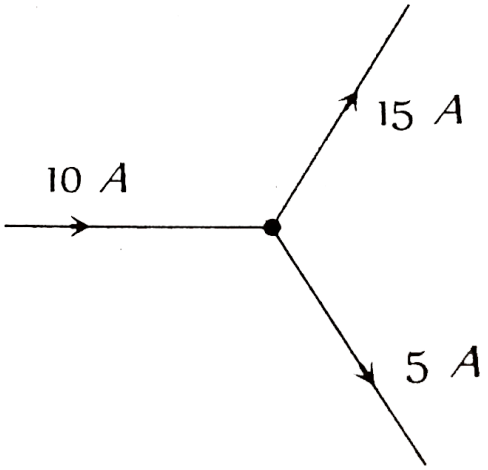
168. Is it possible



A. Yes

B. No

C. Cannot be predicted

D. Insufficient data to reply

Answer: a

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169. In a series circuit $C = 2\mu F, L = 1mH$ and $R = 10\Omega$, when the current in the circuit is maximum, at that time the ratio of the energies stored in the capacitor and the inductor will be

A. $1:1$

B. $1:2$

C. $2:1$

D. $1:5$

Answer: d

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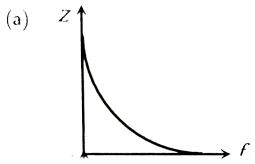
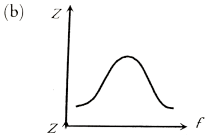
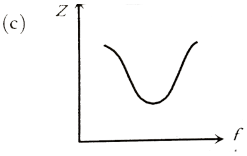
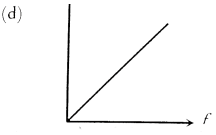
170. Which of the following curves represents the variation of impedence (Z) with frequency f in series LCR circuit?

A. 

B. 

C. 

D. 

Answer: c

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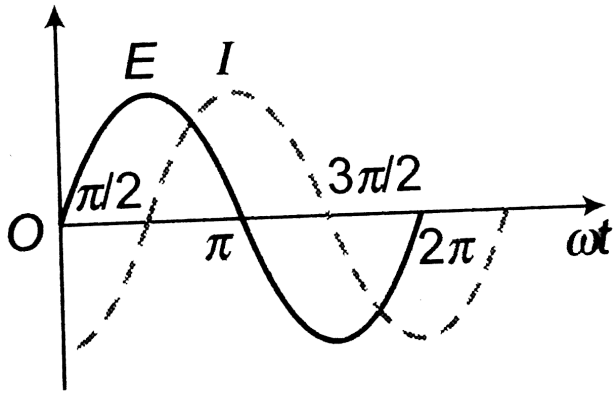
171. The variation of the instantaneous current (I) and the instantaneous e.m.f (E) in a circuit is as shown in

figure. Which of the following statement is correct?



A. The voltage lags behind the current by $\pi / 2$

B. The voltage leads the current by $\pi / 2$

C. The voltage and the current are in phase

D. The voltage leads the current by π

Answer: b

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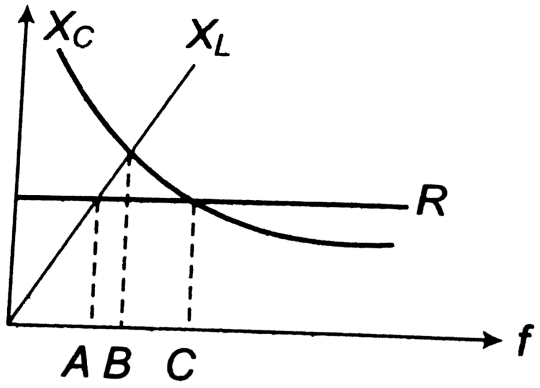
172. The figure shows variation of R, X_L and X_C with frequency f in a series L, C, R circuit. Then for what frequency point, the circuit is inductive ?



A. A

B. B

C. C

D. All points

Answer: c

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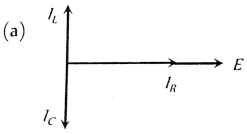
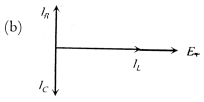
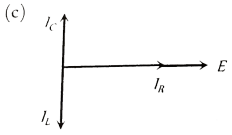
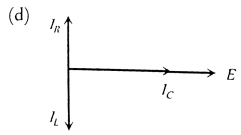
173. An alternating emf is applied across a parallel combination of a resistance R, capacitance C and an inductance L. If I_R, I_L, I_C are the currents through R, L and C respectively. Then the diagram which correctely represents, the phase relationship among I_R, I_L, I_C and source emf Em is given by

A. 

B. 

C. 

D. 

Answer: c

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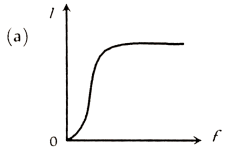
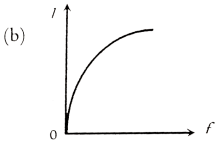
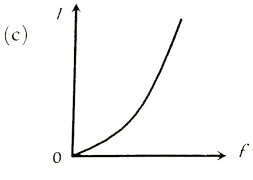
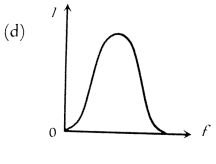
174. An AC source of variable frequency f is connected to an LCR series circuit. Which one of the graphs in figure represents the variation of current of current I in the circuit with frequecy f?

A. 

B. 

C. 

D. 

Answer: d

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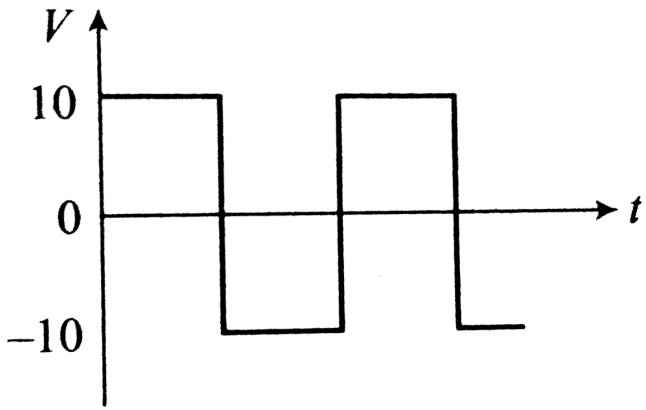
175. The r.m.s. voltage of the wave form shown is



A. 10 V

B. 7 V

C. 6.37 V

D. None of these

Answer: a

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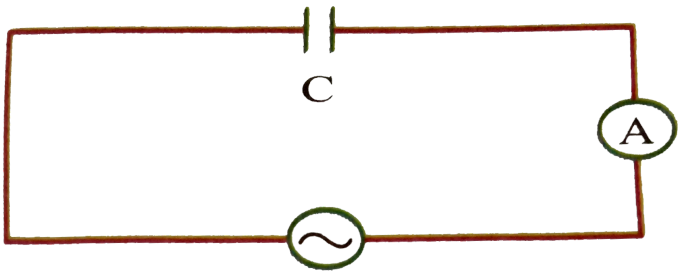
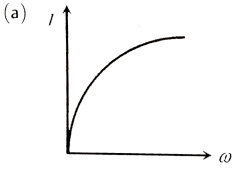
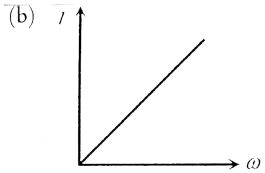
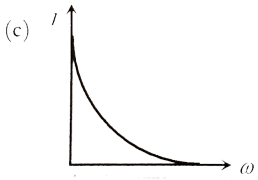
176. A constant voltage at different frequencies is applied across a capacitance C as shown in the figure. Which of the following graphs correctly depicts the variation of current with frequency

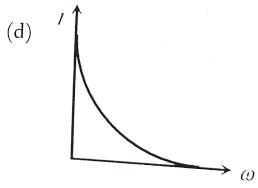


A.C. generator

A. 

B. 

C. 

D. 

Answer: b

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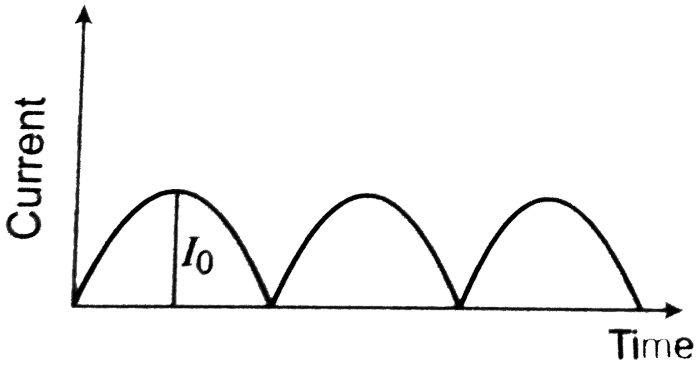
177. The output current versus time curve of a rectifire is shown in the figure. The voltage value of output current

in this case is



A. 0

B. $\frac{I_0}{2}$

C. $\frac{2I_0}{\pi}$

D. I_0

Answer: c

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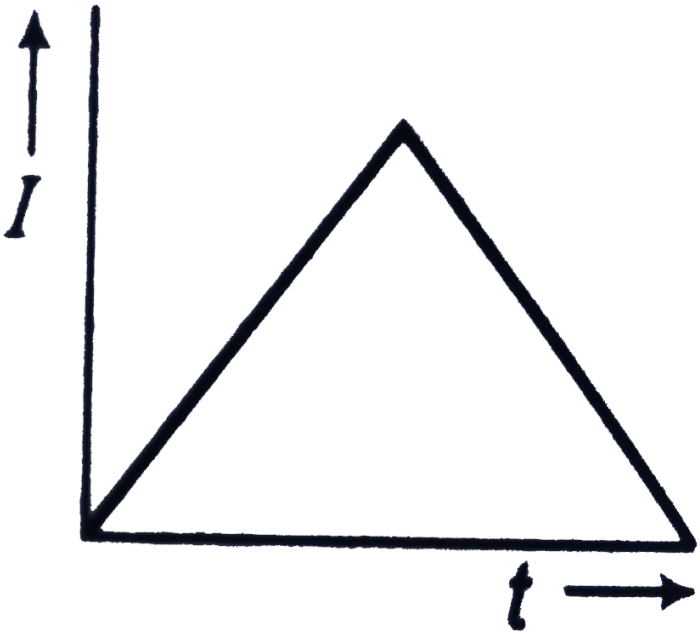
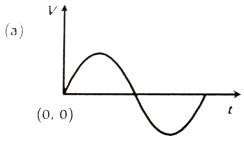
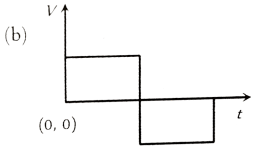
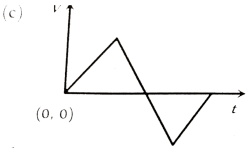
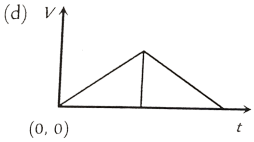
178. An alternating current I in an inductance coil varies with time t according to the graph as shown: Which one of the following graph gives the variation of voltage with time?



A. 

B. 

C. 

D. 

Answer: b

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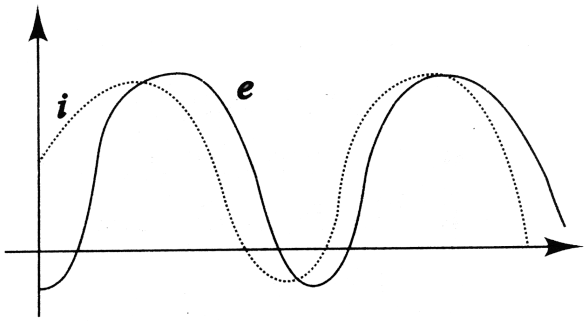
179. When an ac source of emf$e = E_0 \sin(100t)$ is connected across a circuit, the phase difference between emf e and currnet I in the circuit is observed to be $(\pi)/(4)$ as shown in fig. If the circuit consists possibly

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. $R = 1k\Omega, L = 10H$

D. $R = 1k\Omega, L = 1H$

Answer: a

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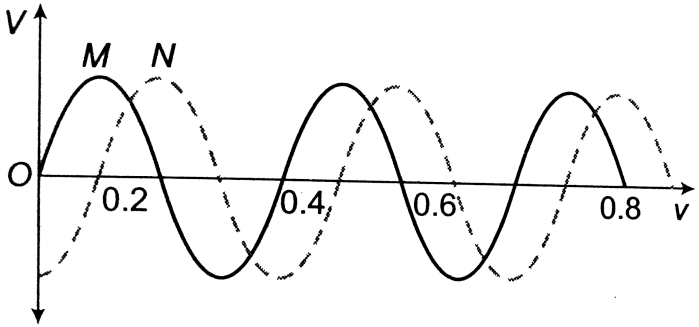
180. Two sinusoidal voltage of the same frequency are shown in the diagram. What is the frequency, and the phase relationship between the voltage?



Frequency in Hz phase lead of N over M in radius

A.

Frequency m Hz	Phase lead of N over M in radians
0.4	$-\pi/4$

B.

Frequency m Hz	Phase lead of N over M in radians
2.5	$-\pi/2$

C.

Frequency m Hz	Phase lead of N over M in radians
2.5	$+\pi/2$

D.

Frequency m Hz	Phase lead of N over M in radians
2.5	$-\pi/4$

Answer: b

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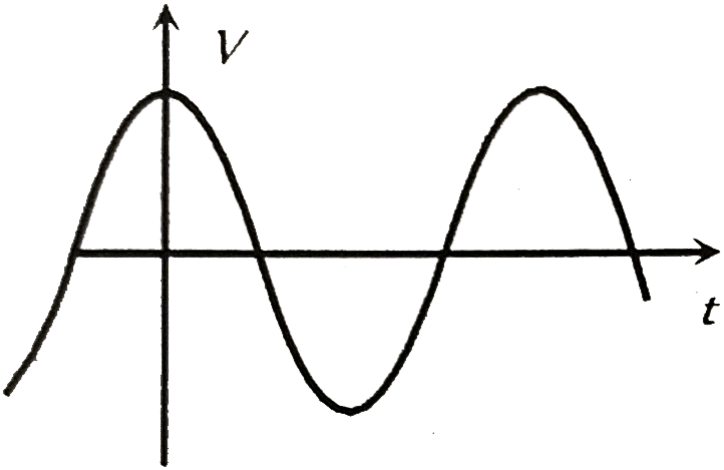
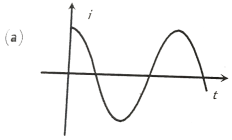
181. The voltage across a pure inductor is represented by the following diagram. Which one of the following

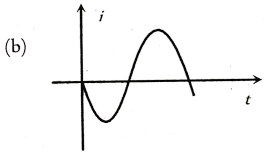
diagrams will represent the current



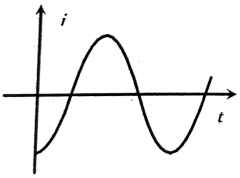
A.



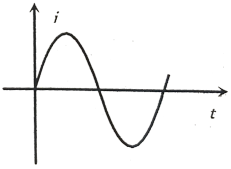
B.



C.



D.



Answer: D

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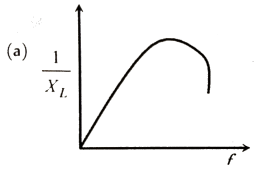
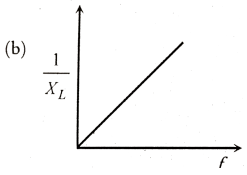
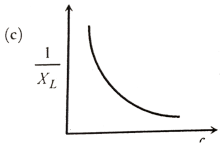
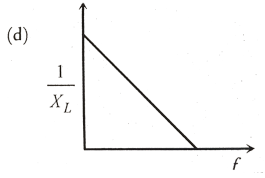
182. In pure inductive circuit, the curves between frequency f and reciprocal of inductive reactance $1/X_L$ is

A. 

B. 

C. 

D. 

Answer: c

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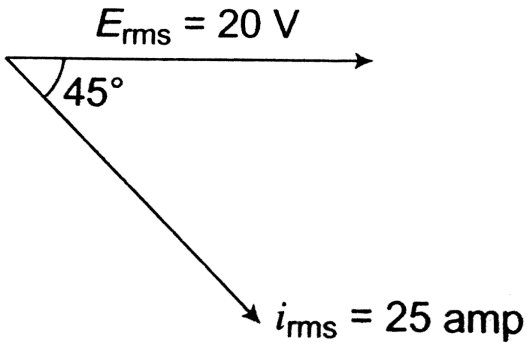
183. The vector diagram of current and voltage for a circuit as shown. The components of the circuit will be



A. LCR

B. LR

C. LCR ot LR

D. None of these

Answer: c

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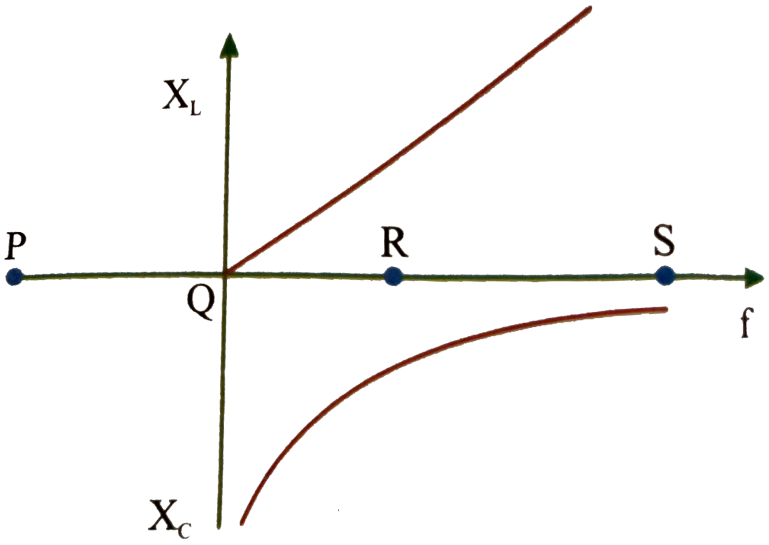
184. The resonance point in $X_L - f$ and $X_C - f$ curves is



A. P

B. Q

C. R

D. S

Answer: c

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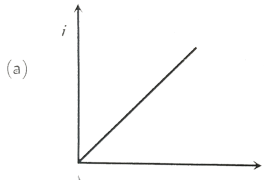
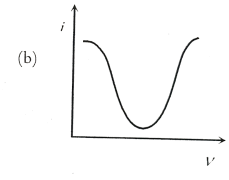
185. The $i - v$ curve for anti-resonant circuit is

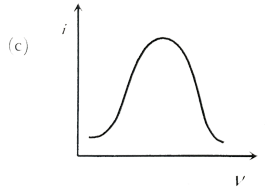
A.



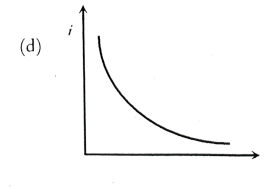
B.



C.



D.



Answer: b

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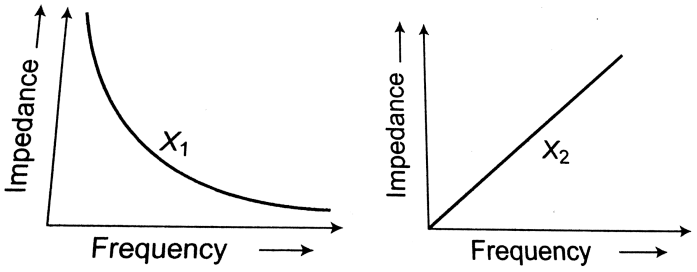
186. The graphs given below depict the dependence of two reactive impedences X_1 and X_2 on the frequency of the alternating e.m.f. applied individually to them. We can then say that



A. X_1 is an inductor and X_2 is a capacitor

B. X_1 is a resistor and X_2 is a capacitor

C. X_1 is a capacitor and X_2 is an inductor

D. X_1 is an inductor and X_2 is a resistor

Answer: c

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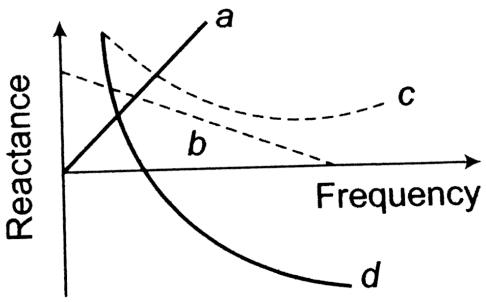
187. Which of the following plots may represent the reactance of a series LC combination?



A. a

B. b

C. c

D. d

Answer: d

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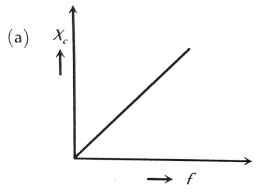
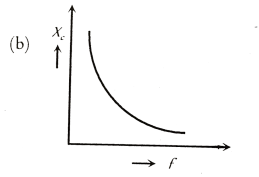
188. Identify the graph which correctly reperesents the variation of capacitive reactance X_C with frequency

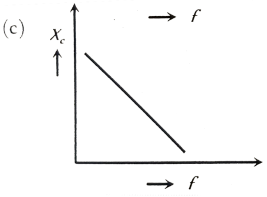
A.

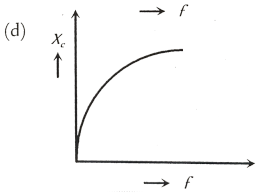


B.



C.



D. 

Answer: b

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189. Assertion: In series LCR circuit resonance can take place.

Reason: Resonance takes place if inductance and capacitive reactance are equal and opposite.

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer: a

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190. Assertion: The alternating current lags behined the e.m.f. by a phase angle of $\pi/2$, when AC flows through an inductor.

Reason: The inductive reactance increases as the frequency of AC source decreases.

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer: c

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191. Assertion: Capacitance serves as a block for DC and offers an easy path to AC.

Reason: Capacitance reactance is inversely proportional to frequency.

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer: a

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192. Assertion: When capacitive reactance is smaler than the inductive reactance is LCR circuit, e.m.f. leads the current.

Reason : The phase angle is the angle between the alternating e.m.f. and alternating current of the circuit.

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer: b

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193. Assertion: Chock coil is the prefered over a resistor to adjust current in an AC circuit.

Reason: Power factor for inductance is zero.

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer: a

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194. Assertion: If the frequency of alternating current in an AC circuit consisting of an inductance coil is increased then current gets decreased.

Reason: The current is inversely proportional to frequency of alternating current.

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer: a

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195. Assertion: A bulb connected in series with a solenoid is connected to AC source. If a soft iron core is introduced in the solenoid, the bulb will glow brighter. Reason: On introducing soft iron core in the solenoid, the inductance increases.

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

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

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: d

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196. Statement 1: An alternating current shown magnetic effect.

Statement 2: Alternating current varies with time .

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer: b

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197. Statement 1: Both dc and ac can be measured by a hot wire instrument.

Statement 2: the hot wire instrument is based on the principle of magnetic effect of current.

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer: c

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198. Assertion: AC is more dangerous than DC

Reason: Frequency of AC is dangerous for humban body.

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer: a

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199. 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 and reason are true and the reason is the correct explanation of the assertion.

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer: b

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200. Assertion: The division are equaly marked on the scale of AC ammeter.

Reason: Heat produced is directely proportional to the current

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer: d

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201. Assertion: When AC circuit contain resistor only, its power is minimum.

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

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer: d

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202. Assertion: An electric lamp connected in series with a variable capacitor and AC source, its brightness increases with increases in capacitance.

Reason: Capacitive reactance decrease with increases in capacitance of capacitor.

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer: a

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203. Assertion: An inductance and a resistance are connected in series with an AC circuit. In this circuit the current and the potential difference across the resistance lag behind potential difference across the inductance by an angle $\pi / 2$.

Reason: In LR circuit voltage leads the current by phase angle which depends on the value of inductance and resistance both.

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer: b

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204. Assertion: A capacitor of suitable capacitance can be used in an AC circuit in place of the choke coil.

Reason: A capacitor blocks DC and allows AC

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

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

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

Answer: b

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Set

1. A bulb and a capacitor are in series with an AC source. On increasing frequency how will glow of the bulb change

A. The glow decreases

B. The glow increases

C. The glow remain the same

D. The bulb quenches

Answer: b

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2. The r.m.s current in an AC circuit is $2A$. If the wattless current be $\sqrt{3}A$, what is the power factor?

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

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

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

D. $\frac{1}{3}$

Answer: c

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3. $\frac{2.5}{\pi}\mu F$ capacitor and $3000-$ ohm resistance are joined in series to an AC source of 200volts and

$50\,\sec^{-1}$ frequency. The power factor of the circuit and the power dissipated in it will respectively

A. $0.6,\ 0.06W$

B. $0.06,\ 0.6W$

C. $0.6,\ 4.8W$

D. $4.8,\ 0.6W$

Answer: c

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4. The self-inductance of a choke coil is $10mH$. When it is connected with a $10VDC$ source, then the loss of power is 20watt. When it is connected with $10\text{volt}AC$

source loss of power is 10watt. The frequency of AC source will be

A. 50 Hz

B. 60 Hz

C. 80 Hz

D. 100 Hz

Answer: c

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5. In an LCR circuit $R = 100ohm$. When capacitance C is removed, the current lags behind the voltage by $\pi/3$.

When inductance L is removed, the current leads the voltage by $\pi/3$. The impedence of the circuit is

A. 50 ohm

B. 100 ohm

C. 200 ohm

D. 400 ohm

Answer: B

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6. A group of electric lamps having a total power rating of 1000 watt is supplied by an AC voltage

$E = 200\sin(310t + 60^\circ)$. Then the r.m.s value of the circuit current is

A. $10A$

B. $10\sqrt{2}A$

C. $20A$

D. $20\sqrt{2}A$

Answer: b

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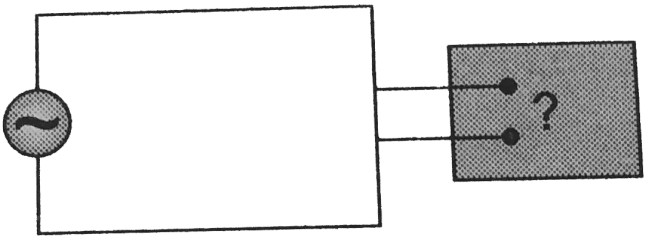
7. Following figure shows an AC generator to a "block box" through a pair of terminals. The box contains possible R, L, C or their combination, whose elements

and arrangements are not known to us.



Measurements, outside the box reveals that $e = 75\sin(\omega t)$volts, $i = 1.5\sin(\omega t + 45^\circ)$ amp then. the wrong statements is

A. There must be a capacitor in the box

B. There must be an inductor in the box

C. There must be a resistance in the box

D. The power factor is 0.707

Answer: B

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8. A resistor R, an inductor L and a capacitor C are connected in series to a source of frequency n. If the resonant frequency is n_r, then the current lags behind voltage when

A. $n = 0$

B. $n < n_r$

C. $n = n_r$

D. $n > n_r$

Answer: d

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9. If power factor is $1/2$ in a series RL, circuit $R = 100\Omega$. AC mains is used then L is

A. $\frac{\sqrt{3}}{\pi}$ Henery

B. π Henry

C. $\frac{\pi}{\sqrt{3}}$ Henry

D. None of these

Answer: A

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10. What will be the self-inductance of a coil, to be connected in a series with a resistance of $\pi\sqrt{3}\Omega$ such

that the phase difference between the e.m.f. and the current at $50Hz$ frequency is 30°?

A. 0.5 Henry

B. 0.03 Henry

C. 0.05 Henry

D. 0.01 Henry

Answer: D

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11. The phase difference between the voltage and the current in an AC circuit is $\pi/4$. If the frequency is $50Hz$ then this phase difference will be equivalent to a time of

A. 0.02 s

B. 0.25 s

C. 2.5 ms

D. 25 ms

Answer: C

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12. Instantaneous values of current and e.m.f in an AC circuit are $I = I/\sqrt{2}\sin 314$ tamp and $E = \sqrt{2}\sin(314t - \pi/6)V$ respectively. The phase difference between E and I will be

A. $-\pi/6rad$

B. $-\pi/3rad$

C. $\pi/6rad$

D. $\pi/3rad$

Answer: a

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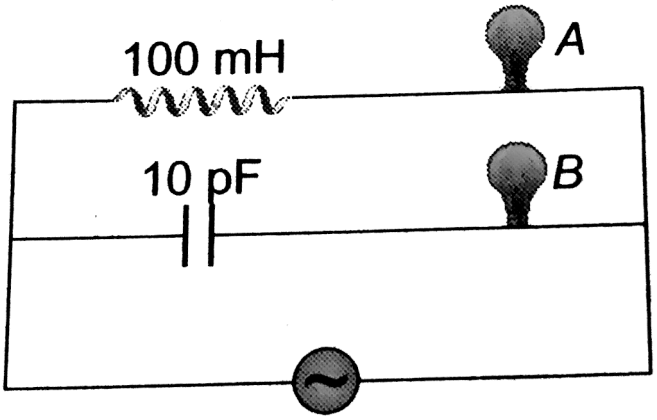
13. If A and B are indentical bulbs, which bulb glows brighter?



A. A

B. B

C. Both equally bright

D. Cannot say

Answer: a

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14. The instantaneous values of current and voltage in an ac circuit are $i = 100 \sin 314 ramp$ and $e = 200 \sin(314t + \pi/3)V$ respectively. If the resistance is 1Ω then the reactance of the circuit will be

A. $-200\sqrt{3}\Omega$

B. $\sqrt{3}\Omega$

C. $-200/\sqrt{3}\Omega$

D. $100\sqrt{3}\Omega$

Answer: b

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15. What is the r.m.s. value of an alternating current which when passed through a resistor produces heat which is thrice of that produced by a direct current of 2 amperes in the same resistor?

A. 6 amp

B. 2 amp

C. 3.46 amp

D. 0.66 amp

Answer: c

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