DPP
DAILY PRACTICE PROBLEMS

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

Topic :-Electro Magentic Induction

1. The mutual inductance between two coils is $1.25\ henry$. If the current in the primary changes at the rate of $80\ ampere/second$, then the induced e.m.f. in the secondary is
   a) $12.5\ V$ b) $64.0\ V$ c) $0.016\ V$ d) $100.0\ V$

2. An electron moves along the line PQ which lies in the same plane as a circular loop of conducting wire as shown in figure. What will be the direction of the induced current in the loop?
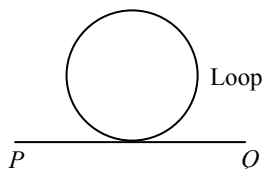

   a) Anticlockwise   b) Clockwise
   c) Alternating   d) No current will be induced

3. A coil of area $80\ square\ cm$ and 50 turns is rotating with $2000\ revolutions\ per\ minute$ about an axis perpendicular to a magnetic filed of $0.05\ tesla$. The maximum value of the e.m.f. developed in it is

   a) $200\ \pi\ volt$ b) $\dfrac{10\pi}{3}\ volt$ c) $\dfrac{4\pi}{3}\ volt$ d) $\dfrac{2}{3}\ volt$

4. A motor having an armature of resistance 2Ω is designed to operate at $220\ V$ mains. At full speed, it develops a back e.m.f. of $210\ V$. When the motor is running at full speed, the current in the armature is
   a) $5A$ b) $105A$ c) $110A$ d) $215A$

5. If the number of turns in a coil becomes doubled, then it self inductance will be
   a) Double   b) Halved   c) Four times   d) Unchanged

6. The current through a $4.6\ H$ inductor is shown in the following graph. The induced emf during the time interval $t = 5\ milli-sec$ to $6\ milli-sec$ will be
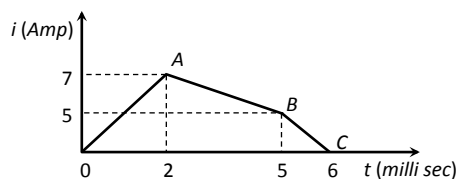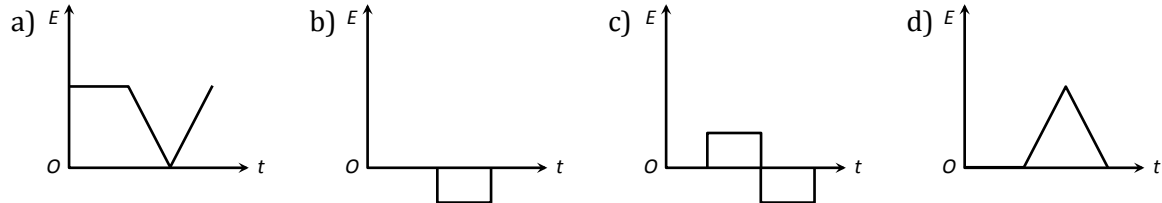

   a) $10^3 V$ b) $-23 \times 10^3\ V$ c) $23 \times 10^3\ V$ d) Zero

7. The current i in an induction coil varies with time t according to the graph shown
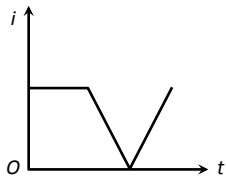
in figure. Which of the following graphs shows the induced emf (e) in the coil with time

a)   b)   c)   d)

8. A conducting ring of radius 1 $meter$ is placed in an uniform magnetic field B of $0.01 telsa$ oscillating with frequency $100 Hz$ with its plane at right angles to B. What will be the induced electric field

   a) π $volt/m$ b) 2 $volt/m$ c) 10 $volt/m$ d) 62 $volt/m$

9. A capacitor is fully charged with a battery. Then the battery is removed and a coil is connected with the capacitor in parallel, current varies as

   a) Increases monotonically   b) Decreases monotonically

   c) Zero   d) Oscillates indefinitely

10. Two coils are placed close to each other. The mutual inductance of the pair of coils depends upon

    a) The rates at which currents are changing in the two coils

    b) Relative position and orientation of the two coils

    c) The materials of the wires of the coils

    d) The currents in the two coils

11. Shown in the figure is a circular loop of radius r and resistance R. A variable magnetic field of induction $B = B_0 e^{-t}$ is established inside the coil. If the key (K) is closed, the electrical power developed right after closing the switch is equal to
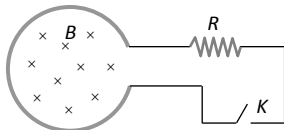

   a) $\dfrac{B_0^2 \pi r^2}{R}$ b) $\dfrac{B_0 10 r^3}{R}$ c) $\dfrac{B_0^2 \pi^2 r^4 R}{5}$ d) $\dfrac{B_0^2 \pi^2 r^4}{R}$

12. An aircraft with a wing-span of 40 m files with a speed of 1080 $km\ h^{-1}$ in the eastward direction at the constant altitude in the northern hemisphere, where the vertical component of earth's magnetic field is $1.75 \times 10^{-5} T$. Then the emf that develops between the tips of the wings is

    a) 0.5 V b) 0.35 V c) 0.21 V d) 2.1 V

13. A metal of radius 100 cm is rotated at a constant angular speed of 60 rads^{-1} in a plane at right angles to an external field of magnetic induction 0.05 Wbm^{-2}. The emf induced between between the centre and a point on the rim will be

    a) 3 V   b) 1.5 V   c) 6 V   d) 9 V

14. The current is flowing in two coaxial coils in the same direction. On increasing the distance between the two, the electric current will
    a) Increase
    b) Decrease
    c) Remain unchanged
    d) The information is incomplete

15. The number of turns in primary coil of a transformer is 20 and the number of turns in the secondary is 10. If the voltage across the primary is 220 V, what is the voltage across the secondary?
    a) 110 V
    b) 130 V
    c) 190 V
    d) 310 V

16. The network shown in the figure is a part of a complete circuit. If at a certain instant the current i is 5 A and is decreasing at the rate of $10^3 A/s$ then $V_A - V_B$ is

    A ⎯WWW⟶—|—•—coil— B
    1Ω   15 V   5mH
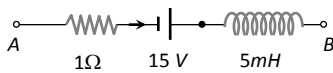
    a) 5 V
    b) 10 V
    c) 15 V
    d) 20 V

17. According to Lenz's law of electromagnetic induction
    a) The induced emf is not in the direction opposing the change in magnetic flux.
    b) The relative motion between the coil and magnet produces change in magnetic flux
    c) Only the magnet should be moved towards coil
    d) Only the coil should be moved towards magnet

18. If the switch in the following circuit is turned off, then
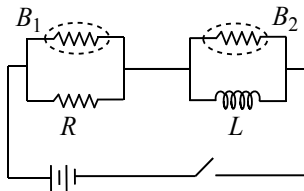
    a) The bulb B_1 will go out immediately whereas B_2 after sometimes
    b) The bulb B_2 will go out immediately whereas B_1 after sometime
    c) Both B_1 and B_2 will go out immediately
    d) Both B_1 and B_2 will go out after sometime

19. A transformer is employed to
    a) Obtain a suitable dc voltage
    b) Convert dc into ac
    c) Obtain a suitable ac voltage
    d) Convert ac into ac

20. In step-up transformer, relation between number of turns in primary (N_p) and number of turns is secondary (N_s) coils is
    a) N_s is greater than N_p b) N_p is greater than N_s c) N_s is equal to N_p d) $N_p = 2N_s$