

Topic :-Electro Magnetic Induction

- A circular loop of radius R , carrying current I lies in xy – plane with its centre at origin. The total magnetic flux through xy -plane is
 - Directly proportional to R
 - Directly proportional to I
 - Inversely proportional to I
 - Zero
- The number of turns of the primary and the secondary coils of a transformer are 10 and 100 respectively. The primary voltage and the current are given as 2 V and 1 A. Assuming the efficiency of the transformer as 90%, the secondary voltage and the current respectively are
 - 20V and 0.1A
 - 0.2V and 1A
 - 20V and 0.09 A
 - 0.2 V and 0.9 A
- Two coils are placed close to each other. The mutual inductance of the pair of coils depends upon
 - The rates at which currents are changing in the two coils
 - Relative position and orientation of the two coils
 - The materials of the wires of the coils
 - The currents in the two coils
- A six pole generator with fixed field excitation develops an emf of 100 V, when operating at 1500 rpm. At what speed must it rotate to develop 120 V?
 - 1200 rpm
 - 1800 rpm
 - 1500 rpm
 - 400 rpm
- If a coil of metal wire is kept stationary in a non-uniform magnetic field, then
 - An e.m.f. is induced in the coil
 - A current is induced in the coil
 - Neither e.m.f. nor current is induced
 - Both e.m.f. and current is induced
- A transformer is used to light a 100 W and 110 V lamp from a 220 V mains. If the main current is 0.5 A, the efficiency of the transformer is approximately
 - 30%
 - 50%
 - 90%
 - 10%
- The number of turns in the primary coil of a transformer is 200 and the number of turns in the secondary coil is 10. If 240 volt AC is applied to the primary, the output from the secondary will be
 - 48 V
 - 24 V
 - 12 V
 - 6 V
- Whenever a magnet is moved either towards or away from a conducting coil, an emf is induced, the magnitude of which is independent of
 - The strength of the magnetic field
 - The speed with which the magnet is moved
 - The number of turns in the coil
 - The resistance of the coil

9. A helicopter rises vertically with a speed of 100 ms^{-1} . If helicopter has length 10 m and horizontal component of earth's magnetic field is $5 \times 10^{-3} \text{ Wbm}^{-2}$, then the induced emf between the tip of nose and tail of helicopter is
 a) 50 V b) 0.5 V c) 5 V d) 25 V
10. A coil of Cu wire (radius- r , self inductance- L) is bent in two concentric turns each having radius $\frac{r}{2}$. The self inductance now
 a) $2L$ b) L c) $4L$ d) $L/2$
11. The net magnetic flux through any closed surface, kept in a magnetic field is
 a) Zero b) $\frac{\mu_0}{4\pi}$ c) $4\pi\mu_0$ d) $\frac{4\mu_0}{\pi}$
12. A coil of resistance 400Ω is placed in a magnetic field. If the magnetic flux $\phi(\text{wb})$ linked with the coil varies with time t (sec) as $\phi = 50t^2 + 4$. The current in the coil at $t = 2$ sec is
 a) 0.5 A b) 0.1 A c) 2 A d) 1 A
13. A varying current at the rate of 3 A/s in a coil generates an e.m.f. of 8 mV in a nearby coil. The mutual inductance of the two coils is
 a) 2.66 mH b) $2.66 \times 10^{-3} \text{ mH}$ c) 2.66 H d) 0.266 H
14. The number of turns in primary and secondary coils of a transformer is 50 and 200 respectively. If the current in the secondary coil is 4 A , then the current in the primary coil is
 a) 1 A b) 2 A c) 4 A d) 5 A
15. A circular coil of mean radius of 7 cm and having 400 turns is rotated at the rate of 1800 revolutions per minute in the earth's magnetic field ($B = 0.5 \text{ gauss}$), the maximum e.m.f. induced in coil will be
 a) 1.158 V b) 0.58 V c) 0.29 V d) 5.8 V
16. Electric fields induced by changing magnetic fields are
 a) Conservative
 b) Non-conservative
 c) May be conservative or non-conservative depending on the condition
 d) Nothing can be said
17. In an induction coil with resistance, the induced emf will be maximum when
 a) The switch is put on due to high resistance b) The switch is put off due to high resistance
 c) The switch is put on due to low resistance d) The switch is put off due to low resistance
18. The inductance of a solenoid 0.5 m long of cross-sectional area 20 cm^2 and with 500 turns is
 a) 12.5 mH b) 1.25 mH c) 15.0 mH d) 0.12 mH
19. A coil of resistance 10Ω and an inductance 5 H is connected to a 100 volt battery. Then energy stored in the coil is
 a) 125 erg b) 125 J c) 250 erg d) 250 J
20. A small piece of metal wire is dragged across the gap between the poles of a magnet in 0.4 s . If change in magnetic flux in the wire is $8 \times 10^{-4} \text{ Wb}$, then emf induced in the wire is
 a) $8 \times 10^{-3} \text{ V}$ b) $6 \times 10^{-3} \text{ V}$ c) $4 \times 10^{-3} \text{ V}$ d) $2 \times 10^{-3} \text{ V}$