DPP
DAILY PRACTICE PROBLEMS

Class : XIIth **Subject : PHYSICS**
Date : **DPP No. : 10**

Topic :-Alternating Current

1. An LCR circuit contains $R = 50\ \Omega$, $L = 1\ mH$ and $C = 0.1\ \mu F$. The impedance 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) $2\pi \times 10^6 s^{-1}$

2. A metal rod of resistance 20 Ω is fixed along a diameter of a conducting ring of radius 0.1 m and lies on $x - y$ plane. There is a magnetic field $\vec{B} = (50\ \text{T})\ \hat{k}$. The ring rotates with an angular velocity $\omega = 20\ \text{rads}^{-1}$ about its axis. An external resistance of 10 Ω is connected across the centre of the ring and rim. The current through external resistance is

   a) $\frac{1}{2}$ A b) $\frac{1}{3}$ A c) $\frac{1}{4}$ A d) Zero

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

   a) 30° b) 40° c) 80° d) 90°

4. 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) $1/\sqrt{2}$

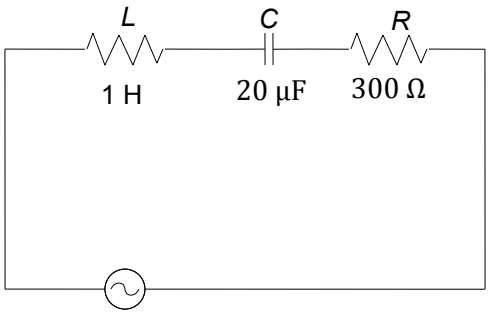
5. In an induction coil, the coefficient of mutual inductance is 4H. If current of 5A in the primary coil is cut off i 1/ 1500s, the emf at the terminals of the secondary coil will be

   a) 15 kV b) 60 kV c) 10 kV d) 30 Kv

6. The coil of choke in a circuit

   a) Increases the current b) Decreases the current
   c) De not change the current d) Has high resistance to dc circuit

7. In the L-C-R circuit shown, the impedance is

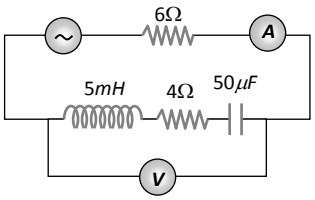


a) 500 Ω b) 300 Ω c) 100 Ω d) 200 Ω

8. 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

9. In the circuit shown in the figure, the ac source gives a voltage $V = 20\cos(2000t)$. Neglecting source resistance, the voltmeter and ammeter reading will be

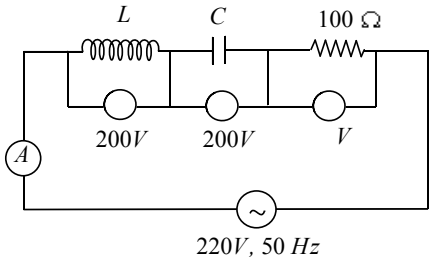


a) $0V$, $0.47A$ b) $1.68V$, $0.47A$ c) $0V$, $1.4\ A$ d) $5.6V$, $1.4\ A$

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

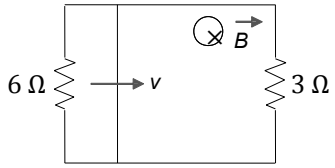
a) 10 V, 10 V and 5 V b) 10 V, 10 V and 10 V c) 20 V, 20 V and 5 V d) 20 V, 20 V and 10 V

11. The readings of ammeter and voltmeter in the following circuit are respectively



a) $2A$, $200V$ b) $1.5A$, $100V$ c) $2.7A$, $220V$ d) $2.2A$, $220V$

12. A rectangular loop with a sliding connector of length $l = 1.0$ m is situated in a uniform magnetic field B = 2T. Perpendicular to the plane of loop. Resistance of connector is $r = 2\Omega$. Two resistance of 6 Ω and 3 Ω are connected as shown in figure. The external force required to keep the connector moving with a constant velocity $v = 2$ ms^{-1} is



a) 2 N b) 1 N c) 4 N d) 6 N

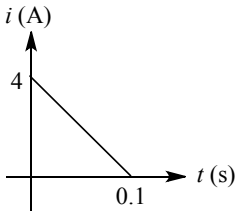
13. What is the *r.m.s.* value of an alternating current which when passed through a resistor produces heat which is thrice of that produced by a direct current of 2 amperes in the same resistor

a) 6 *amp* b) 2 *amp* c) 3.46 *amp* d) 0.66 *amp*

14. A bulb is connected first with dc and then ac of same voltage it will shine brightly with
a) AC b) DC
c) Brightness will be in ratio 1/1.4 d) Equally with both

15. If an alternating voltage is represented as $E = 141\sin(628\,t)$, then the rms value of the voltage and the frequency are respectively
a) 141 V, 628 Hz b) 100 V, 50 Hz c) 100 V, 100 Hz d) 141 V, 100 Hz

16. Some magnetic flux is changed from a coil of resistance 110 Ω. As a result, an induced current is developed in it, which varies with time as shown in figure. The magnitude of change in flux through the coil in weber is



a) 4 b) 8 c) 2 d) 6

17. Two coils *A* and *B* have 200 and 400 turns respectively. A current of 1 A in coil A causes a flux per turn of 10^{-3} Wb to link with *A* and a flux per turn of 0.8×10^{-3} Wb through B. The ratio of mutual inductance of *A* and *B* is

a) 0.625 b) 1.25 c) 1.5 d) 1.625

18. 220 V, 50 Hz AC is applied to a resistor. The instantaneous value of voltage is

a) $220\sqrt{2}\sin 100\pi t$ b) $220\sin 100\pi t$ c) $220\sqrt{2}\sin 50\pi t$ d) $220\sin 50\pi t$

19. Two circuits have mutual inductance of 0.09 H. Average emf induced in the secondary by a change of current from 0 to 20 A in 0.006 s in primary will be

a) 120 V b) 200 V c) 180 V d) 300 V

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

a) 0.052 H b) 2.42 H c) 16.2 mH d) 1.62 mH