



B.K. BIRLA CENTRE FOR EDUCATION

SARALA BIRLA GROUP OF SCHOOLS
A CBSE DAY-CUM-BOYS' RESIDENTIAL SCHOOL



PRE MID-TERM EXAMINATION

PHYSICS (042)

Class: XII

SET-2

Time: 1hr

Date: 21.07.26

Max Marks: 25

Admission no:

Roll no: ---

General Instructions:

- (i) *There are three sections A, B, and C with 13 questions in total, Section A has 5 Multiple Choice Questions of one mark each, Section B has 4 questions of two marks each and Section C has 4 questions of three marks each.*
- (ii) *All questions are compulsory.*
- (iii) *Calculators are not allowed.*

Section A (1 Mark each)

1. The magnetic susceptibility of a material is +999. The material is most likely:
(a) Diamagnetic (b) Paramagnetic (c) Ferromagnetic (d) Superconductor
2. A coil has inductance L. If the number of turns is doubled and length remains same, the new inductance becomes:
(a) L (b) 2L (c) 4L (d) 8L
3. A magnetic dipole placed parallel to a non-uniform magnetic field will experience:
(a) only force (b) only torque (c) both force and torque (d) neither force nor torque
4. The magnetic flux linked with a coil is: $\Phi = 8t^3 - 4t^2 + 3t + 2$
Find emf at $t = 1$ s.
(a) -19 V (b) -17 V (c) -21 V (d) -23 V

5. Assertion-Reason

Assertion: Eddy currents are undesirable in transformer cores.

Reason: Eddy currents cause energy loss as heat.

- (a) Both true and Reason explains Assertion
- (b) Both true but Reason does not explain Assertion

- (c) Assertion true, Reason false
(d) Both false

Section B (2 Marks Each)

6. Two coils have mutual inductance 'M'. If the number of turns of one coil is doubled and the other is tripled, what happens to 'M'?
7. Explain why diamagnetic materials are repelled by magnetic fields.
8. A rod of length 50 cm moves with speed 8 m/s perpendicular to magnetic field 0.6 T. Calculate induced emf.
9. A coil of resistance $4\ \Omega$ and inductance 0.8 H is connected to a battery of 12 V. Find the rate of growth of current at the instant of switching on.

Section C (3 Marks Each)

10. A circular loop of radius 10 cm lies in uniform magnetic field 0.5 T. If the plane of loop is rotated from perpendicular to parallel to the field in 0.2 s, find average induced emf.
11. Derive the expression for energy stored in an inductor.
12. Explain AC generator with diagram, principle, and derive expression for alternating emf.
13. A solenoid of length 0.5 m, area $2 \times 10^{-4}\ \text{m}^2$ and 1000 turns carries current 5 A. Find:
(i) Magnetic field inside solenoid
(ii) Self inductance
- (Given: $\mu_0 = 4\pi \times 10^{-7}$)
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