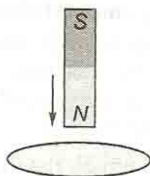


## Topic :-Electro Magnetic Induction

1. A coil of wire of a certain radius has 600 turns and a self inductance of  $108\text{ mH}$ . The self inductance of a 2<sup>nd</sup> similar coil of 500 turns will be

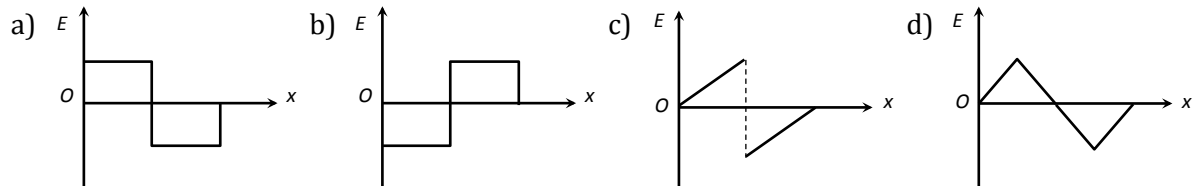
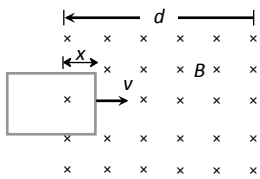
a)  $74\text{ mH}$                       b)  $75\text{ mH}$                       c)  $76\text{ mH}$                       d)  $77\text{ mH}$

2. A copper ring having a cut such as not to form a complete loop is held horizontally and a bar magnet is dropped through the ring with its length along the axis of the ring, figure. The acceleration of the falling magnet is

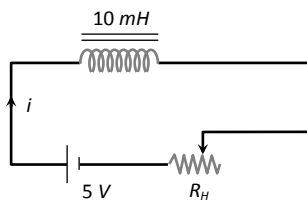


- a)  $g$                                       b) Less than  $g$                       c) More than  $g$                       d) Zero
3. A short-circuited coil is placed in a time-varying magnetic field. Electrical power is dissipated due to the current induced in the coil. If the number of turns were to be quadrupled and the wire radius halved, the electrical power dissipated would be
- a) Halved                                      b) The same                                      c) Doubled                                      d) Quadrupled
4. An ideal transformer has 100 turns in the primary and 250 turns in the secondary. The peak value of the ac is  $28\text{ V}$ . The *r.m.s.* secondary voltage is nearest to
- a)  $50\text{ V}$                                       b)  $70\text{ V}$                                       c)  $100\text{ V}$                                       d)  $40\text{ V}$
5. A wheel with ten metallic spokes each  $0.50\text{ m}$  long is rotated with a speed of  $120\text{ rev/min}$  in a plane normal to the earth's magnetic field at the place. If the magnitude of the field is  $0.4\text{ gauss}$ , the induced e.m.f. between the axle and the rim of the wheel is equal to
- a)  $1.256 \times 10^{-3}\text{ V}$                       b)  $6.28 \times 10^{-4}\text{ V}$                       c)  $1.256 \times 10^{-4}\text{ V}$                       d)  $6.28 \times 10^{-5}\text{ V}$

6. A rectangular loop is being pulled at a constant speed  $v$ , through a region of certain thickness  $d$ , in which a uniform magnetic field  $B$  is set up. The graph between position  $x$  of the right hand edge of the loop and the induced emf  $E$  will be



7. If the current is halved in a coil, then the energy stored is how much times the previous value  
 a)  $\frac{1}{2}$                       b)  $\frac{1}{4}$                       c) 2                      d) 4
8. The self-inductance of the motor of an electric fan is 10 H. In order to impart maximum power at 50 Hz, it should be connected to a capacitance of  
 a)  $4 \mu\text{F}$                       b)  $8 \mu\text{F}$                       c)  $1 \mu\text{F}$                       d)  $2 \mu\text{F}$
9. An electric motor operates on a 50 volt supply and a current of 12A. If the efficiency of the motor is 30%, what is the resistance of the winding of the motor  
 a)  $6\Omega$                       b)  $4\Omega$                       c)  $2.9\Omega$                       d)  $3.1\Omega$
10. The total charge, induced in a conducting loop, when it is moved in a magnetic field depends on  
 a) Rate of change of magnetic on                      b) Initial magnetic flux only  
 c) Total change in magnetic flux and resistance                      d) Final magnetic flux only
11. A transformer rated at 10k W is used to connect a 5 kV transmission line to a 240 V circuit. The ratio of turns in the windings of the transformer is  
 a) 5                      b) 20.8                      c) 104                      d) 40
12. The resistance in the following circuit is increased at a particular instant. At this instant the value of resistance is  $10\Omega$ . The current in the circuit will be



- a)  $i = 0.5 \text{ A}$                       b)  $i > 0.5 \text{ A}$                       c)  $i < 0.5 \text{ A}$                       d)  $i = 0$
13. If rotational velocity of a dynamo armature is doubled, then induced e.m.f. will become  
 a) Half                      b) Two times                      c) Four times                      d) Unchanged
14. A step-down transformer is connected to 2400 volts line and 80 amperes of current is found to flow in output load. The ratio of the turns in primary and secondary coil is 20 : 1. If transformer efficiency is 100%, then the current flowing in primary coil will be  
 a) 1600 A                      b) 20 A                      c) 4 A                      d) 1.5 A

15. Flux  $\phi$  (in weber) in a closed circuit of resistance  $20\Omega$  varies with time  $t$  (in second) according to equation  $\phi = 6t^2 - 5t + 1$ .

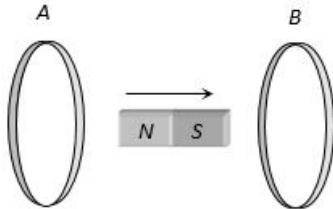
The magnitude of the induced current at  $t=0.25$  s is

- a) 1.2 A                      b) 0.8 A                      c) 0.6 A                      d) 0.1 A

16. In an ideal transformer the number of turns of primary and secondary coil is given as 100 and 300 respectively. If the power input is  $60\text{ W}$ , the power output is

- a)  $100\text{ W}$                       b)  $300\text{ W}$                       c)  $180\text{ W}$                       d)  $60\text{ W}$

17. In the diagram shown if a bar magnet is moved along the common axis of two single turn coils A and B in the direction of arrow



- a) Current is induced only in A & not in B  
 b) Induced currents in A & B are in the same direction  
 c) Current is induced only in B and not in A  
 d) Induced currents in A & B are in opposite directions

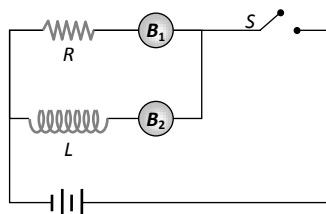
18. A  $10\text{ metre}$  wire kept in east-west direction is falling with velocity  $5\text{ m/sec}$  perpendicular to the field  $0.3 \times 10^{-4}\text{ Wb/m}^2$ . The induced e.m.f. across the terminal will be

- a)  $0.15\text{ V}$                       b)  $1.5\text{ mV}$                       c)  $1.5\text{ V}$                       d)  $15.0\text{ V}$

19. A circular coil of diameter  $21\text{ cm}$  is placed in a magnetic field of induction  $10^{-4}\text{ T}$ . the magnitude of flux linked with coil when the plane of coil makes an angle  $30^\circ$  with the field is

- a)  $1.44 \times 10^{-6}\text{ Wb}$                       b)  $1.732 \times 10^{-6}\text{ Wb}$                       c)  $3.1 \times 10^{-6}\text{ Wb}$                       d)  $4.2 \times 10^{-6}\text{ Wb}$

20. The adjoining figure shows two bulbs  $B_1$  and  $B_2$ , resistor  $R$  and an inductor  $L$ . When the switch  $S$  is turned off



- a) Both  $B_1$  and  $B_2$  die out promptly                      b) Both  $B_1$  and  $B_2$  die out with some delay  
 c)  $B_1$  dies out promptly but  $B_2$  with some delay                      d)  $B_2$  dies out promptly but  $B_1$  with some delay