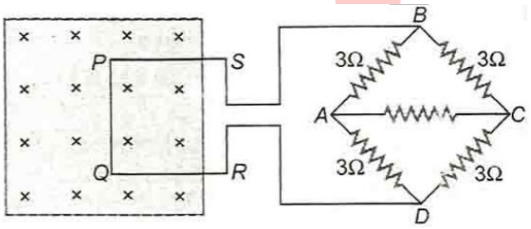
DPP
DAILY PRACTICE PROBLEMS

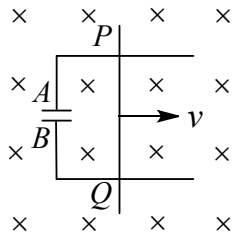
Class : XIIth **Subject : PHYSICS**
Date : **DPP No. :6**

Topic :-Alternating Current

1. What is the average value of the AC voltage over one complete cycle?
   a) Zero b) V_{max} c) $\frac{2V_{max}}{\pi}$ d) $\frac{V_{max}}{2}$
2. A current of 10 A in the primary coil of a circuit is reduced to zero. If the coefficient f mutual inductance is 3H and emf induced in secondary coil is 30 kV, time taken for the change of current is
   a) 10^3 s b) 10^2 s c) 10^{-3} s d) 10^{-2} s
3. A square metal wire loop $PQRS$ of side 10 cm and resistance 1 Ω is moved with a constant velocity v_c in a uniform magnetic field of induction $B = 2$ Wbm^2, as shown in figure. The magnetic field lines are perpendicular to the plane of the loop (directed into the paper). The loop is connected to network $ABCD$ of resistors each of value 3 Ω. The resistance of the lead wires SB and RD are negligible. The speed of the loop so as to have a steady current of mA in the loop is



   a) 2 ms^{-1} b) 2 × 10^{-2}ms^{-1} c) 20 ms^{-1} d) 200 ms^{-1}
4. A conducting rod $PQ\ of\ length\ L = 1.0$ m is moving with a uniform speed $v = 2.0$ ms^{-1} in a uniform magnetic field = 4.0 T directed into the paper. A capacitor of capacity $C = 10\ \mu F$ is connected as shown in figure. Then,



   a) $q_A = -80\mu\ C\ and\ q_B = +80\mu\ C$ b) $q_A = +80\mu\ C\ and\ q_B = -80\mu\ C$
   c) $q_A = 0 = q_B$ d) Charge stored in the capacitor increases

expotentially with time

5. For a large industrial city with much load variations , the DC generator should be

   a) Series wound b) Shunt wound c) Mixed wound d) Any

6. The self inductance of the motor of an electric fan is $10H$. In order to impart maximum power at 50 Hz, it should be connected to a capacitance of

   a) 1 μF b) 2 mF c) 4 mF d) 8 mF

7. In $L-C-R$ circuit, an alternating emf of angular frequencyω is applied then the total impedance will be

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

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

8. $\frac{2.5}{\pi}\mu F$ capacitor and 3000-ohm resistance are joined in series to an ac source of 200 $volt$ and $50sec^{-1}$ frequency. The power factor of the circuit and the power dissipated in it will respectively be

   a) 0.6, 0.06 W b) 0.06, 0.6 W c) 0.6, 4.8 W d) 4.8, 0.6 W

9. For series LCR circuit, wrong statement is

   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 $\pi/2$

10. An ideal coil of 10 H is connected in series with a resistance of 5 Ω and a battery of 5 V. 2s after the connection is made, the current flowing (in ampere) in the circuit is

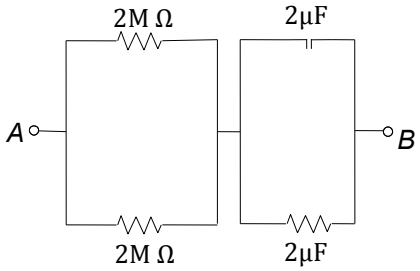
    a) $(1-e)$ b) e c) e^{-1} d) $(1-e^{-1})$

11. If a current of 3 A flowing in the primary coil is reduced to zero in 0.001 s, the induced emf in between the two coils is 15000 V, the coefficient of mutual induction is
    a) 0.5 H b) 5 H c) 1.5 H d) 10 H

12. The power factor of LCR circuit at resonance is

a) 0.707 b) 1 c) Zero d) 0.5

13. At time $t = 0$, a battery of 10 V is connected across points A and B in the given circuit. If the capacitors have no charge initially, at what time (in second) does the voltage across them become 4 V?
(Take ln 5 = 1.6, ln 3 = 1.1)

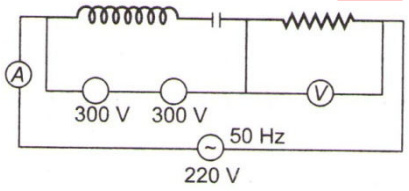


a) 2 b) 3 c) 2.5 d) $\frac{3}{2}$

14. An air cored coil has a self-inductance of 0.1 H. A soft iron core of relative permeability 100 is 1/10 th. The value of self-inductance now becomes
a) 1 mH b) 10 mH c) 0.4 H d) 0.8 H

15. The armature of a shunt wound motor can with stand current up to 8A before it overheats and it damaged. If the armature resistance is 0.5 Ω, minimum back emf that must be motor is connected to a 120 V line is
a) 120 V b) 116 V c) 124 V d) 4 V

16. In the circuit shown below what will be the readings of the voltmeter and ammeter? (Total impedance of circuit $Z = 100\ \Omega$)



a) 200 V, 1 A b) 800 V, 2 A c) 100 V, 2 A d) 220 V, 2.2 A

17. In the non-resonant circuit, what will be the nature of the circuit for frequencies higher than the resonant frequency
a) Resistive b) Capacitive c) Inductive d) None of the above

18. In AC circuit a resistance of R Ω is connected in series with an inductance L. If the phase difference between the current and voltage is 45°, the inductive reactance will be
a) $R/2$ b) $R/4$ c) R d) None of the above

19. The current in series LCR circuit will be maximum when ω is
a) As large as possible b) Equal o natural frequency of LCR system
c) $\sqrt{LC}$ d) $\sqrt{1/LC}$

20. Two conducting circular loops of radii R_1 and R_2 are placed in the same plane with their centres coinciding. If $R_1 > R_2$, the mutual inductance M between them will be directly proportional to
a) $\frac{R_1}{R_2}$ b) $\frac{R_2}{R_1}$ c) $\frac{R_1^2}{R_2}$ d) $\frac{R_2^2}{R_1}$