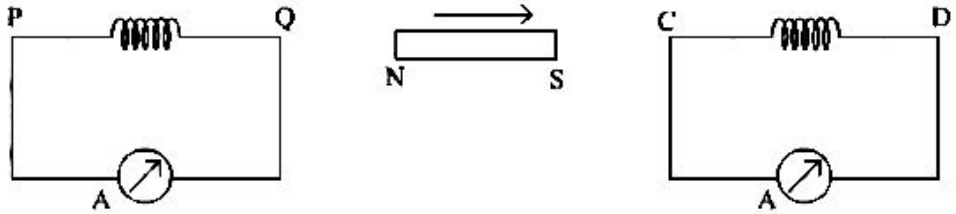
# CBSE 12th Physics
# Unsolved Important Questions
# Chapter 6

## 1 Mark Questions:

**Q.1. Define self-inductance of a coil. Write its S.I. units.**

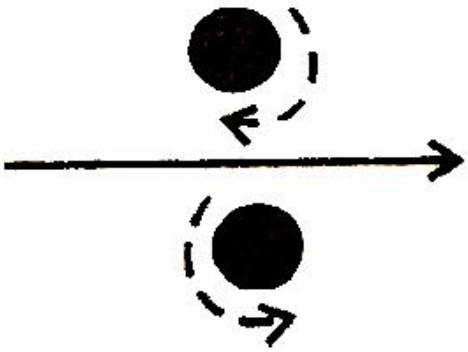
**Q.2. A bar magnet is moved in the direction indicated by the arrow between two coils PQ and CD. Predict the direction of induced current in each coil.**




**Q.3. How does the mutual inductance of a pair of coils change when?**
***(i)*** **distance between the coils is increased and**
***(ii)*** **number of turns in the coils is increased?**

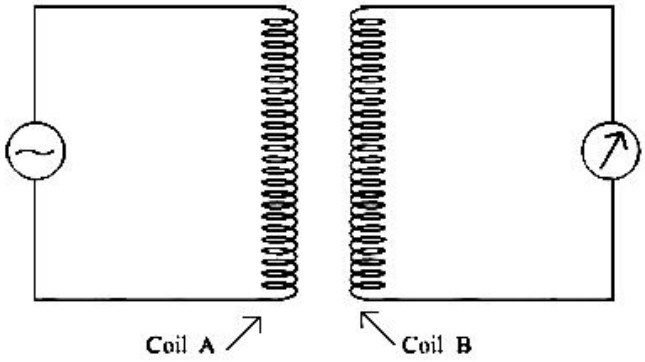
**Q.4. The electric current flowing in a wire in the direction from B to A decreasing. Find out the direction of the induced current in the metallic loop kept above the wire as shown.**

**Q.5. Predict the directions of induced currents in metal rings I and 2 lying in the same plane where current I in the wire is increasing steadily.**



## 2 Mark Questions:

**Q.6. The circuit arrangement given below shows that when an a. C. passes through the coil the current flowing in the coil B.**




**(i) State the underlying principle involved.**

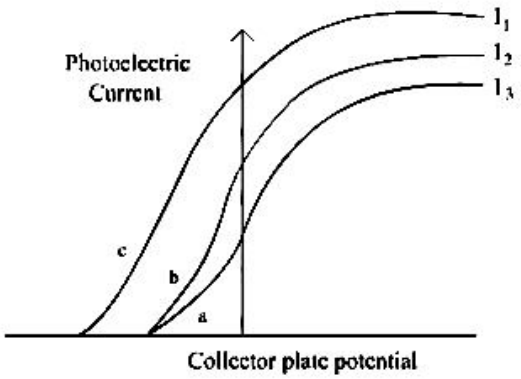
**(ii) Mention two factors on which the current produced in the coil B depends.**

**Q.7. Two identical loops, one of copper and the other of aluminum, are related with the same angular speed in the same magnetic field. Compare (i) the induced emf and (ii) the current produced in the two cols. Justify your answer.**

**Q.8. What are eddy currents? Write any two applications of eddy currents.**

**Q.9. The figure shows a plot of three curves a, b, c showing the variation of photocurrent vs collector plate potential for three different intensities $I_1, I_2$ and $I_3$ having frequencies $v_1, v_2$ and $v_3$ respectively incident on a photosensitive surface.**

**Point out the two curves for which the incident radiations have same frequency but different intensities.**




**Q.10. State Lenz's Law. A metallic rod held horizontally along east-west direction, is allowed to fall under gravity. Will there be an emf induced at its ends? Justify your answer.**

## 3 Mark Questions:

**Q.11. (i) State faraday's law of electromagnetic induction.**

**(ii) A jet plane is travelling towards west at a speed of 1800 km/h. What is the voltage difference developed between the ends of the wing having a span of 25 m, if the earth's magnetic field at the location has a magnitude of $5 \times 10^{-4}$T and the angle is $30^0$?**

**Q.12. Define the term 'mutual inductance' between the two coils.**

**Obtain the expression for mutual inductance of a pair of long coaxial solenoids each of length *l* and radii $r_1$ and $r_2$ $(r_2 \gg r_1)$. Total number of solenoids are $N_1$ and $N_2$ respectively.**

**Q.13. Define mutual inductance between a pair of coils. Derive an expression for the mutual inductance of two long coaxial solenoids of same length wound one over the other.**

**Q.14. A metallic rod length *I* is rotated at a constant angular speed, normal to a uniform magnetic field B. derive an expression for the current induced in the rod, if the resistance of the rod is R.**

**Q.15. (a) Define self-inductance. Write its S. l. units.**

**(b) Derive an expression for self-inductance of a long solenoid of length l, cross-sectional area A having N number of turns.**

## 5 Marks Questions:

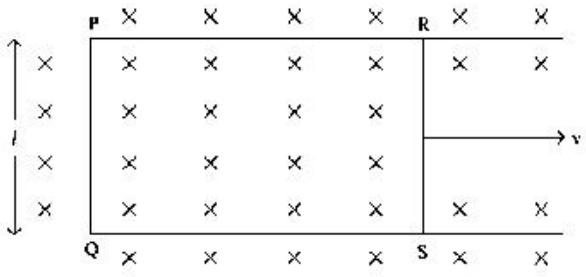
**Q.16. (a) What are eddy currents? write their two applications.**

**(b) Figure shows a rectangular conducting loop PQSR in which arm RS of length 'i' is movable. The loop is kept in a uniform magnetic field 'B' directed downward perpendicular to the plane of the loop. The arm RS is moved with a uniform speed 'v' Deduce an expression for**

**(i) the *emf* induced across harm 'RS',**

**(ii) the external force required to move the arm, and**

**(iii) the power dissipated as heat.**

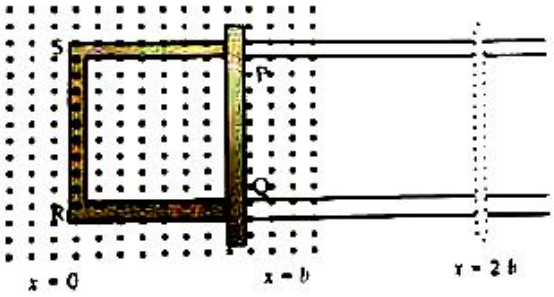


**Q.17. (a) State Lenz's law. Give one example to illustrate this law. The Lenz's is a consequence of the principle of conservation of energy. 'Justify this statement.**

**(b) Deduce an expression for the inductance of two long coaxial solenoids but having different radii and different number of turns.**

**Q.18. State Faraday's law of electromagnetic induction.**

**Figure shows a rectangular conductor PORS in which the conductor PQ is free to move in a uniform magnetic field B perpendicular to the plane of the paper. The field extends from x=0 to x=b and is zero for x>b. Assume that only the arm PQ possesses resistance *r*, when the arm PQ is pulled outward from x=0 with constant speed v, as in the expressions for the flux and the induced emf. Sketch the variations of these quantities with distance $0 \leq x \leq 2b$.**




**Q.19. (a) Describe a simple experiment (or activity) to show that the polarity of emf induced in a coil is always such that it tends to produce a current which opposes the change of magnetic flux that produces it.**

**(b) The current flowing through an inductor of self-inductance L is continuously increasing. Plot a graph showing the variation of**

**(i) Magnetic flux versus the current**

**(ii) Induced emf versus dl/dt**

**(iii) Magnetic potential energy stored versus the current.**

**Q.20. (a) Draw a schematic sketch of an ac generator describing its basic elements. State briefly its working principle. Show a plot of variation**

**(i) Magnetic flux and (ii) Alternating emf versus time generated by a loop of wire rotating in a magnetic field.**

**(b) Why is choke coil needed in the use of fluorescent tubes with ac mains?**