PHYSICS

RESONANCE ENGLISH

ALTERNATING CURRENT

Exercise

1. In L-C-R series circuit, an alternating emf e and current i are given by the equations e= 100sin (100t V.

$$i = 100 \sin\left(100t + \frac{\pi}{3}\right) mA$$

The average power dissipated in the circuit will be

A. 10^4 watt

B. 10 watt

C. 2.5 watt

D. 5 watt

Answer: C

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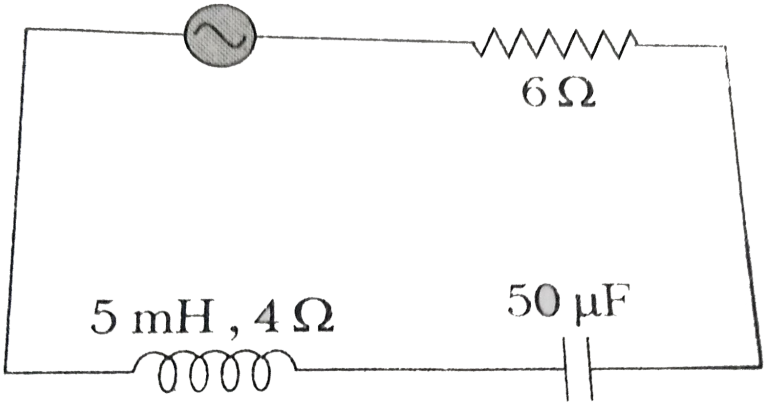
2. In the circuit shown, the AC source has voltage V = 20cos(ωt)volt with ω = 200 $rads^{-1}$ the amplitude of the current will be nearest to



A. 2A

B. 3.3A

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

D. $\sqrt{5}A$

Answer: A

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3. A coil of 200 Ω resistance and 1.0 H inductance is connected 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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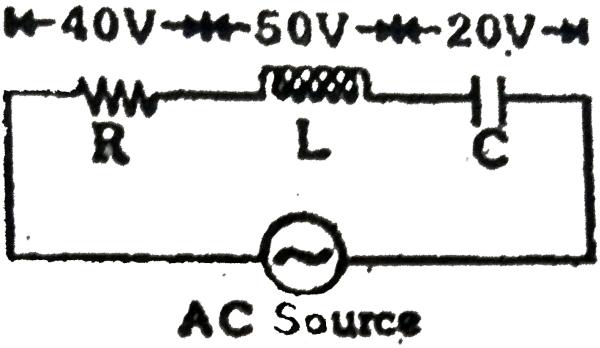
4. In series LCR circuit, the voltages across R, L and C are shown in the figure. The voltage of

applied source



A. 110 V

B. 10 volt

C. 50 volt

D. 70 volt

Answer: C

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5. When 100V. DC is applied across a solenoid a current of 1A flows in it. When 100V, AC is applied across the same coil, the current drops to 0.5A. The frequency of the AC is 50Hz. The impendence and inductance of the solenoid are

A. 200 ohm and 0.55 Henry

B. 100 ohm and 0.86 Henry

C. 200 ohm and 1.0 Henry

D. 100 ohm and 0.93 Henry

Answer: A

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6. The average power dissipated in a pure inductor of inductance L when an AC current is passing through it ,is

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

B. I^2X_1

C. $LI^2/4$

D. zero

Answer: D

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7. The power factor of LCR circuit at resonance is :

A. 0.707

B. 1

C. 0.5

D. zero

Answer: B

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8. In an ac circuit the current is given by $i = 0.5\sin(314t + 60^\circ)$ milliampere. Then peak to peak value of current is-

A. 0.5A

B. 1.0A

C. 0.5mA

D. 1.0 mA

Answer: D

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9. In an electric circuit applied ac emf is $e = 20 \sin 300t$ volt and the current is $i = 4 \sin 300t$ ampere. The reactance of the circuit is-

A. 5 ohm

B. 80 ohm

C. $1.8k\Omega$

D. zero

Answer: D

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10. The time required for a 50 Hz alternating current to increase from 0 to 70.7% of its peak value is

A. 2.5 ms

B. 10 ms

C. 20 ms

D. 14.14 ms

Answer: A

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11. A steady dc current of 2.83A is flowing in a resistance wire. The rms value of this current is-

A. 2.83 A

B. about 2A

C. about 4A

D. undefined for dc

Answer: A

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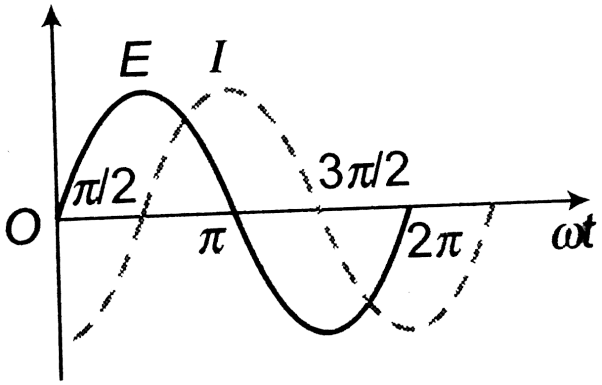
12. The variation of the instantaneous current (I) and the instantaneous e.m.f (E) in a circuit is as shown in figure. Which of the

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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13. In a series LCR circuit containing an AC voltage source of frequency ω, current and voltage are measured. Then for the resistance, consider the statements-

[a] current is maximum at $\omega^2 = 1/LC$

[b] current is minimum at $\omega^2 = 1/LC$

[c] voltage across R is maximum at $\omega^2 = 1/LC$

[d] voltage across R is minimum at $\omega^2 = 1/LC$

the voltage statement is

A. a and c are both correct

B. b and d are both correct

C. a and d are both correct

D. none of these

Answer: A

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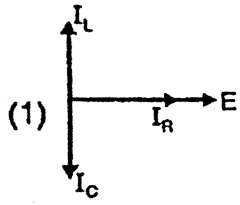
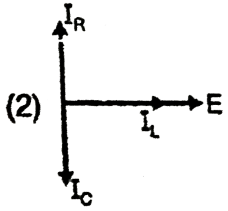
14. An alternating emf is applied across a parallel combination of a resistance R, capacitance C and an inductance L. If $\underset{R}{I}$, $\underset{L}{I}$ and $\underset{C}{I}$ are the currents through R,L and C respectively, the phase relationship among $\underset{R}{I}$, $\underset{L}{I}$ and $\underset{C}{I}$ and source emf E, is given by

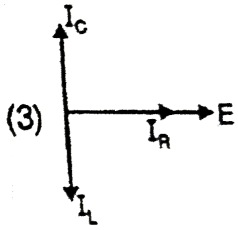
A.



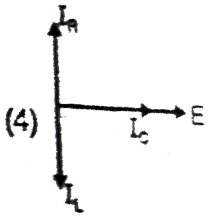
B.



C.



D.



Answer: C

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15. The value of current at half power points is

-

A. $\sqrt{2}I_m$

B. $I_m / \sqrt{2}$

C. $I_m / 2$

D. $2I_m$

A. $\sqrt{2}I_m$

B. $I_m / \sqrt{2}$

C. $I_m / 2$

D. $2I_m$

Answer: B

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16. The power factor of a good choke coil is

A. zero

B. one

C. 0.5

D. none of the above

Answer: A

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17. Which one has the dimensions different from the remaining three

A. power

B. work

C. torque

D. energy

A. power

B. Work

C. torque

D. energy

Answer: D

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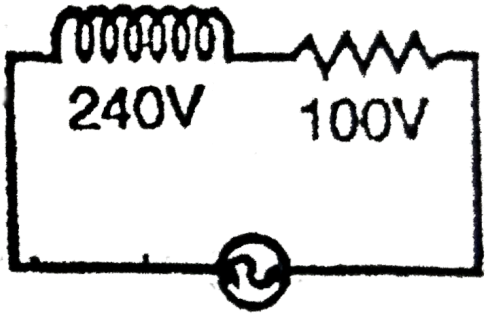
18. In the figure shown, a current of 2 amperes flows in the circuit. The impedence of the circuit is-



A. 170Ω

B. 70Ω

C. 130Ω

D. 120Ω

Answer: C

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19. Assertion (A) : The electrostatic energy stored in capacitor plus magnetic energy stored in inductor will always be zero in series LCR circuit driven by ac voltage source under

condition of resonance.

Reason (R) : The complete voltage of ac source appears across the resistor in a series LCR circuit driven by ac voltage source under condition of resonance.

A. Statement-1 is true, Statement-2: is true, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is true, Statement-2: is true, Statement-2 is NOT a correct explanation for Statement-1.

C. Statement-1 is true but statement-2 is false

D. Statement-1 is false, Statement-2 is true

Answer: D

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