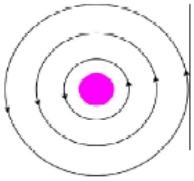
PHYSICS

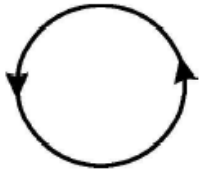
6. ELECTROMAGNETISM

1. Mark Questions:

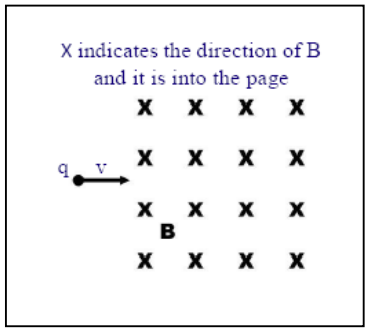
1. What do you conclude from Oersted experiment?
2. Define magnetic flux ?
3. Define magnetic flux density ?
4. Let θ be the angle between magnetic field (B) and normal to the plane with area (A). Then Write the formulas for (i) magnetic flux density and (ii) magnetic flux through the plane?
5. What is right hand thumb rule? (or) Which rule do you use to find the direction of magnetic field around straight wire carrying current and state that rule.
6. Magnetic lines are as shown in the following figure. What is the direction of the current flowing through the wire?



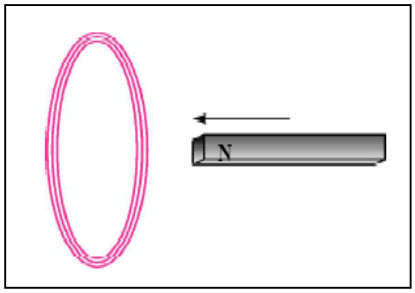
7. Which rule do you use to determine the direction of the filed due to coil or solenoid carrying current and state that rule
8. The direction of current flowing in a coil is shown in figure. What type of magnetic pole is formed at the face that has flow of current as shown in figure.



9. Symbol 'X' indicates the direction of a magnetic field (B) into the page. If a charge (q) moving with a velocity (v) perpendicular to the magnetic field B as shown in the figure. Then
(i) What is the magnetic force acting on the charge?
(ii) What is the magnetic force on the charge if it moving parallel to the magnetic field?



10. Symbol X indicates the direction of a magnetic field into the page. A straight long wire carrying current along its length is kept perpendicular to the magnetic field. What is the magnitude of force experienced by the wire? In what direction does act?
11. What is solenoid?
12. State Faraday's law.
13. Define electromagnetic induction.
4. Define Lenz law
15. The value of magnetic induction of uniform field is 2T. What is the flux passing through the surface area of 1.5 m^2 perpendicular to the field?
16. A bar magnet with North Pole facing towards a coil moves as shown in the figure. What happens to the magnetic flux passing through the coil?



17. Write the devices which convert electrical energy into mechanical energy and mechanical energy into electrical energy. (or) Distinguish between electric motor and generator.

6. ELECTROMAGNETISM
KEY

1. Current carrying wire produces magnetic field.
2. Magnetic flux : The number of magnetic lines of force passing through a given normal area is called "Magnetic flux" (ϕ)
3. Magnetic flux density or Magnetic field induction(B) : - The amount of magnetic flux passing through one unit normal area is called "Magnetic flux density."

$$B = \frac{\phi}{A}$$

4. (i) B = Ø / A Cosθ

   (ii) Ø = BA Cosθ

5. Right hand thumb rule:- If we imagine a current carrying conductior being held in the right hand such that the thumb is along the conductor in the direction of current then other fingers curling the wire indicate the direction of magnetic field.
6. Since the magnetic field lines are anti-clockwise direction, the direction of the current is vertically upwards according toright hand thumb rule.
7. The direction of the filed due to coil or solenoid is determined by using "right hand rule" which states that "when you curl your right hand finger in the direction of current, thumb gives the direction of magnetic field"
8. Since the direction of the current is in anticlockwise direction, North Pole is formed at the face of the coil.
9. (i) F = qvB (ii) Zero
10. 1. F = BIL

    2. As per Right hand rule direction of force is towards left side.
11. A current carrying helical coil is called solenoid.
12. The induced emf generated in a closed loop is equal to the rate of change of magnetic flux related with it.
13. The production of induced emf in a closed circuit due a change of magnetic flux related with the circuit is called "Electromagnetic induction."
14. During the electromagnetic induction, the induced emf always opposes the change that produced it.
15. Given:- Magnetic field induction, B =2T

    Surface area, A = 1.5 m^2

    Magnetic flux, Φ=?

    Formula:- Magnetic flux,Φ= BA = 2 × 1.5 =3 Weber
16. Magnetic flux increases in the coil and this change in magnetic flux produces induced emf in the coil in anticlockwise direction.
17. 1. Electric motor converts electrical energy into mechanical energy.

    2. AC, DC generators convert mechanical energy into electrical energy.