

Topic :-Alternating Current

1. An alternating current of frequency ' f ' is flowing in a circuit containing a resistance R and a choke L in series. The impedance 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) $\sqrt{R^2 + 2\pi fL}$

2. The process by which ac is converted into dc is known as

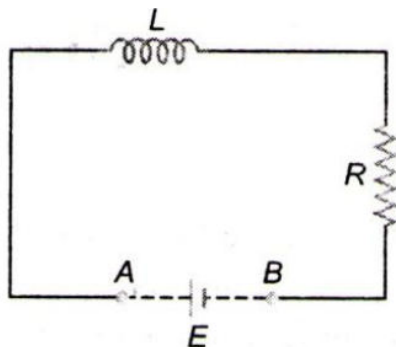
a) Purification b) Amplification c) Rectification d) Current amplification

3. 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) 101.3V b) 84.8V c) 70.7V d) 56.5V

4. An inductor ($L = 100$ mH), a resistor ($R = 100 \Omega$) and a battery ($E = 100$ V) are initially connected in series as shown in figure. After a long time the battery is disconnected after short circuiting the points A and B .

The current in the circuit 1 ms after the short circuit is

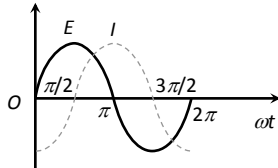


- a) $1/e$ A b) e A c) 0.1 A d) 1 A
5. $\frac{R}{L}$ has the dimensions to
- a) Time b) Mass c) Length d) Frequency

6. The instantaneous values of current and emf in an ac circuit are $I = 1/\sqrt{2} \sin 314 t \text{ amp}$ and $E = \sqrt{2} \sin(314 t - \pi/6) \text{ V}$ respectively. The phase difference between E and I will be

- a) $-\pi/6 \text{ rad}$ b) $-\pi/3 \text{ rad}$ c) $\pi/6 \text{ rad}$ d) $\pi/3 \text{ rad}$

7. The variation of the instantaneous current (I) and the instantaneous emf (E) in a circuit is as shown in fig. Which of the following statements 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

8. In a $L - R$ circuit, the value of L is $(\frac{0.4}{\pi}) \text{ H}$ and the value of R is 30Ω . If in the circuit, an alternating emf of 200 V at 50 cycle/s is connected, the impedance of the circuit and current will be

- a) $11.4 \Omega, 17.5 \text{ A}$ b) $30.7 \Omega, 6.5 \text{ A}$ c) $40.4 \Omega, 5 \text{ A}$ d) $50 \Omega, 4 \text{ A}$

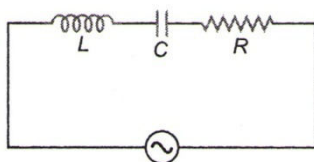
9. In an A.C. circuit the current

- 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

10. A 100 V , AC source of frequency 500 Hz is connected to an $L-C-R$ circuit with $L=8.1 \text{ mH}$,

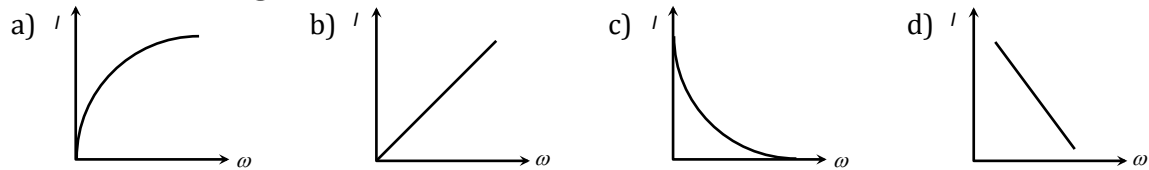
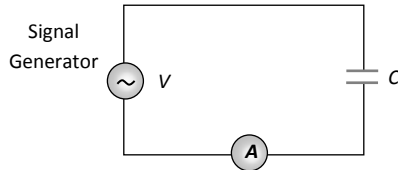
$C = 12.5 \mu\text{F}$, $R = 10 \Omega$ all connected in series as shown in figure. What is the quality factor of

circuit?



- a) 2.02 b) 2.5434 c) 20.54 d) 200.54

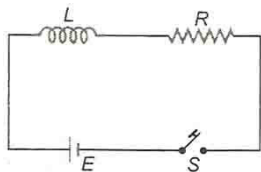
11. A constant voltage at different frequencies is applied across a capacitance C as shown in the figure. Which of the following graphs correctly depicts the variation of current with frequency



12. 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) $20\sqrt{2}$ d) $\frac{20}{\sqrt{2}}$

13. In the circuit shown in figure switch S is closed at time $t = 0$. The charge which passes through the battery in one time constant is

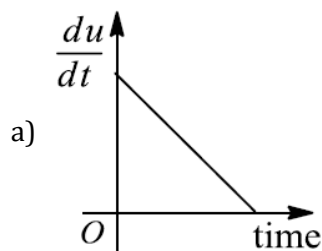


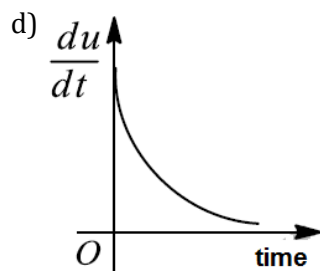
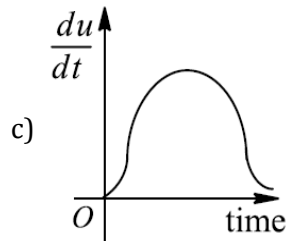
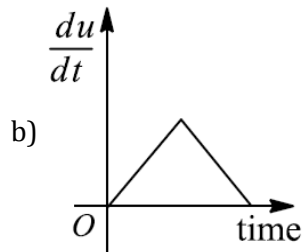
a) $\frac{EL}{eR^2}$ b) $\frac{eL}{ER}$ c) $\frac{eR^2E}{L}$ d) $E\left(\frac{L}{R}\right)$

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

a) 90% b) 80% c) 70% d) 60%

15. In an $L - R$ circuit to a battery, the rate at which energy is stored in the inductor is plotted against time during the growth of current in the circuit. Which of the following, figure best represents the resulting curve?





16. An ac source is rated at $220V, 50\text{ Hz}$. 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) $5 \times 10^{-3}\text{ sec}$
17. The maximum voltage in DC circuit is $282V$. The effective voltage in AC circuit will be
- a) 200 V b) 300 V c) 400 V d) 564 V
18. The capacity of a pure capacitor is 1 farad . In dc circuits, its effective resistance will be
- a) Zero b) Infinite c) 1 ohm d) $1/2\text{ ohm}$
19. An inductive circuit contains a resistance of 10 ohm and an inductance of 2.0 henry . If an ac voltage of 120 volt and frequency of 60 Hz 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
20. The time taken by an alternating current of 50 Hz in reaching from zero to its maximum value will be
- a) 0.5 s b) 0.005 s c) 0.05 s d) 5 s