

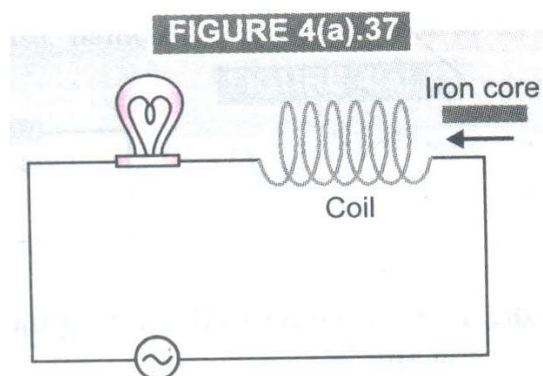
Class: 12

Subject: Physics

Topic: Alternating Current

No. of Questions: 20

1. 220 volt a.c. is more dangerous than 220 volt d.c. Why?
2. Sketch a graph showing the variation of impedance of LCR circuit with the frequency of applied voltage.
3. The hot wire ammeter A in Fig. 4(b).37(a) shows some deflection, but not in Fig. 4(b).37 (b). Why?
4. An electric lamp having coil of negligible inductance connected in series with a capacitor and an a.c. source is glowing with certain brightness, Fig. 4(b).38. How does the brightness of the lamp change on reducing (i) capacitance (ii) frequency?
Justify your answer.
5. An electromagnet has stored 648 J of magnetic energy, when a current of 9 A exists in its coils. What average e.m.f. is induced if the current is reduced to zero in 0.45 s?
6. Air cored chokes are used for reducing low frequency a.c., why?
7. 11 kW of electric power can be transmitted to a distant station at (i) 220 V or (ii) 2200 V. Which of the two mods of transmission should be preferred and why? Support you answer with possible calculations.
8. In India, domestic power supply is at 220 V, 50 hz, while in U.S.A, it is 110 V, 60 hz, Give one advantage and one disadvantage of 220 V supply over 110 V supply.
9. A bulb connected in series with a solenoid is lit by a.c. source Fig. 4(a).37. If the soft iron core is introduced in the solenoid, will the bulb glow brighter?



10. In a car spark coil, an emf of 40,000 volts is induced in its secondary windings when the current in its primary winding changes from 4 A to zero in 10^{-6} s. The mutual inductance between the primary and the secondary windings of the spark coil is

- H
- H
- H
- H

12. In a plane electromagnetic wave, the electric field oscillates sinusoidally at a frequency of 2.0×10^{10} Hz. What is the wavelength of the wave?

- cm
- 1.5 cm
- cm
- cm

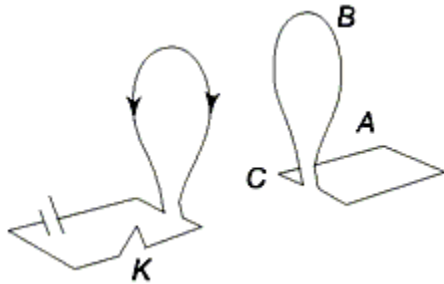
14. An electromagnetic wave is produced by oscillating electric and magnetic fields **E** and **B**. Choose the only incorrect statement from the following.

- E** is perpendicular to **B**.
- E** is perpendicular to the direction of propagation of the wave.
- B** is perpendicular to the direction of propagation of the wave.
- E** is parallel to **B**.

16. What is the self inductance of an air – core solenoid, 3.14 m long, cross-sectional area 10^{-3} m² and having 500 turns?

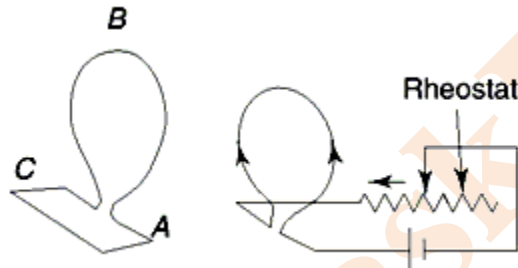
- mH
- mH
- mH
- mH

17. The figure below shows two coils placed close to each other. When the key K is pressed so that a current starts building up in one of the coils, then



- a current flows along ABC in the other coil
- a current flows along CBA in the other coil
- no current flows in the other coil
- an alternating current flows in the other coil

18. The figure below shows two coils placed close to each other. When the current through one coil is decreased gradually by shifting the position of the rheostat, then



- a current flows along ABC in the other coil
- a current flows along CBA in the other coil
- no current flows in the other coil
- an alternating current flows in the other coil

19. If the flux of magnetic induction through a coil of resistance R and having n turns changes from ϕ_1 to ϕ_2 , then the magnitude of the charge that passes through the coil is

- $\frac{(\phi_2 - \phi_1)}{R}$
- $\frac{n(\phi_2 - \phi_1)}{R}$
- $\frac{(\phi_2 - \phi_1)}{nR}$

d. $\frac{nR}{(\phi_2 - \phi_1)}$

20. A metallic wheel with 8 metallic spokes, each of length r , is rotating at an angular frequency ω in a plane perpendicular to the magnetic field B . The magnitude of the induced emf between the axle and the rim of the wheel is

- a. $\frac{1}{2} \omega r^2 B$
- b. $2 \omega r^2 B$
- c. $4 \omega r^2 B$
- d. $8 \omega r^2 B$