CHAPTER-6
Electromagnetic Induction
ASSIGNMENT-1

1 Mark Questions

Q1. A coil of N turns and area A is rotated at the rate of n rotations per second in a magnetic field of intensity B, the magnitude of the maximum magnetic flux will be

(a)NAB (b)nAB (c) NnAB (d)2πnNAB

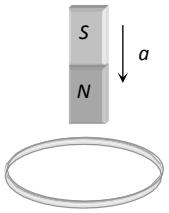
Q2. In electromagnetic induction, the induced e.m.f. in a coil is independent of

(a)Change in the flux (b) Time (c)Resistance of the circuit (d) none of the above

Q3. Lenz's law is consequence of the law of conservation of

(a)Charge (b) Momentum (c) Mass (d) Energy

Q4. A metallic ring is attached with the wall of a room. When the north pole of a magnet is brought near to it, the induced current in the ring will be



(a) First clockwise then anticlockwise (b) In clockwise direction

(c) In anticlockwise direction (d)First anticlockwise then clockwise

Q5. Lenz's law is expressed by the following formula (here e = induced e.m.f., ϕ = magnetic flux in one turn and N = number of turns)

(a) $e = -\phi \frac{dN}{dt}$ (b) $e = -N \frac{d\phi}{dt}$ (c) $e = -\frac{d}{dt}\left(\frac{\phi}{N}\right)$ (d) $e = N \frac{d\phi}{dt}$

Q6. A moving conductor coil in a magnetic field produces an induced e.m.f. This is in accordance with

(a) Amperes law (b) Coulomb law (c) Lenz's law (d) Faraday's law

Q7. The self-inductance of a coil is 5 henry, a current of 1 amp change to 2 amp within 5 second through the coil. The value of induced e.m.f. will be

(a) 10 volt (b) 0.10 volt (c)1.0 volt (d) 100 volt

Q8. The self-inductance of a solenoid of length L, area of cross-section A and having N turns is

(a) $\frac{\mu_0 N^2 A}{L}$ (b) $\frac{\mu_0 NA}{L}$ *(c)* $\mu_0 N^2 LA$ (d) $\mu_0 NAL$

Q9. A magnet is brought towards a coil (i) speedily (ii) slowly, then the induced e.m.f will be respectively

(a) More in first case and more in first case

(b) More in first case and equal in both case

(c) Less in first case and more in second case

(d) Less in first case and equal in both case

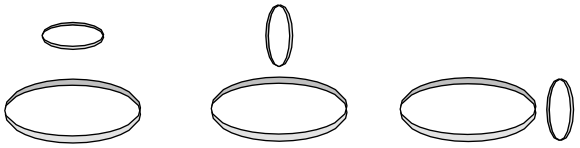
Q10. The direction of induced e.m.f. during electromagnetic induction is given by

(a) Faraday's law (b) Lenz's law (c) Maxwell's law (d) Ampere's law

Q11. The unit of magnetic flux is

(a) weber/m^2 (b) Weber (c)Henry (d) Ampere/m

Q12. Two circular coils can be arranged in any of the three situations shown in the figure. Their mutual inductance will be



(a) Maximum in situation (A) (b) Maximum in situation (B)

(c) Maximum in situation (C) (d) The same in all situations

Assertion Reason Questions

Directions: (a) If both assertion and reason are true and the reason is the correct explanation of the assertion.

(b) If both assertion and reason are true but reason is not the correct explanation of the assertion.

(c) If assertion is true but reason is false.

(d) If the assertion and reason both are false.

Q13. **Assertion** : Magnetic flux can produce induced e.m.f.

Reason: Lenz established induced e.m.f. experimentally.

Q14. **Assertion** : An induced emf is generated when magnet is withdrawn from the solenoid.

Reason: The relative motion between magnet and solenoid

induces emf.Q15. **Assertion** : A transformer cannot work on dc

supply.

Reason: dc changes neither in magnitude nor in direction.

Q16. **Assertion** : . EMF induce in coil when flux link with coil changes

Reason: It induce to oppose the cause which produce It

Q17. **Assertion** : Magnetic flux link with coil is directly proportional to

current. **Reason**: Self-inductance will not play any role in linking of magnetic

flux with coil.Q18. **Assertion** : Lenz law is based on conservation of energy.

Reason : Constant current is able to induce emf

in coil.Q19. What is the SI unit of magnetic

flux?

Q20. What is Faraday law electromagnetic induction?

2- Marks Questions

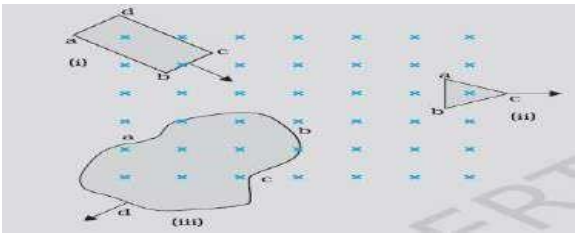
Q21. State and Explain Lenz's law?

Q22. What are the factors on which self-inductance depends?

3-Marks Questions

Q23. Define the coefficient of self-inductance (L). Write its unit. Write the two factors on whichthe self-inductance of along solenoid depends.

Q24. Figure shows planar loops of different shapes moving out of or into a region of a magnetic field which is directed normal to the plane of the loop away from the reader. Determine the direction of induced current in each loop using Lenz's law.



Q25. Obtain an expression for the self-inductance of a long solenoid. Hence define one henry.