ELECTRO MAGNETIC INDUCTION

1) A Circular coil is placed near a current carrying conductor. The induced current is anti clock wise when the coil is,

1. Stationary **2. Moved away from the conductor**

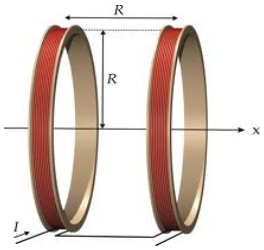
3. Moved towards the conductor **4. When the current in the conductor increases.**

2) A Circular coil is placed near a current carrying conductor. The induced current is clock wise when the coil is,

1. Stationary **2. Moved away from the conductor**

3. Moved towards the conductor **4. When the current in the conductor increases.**

3) Two coils carrying currents I_1 and I_2 placed with their planes parallel [I_1 and I_2 are in the same sence] approach each other.



1. Both I_1 and I_2 will increase. **2. I_1 increases and I_2 will decrease**

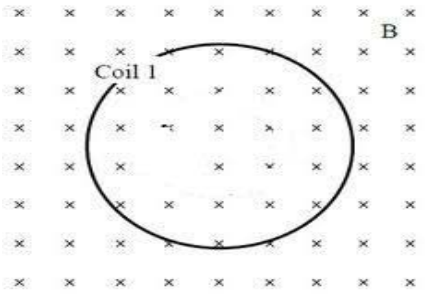
3. I_1 decreases and I_2 will increase. **4. Both I_1 and I_2 will decrease**

4) Two coils carrying currents I_1 and I_2 placed with their planes parallel [I_1 and I_2 are in the opposite sence] approach each other.

1. Both I_1 and I_2 will increase. **2. I_1 increases and I_2 will decrease**

3. I_1 decreases and I_2 will increase. **4. Both I_1 and I_2 will decrease**

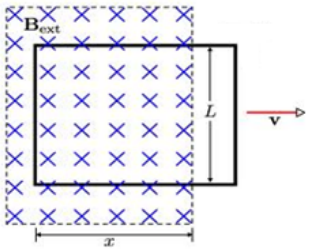
5) **A circular coil of radius R in the plane of the paper is moved perpendicular to a magnetic field B. the magnitude of the induced emf is**



1. πR^2[dB/dt]. **2. 2πR [dB/dt]**

3. 2πR [dR/dt] Ø = BA, **4. 2R [d π /dt] mod e = d/dt(Ø)**

6) **When a rectangular coil moved out of a region of magnetic intensity B with a velocity v, the induced emf is e= Blv.If R is the resistance of the coil, force required to pull the coil out with constant velocity v is,**



1. $B^2 l^2 v/R$ **2. $B l v^2/R$**

3. B l v/R **4. B lv/R**

7) **A coil of wire is held with its plane horizontal to the earth's surface and a small bar magnet dropped vertically down through it. The magnet will fall with a;**

1. constant acceleration = g **2. constant acceleration > g**

3. constant acceleration < g **4. Non uniform acceleration < g**

8) **An electron moves along a straight line [from west to east in the plane of the paper] which lies in the same plane as circular loop of conducting wire. What will be the direction of the induced current in the loop?**

1. Anticlockwise **2. Clockwise**

3. Alternating **4. No current will be induced in the loop.**

9) **Magnetic flux Ø in a closed circuit of resistance 14 Ω varies with time in accordance to the equation, Ø = $12t^2$ - 5t - 5. The magnitude of the induced current in the circuit at t = 0.15 second is**

1) 100mA **2) 10mA e**

3) 1mA **4) 1000mA**

10) **A circuit has a self inductance of 1 H and carries a current of 2A. To prevent sparking when the circuit is broken, a capacitor which can withstand 400 volts is used. The least capacitance of the capacitor connected across the switch is,**

1. 12.5μF

2. 25μF

3. 2.5μF

4. 5μF

11) **A 10 Ω resistor and a 20 Ω resistor are in series with a 2V battery and a key. An ideal inductor of 10 mH is connected across 20 Ω resistor. The key is inserted at t=0. The final value of current in 10 Ω resistor is**

1. 2 A **2. 200mA**

3. 100mA **4. 3/40A**

12) **An inductance coil has a resistance of 100 Ω. When an ac signal of 1kHz is applied across the coil, the current lags behind the voltage by 45^0. The inductance of the coil is,**

1. 10mH **2. 12mH**

3. 16mH **4. 20mH**

13) **The ac voltage applied to an impedance of 50 Ω is given by v = 100 sin (50 πt). Ac meters are connected to the circuit reads,**

1.70V, 1.4A **2. 100V, 2A**

3. 140V, 2A **4. 50V, 5 A**

14) **An RLC circuit consists of R = 40Ω, L = 5H, C = 80μF. The resonance frequency is**

1.20/π Hz **2. 25/π Hz**

3. 2.5/π Hz **4. 200/π Hz**

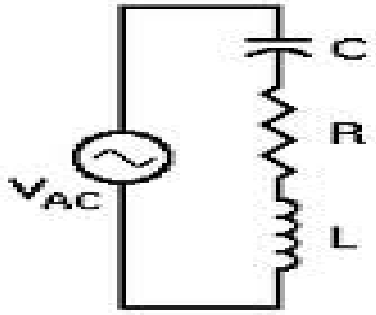
15) A series RLC circuit consists of R = 40 Ω, L = 5H, C = 80μF. The impedance at resonance f_r = 25/ π Hz At resonance Z = R

1. 40 Ω, 2. 80 Ω,

3. 125 Ω, 4. 85 Ω,

16) A series RLC circuit consists of R = 40 Ω, L = 5H, C = 80μF connected to an ac source v_{rms} = 200V. f = 25/π Hz

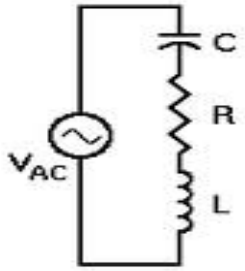
The max value of current and rms pd across the inductance at resonance is



1. 5√2 A,1250V 2. √5 A,125V

3. √2 A, 12.5V 4. 5A,1.25V

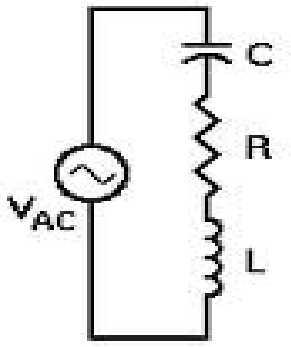
17) A series RLC circuit consists of R = 40 Ω, L = 5H, C = 80μF connected to an ac source v_{rms} = 200V. F = 25/π Hz The rms value of current and rms pd across the resistor at resonance is



1. √2 x5 A,1250V 2. √5 A,125V

3. √2 A, 12.5V 4. 5A,200V

18) A series RLC circuit consist of R = 40Ω, L = 5H,C = 80μF connected to an ac source v_{rms} = 200V,f = 25/π Hz The max value of current and rms pd across the capacitor at resonance is



1.√2 x5 A,1250V **2. √5 A,125V3.**

3. √2 A, 12.5V **4. 5A,1.25V**

19) At resonance in a series resonance circuit the phase difference between pd across the inductor and the pd across the capacitor is

1. 90^0 **2. 100^0**

3. 180^0

20) At resonance in a series resonance circuit the phase difference between pd across the resistor and the pd across the capacitor is

1. 90^0 **2.100^0**

3. 180^0 **4.190^0**

21) At resonance in a series resonance circuit the phase difference between pd across the resistor and the pd across the inductor is

1. 90^0 **2. 100^0**

3. 180^0 **4. 190^0**

22) In an inductor the current varies with time as I = 6+16t and induces an emf of 16mV in the inductor. The self inductance of the coil is

1. 5mH **2. 5mH**

3. 6.25mH **4. 1Mh**

23) In an inductor the current varies with time as I = 6+16t and induces an emf of 16mV in the inductor .The power supply to the inductor at t = 9 second is

1. 1mW 2. 21mW
3. 2.4W 4. 24W

24) Two coils have self inductance of 16 mH and 9mH. The coupling coefficient between them is 1.2. the mutual inductance between the two coils is

1. 14.4mH 2. 1.4.mH
3. 4mH 4. 1mH

25) The impedance of an ideal LC circuit at resonance is

1. Infinity 2. Zero
3. $\sqrt{(X_L^2 - X_C^2)}$ 4. $\sqrt{(X_L - X_C)^2}$

26) The frequency at which the inductive reactance of a pure inductance coil [L = 21/66 mH] is 500 ohm is

1. 2.5 kHz 2. 125 kHz
3. 250 kHz 4. 12.5 kHz $X_L = 2\pi fL$

27) A current I flows through an inductance coil of self inductance L henry. The dimension of I^2L is:

1. $MLT^{-2}A$ 2. $ML^2T^2A^2$
3. ML^2T^{-2} 4. MLT^{-2}

28) A voltmeter measures a pd of V volt across a capacitor of capacitance C, The unit of V^2C is

1. Ampere metre 2. Volt per coulomb
3. Joule per vol 4. Joule

29) In a series RLC circuit the PD across the resistor is 80V, across the inductor is 40V and across the capacitor is 100V. The EMF of the AC source (f = 50Hz) is

1. 220V 2.140V
3. 20V 4. 100V

30) A current of 5A is flowing at 220V in the primary coil of a transformer. If the voltage across the secondary is 2200V when the power loss is 50% the current in the secondary is

1. 5A 2. 1A
3. 0.5A 4. 0.25A

31) The resonant frequency of a series RLC circuit is 10 k Hz. The values of the capacitance and the inductance are increased to 4 times their original value the new resonance frequency in kHz will be

1. 2.5 2. 40
3. 1.25 4. Zero

32) A vertical copper disc of diameter √(7/22) metre makes 600 revolutions per minute about a horizontal axis passing through its center a uniform magnetic field of 0.22 tesla acts at an angle 30^o to the normal to the plane of the disc. The PD between the center and the rim of the disc is

1) 200V **2) 350V**
3) 35V **4) 0.275V**

33) The rails of a railway track are 2m apart and assumed to be insulated from one another. The dip at the place is 45^o and the horizontal component of the earth's magnetic field is 0.0004 tesla. If the velocity of the train is 90 kmph the emf induced is V

1) 2,5V **2) 0.25V**
3) 0.8V **4) 0.08V**

34) The frequency at which the capacitive reactance of a capacitor at 10 kHz becomes 3.14 % of its original value is f = 10000 Hz

1. 50 Hz **2. 100Hz**
3. 200Hz **4. 314Hz**

35) The reactance of a coil which exhibits an effective opposition of 25 Ω to AC (50Hz) and 20 Ω to DC is

1.25 Ω **2. 20 Ω**
3. 15 Ω **4.10 Ω**

36) The impedance of a ideal LC circuit at resonance is

1. Maximum **2. √2 times the original value**
3. 1/√2 times the original value **4. zero**

37) The frequency at which the inductive reactance of a coil at 10000 Hz becomes 3.14% of its original value is

1. 50 Hz **2. 10 x 10^4Hz**
3. 21.87 x 10^4Hz **4. 31.85 x 10^4 Hz**