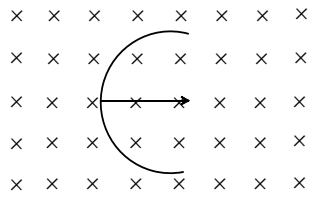
DPP

DAILY PRACTICE PROBLEMS

Class : XIIth **Subject : PHYSICS**
Date : **DPP No. : 9**

Topic :-Electro Magentic Induction

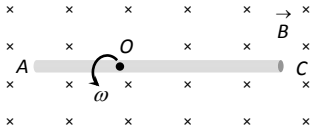
1. When a low flying aircraft passes over head, we sometimes notice a slight shaking of the picture on our TV screen. This is due to
   a) Diffraction of the signal received from the antenna.
   b) Interference of the direct signal received by the antenna with the weak signal reflected by the passing aircraft.
   c) Change of magnetic flux occuring due to the passage of aircraft
   d) Vibration created by the passage of aircraft
2. A straight wire of length L is bent into a semicircle. It is moved in a uniform magnetic field with speed v with diameter perpendicular to the field. The induced emf between the ends of the wire is



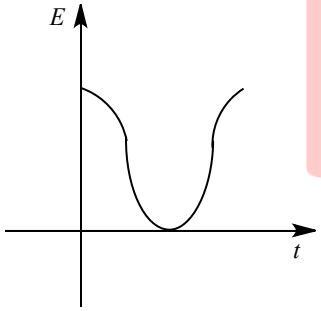
   a) BLv b) $2BLv$ c) $2\pi BLv$ d) $\frac{2BvL}{\pi}$
3. A boat is moving due east in a region where the earth's magnetic field is 5.0×10^{-5} $NA^{-1}m^{-1}$ due north and horizontal. The boat carries a vertical aerial 2 m long. If the speed of the boat is $1.50 ms^{-1}$, the magnitude of the induced emf in the wire of aerial is

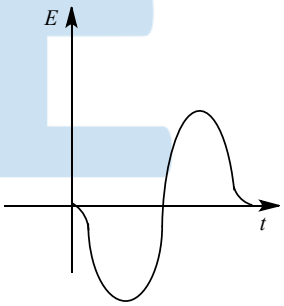
   a) 0.75 mV b) 0.50 mV c) 0.15 mV d) 1 mV
4. A conducting circular loop is placed in a uniform magnetic field 0.04 T with its plane perpendicular to the magnetic field. The radius of the loop starts shrinking at 2 mm/s. The induced emf in the loop when the radius is 2 cm is
   a) 3.2 $\pi\mu V$ b) 4.8 $\pi\mu V$ c) 0.8 $\pi\mu V$ d) 1.6 $\pi\mu V$
5. A square loop of wire, side length 10 cm is placed at angle of 45° with a magnetic field that changes uniformly from 0.1 T to zero in 0.7 s. The induced current in the loop (its resistance is 1 Ω)is
   a) 1.0 mA b) 2.5 mA c) 3.5 mA d) 4.0 mA

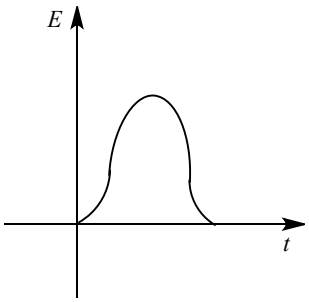
6. An infinitely cylinder is kept parallel to an uniform magnetic field B directed along positive z axis. This direction of induced current as seen from the z axis will be
   a) Clockwise of the +ve z axis b) Anticlockwise +ve z axis
   c) Zero d) Along the magnetic field
7. The self inductance of a solenoid of length L, area of cross-section A and having N turns is
   a) $\frac{\mu_0 N^2 A}{L}$ b) $\frac{\mu_0 NA}{L}$ c) $\mu_0 N^2 LA$ d) $\mu_0 NAL$
8. A conducting rod AC of length $4l$ is rotated about a point O in a uniform magnetic field $\vec{B}$ directed into the paper. $AO = l$ and $OC = 3l$. Then

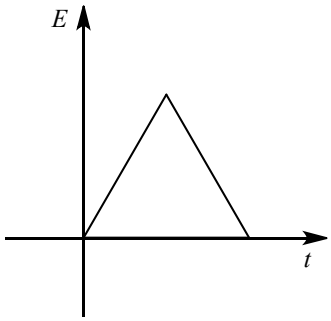


   a) $V_A - V_O = \frac{B\omega l^2}{2}$ b) $V_O - V_C = \frac{7}{2} B\omega l^2$ c) $V_A - V_C = 4\, B\omega l^2$ d) $V_C - V_O = \frac{9}{2} B\omega l^2$
9. A transformer of efficiency 90% draws an input power of 4 kW. An electrical appliance connected across the secondary draws a current of 6 A. The impedance of the device is
   a) 60 Ω b) 50 Ω c) 80 Ω d) 100 Ω
10. The variation of induced emf(ε) with time (t) in a coil if a short bar magnet is moved along its axis with a constant velocity is best represented as

a)


b)


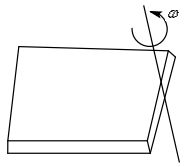
c)


d)


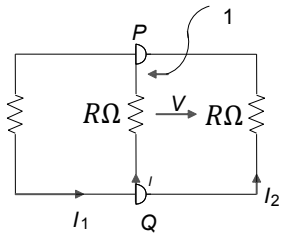
11. Three solenoid coils of same dimension, same number of turns and same number of layers of winding are taken. Coil 1 with inductance L_1 was wound using a Mn wire of resistance $11\Omega m^{-1}$;Coil 2 with inductance L_2 was wound using the similar wire but the direction of winding was reversed in each layer; Coil 3 with inductance $L_3$was wound using a superconducting wire. The self-inductance of the Coils L_1, L_2, L_3 are

a) $L_1 = L_2 = L_3$ b) $L_1, = L_2; L_3 = 0$ c) $L_1, = L_3; L_2 = 0$ d) $L_1 > L_2 > L_3$

12. A transformer is often filled with oil. The oil used should have
    a) Low viscosity
    b) High dielectric strength
    c) Low boiling point
    d) High thermal conducting
13. Which of the following is a wrong statement
    a) An emf can be induced between the ends of a straight conductor by moving it through a uniform magnetic field
    b) The self induced emf produced by changing current in a coil always tends to decrease the current
    c) Inserting an iron core in a coil increases its coefficient of self induction
    d) According to Lenz's law, the direction of the induced current is such that it opposes the flux change that causes it
14. Voltage in the secondary coil of a transformer does not depend upon
    a) Voltage in the primary coil
    b) Ratio of number of turns in the two coils
    c) Frequency of the source
    d) Both (a) and (b)
15. Fleming's left and right hand rule are used in
    a) DC motor and AC generator
    b) DC generator and AC motor
    c) DC motor and DC generator
    d) Both rules are same, any one can be used
16. A horizontal rod of length L rotates about a vertical axis with a uniform angular velocity ω. A uniform magnetic field B exists parallel to the axis of rotation. Then potential difference between the to ends of the rod is



    a) $\omega L^2 B$ b) $\omega^2 LB$ c) $\frac{1}{2}\omega L^2 B$ d) $\frac{1}{2}\omega^2 LB$
17. A rectangular loop has a sliding connector PQ of length l and resistance $R\ \Omega$ and it is moving with a speed v as shown. The set-up is placed in a uniform magnetic field going into the plane of the paper. The three currents I_1,I_2 and I are



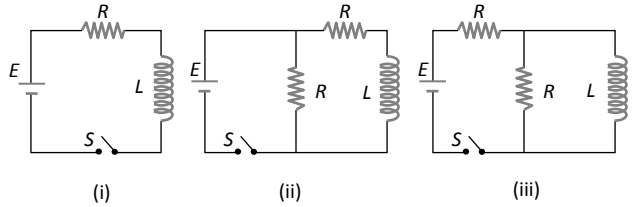
    a) $I_1 = -I_2 = \frac{Blv}{R}, I = \frac{2Blv}{R}$
    b) $I_1 = I_2 = \frac{Blv}{3R}, I = \frac{2Blv}{3R}$
    c) $I_1 = I_2 = I = \frac{Blv}{R}$

d) $I_1 = I_2 = \frac{Blv}{6R}, I = \frac{Blv}{3R}$

18. In transformer, core is made of soft iron to reduce
    a) Hysteresis losses
    b) Eddy current losses
    c) Force opposing electric current
    d) None of the above

19. A coil of self inductance 50 *henry* is joined to the terminals of a battery of e.m.f. 2 *volts* through a resistance of 10 *ohm* and a steady current is flowing through the circuit. If the battery is now disconnected, the time in which the current will decay to $1/e$ of its steady value is
    a) 500 *seconds*
    b) 50 *seconds*
    c) 5 *seconds*
    d) 0.5 *seconds*

20. In which of the following circuit is the current maximum just after the switch S is closed



    a) (i)
    b) (ii)
    c) (iii)
    d) Both (ii) and (iii)