

ETERNAL CAREER CLASSES

SUBJECT : PHYSICS

CLASS : XII

FULL MARKS : 20

NAME :

BOARD TEST : 04

DATE : 16.12.2024

SECTION - A

Single answer type question. Attempt any seven question :-

Marks : $1 \times 7 = 7$

- An electron is moving along positive x – axis in a magnetic field which is parallel to the positive y – axis . in what direction will the magnetic force be acting on the electron ?
 - Along – x axis
 - Along – z axis
 - Along + z axis
 - Along – y axis
- The SI unit of magnetic field intensity is
 - AmN^{-1}
 - $\text{NA}^{-1}\text{m}^{-1}$
 - $\text{NA}^{-2}\text{m}^{-2}$
 - $\text{NA}^{-1}\text{m}^{-2}$
- Two wires of the same length are shaped into a square of side ‘a’ and a circle with radius ‘r’ if they carry same current , the ratio of their magnetic moment is
 - $2 : \pi$
 - $\pi : 2$
 - $\pi : 4$
 - $4 : \pi$
- The coil of a moving coil galvanometer is wound over a metal frame in order to
 - reduce hysteresis
 - increase sensitivity
 - increase moment of inertia
 - provide electromagnetic damping
- Two long parallel wires kept 2 m apart carry 3 A current each, in the same direction . the force per unit length on one wire due to the other is
 - $4.5 \times 10^{-7} \text{Nm}^{-1}$, attractive
 - $4.5 \times 10^{-7} \text{Nm}$, repulsive
 - $9 \times 10^{-7} \text{N/m}$, repulsive
 - $9 \times 10^{-7} \text{N/m}$, attractive
- If an ammeter is to be used in place of a voltmeter, then we must connect the ammeter a :
 - low resistance in parallel
 - low resistance in series
 - high resistance in parallel
 - high resistance in series
- A current carrying wire kept in a uniform magnetic field, will experience a maximum force when it is
 - perpendicular to the magnetic field
 - parallel to the magnetic field
 - at an angle of 45° to the magnetic field
 - at an angle of 60° to the magnetic field
- A constant current is flowing through a solenoid. An iron rod is inserted in the solenoid along its axis. Which of the following quantities will not increase ?
 - the magnetic field at the centre
 - the magnetic flux linked with the solenoid
 - the rate of heating
 - the self – inductance of the solenoid
- What are the main 3 components in a Roget’s spiral ?
 - Mercury , AC voltage source
 - Mercury , DC voltage source

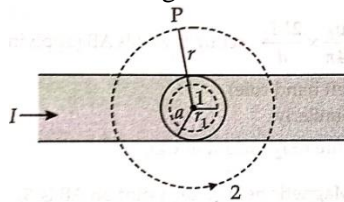
- (c) Mercury , DC voltage source key
 (d) Mercury , AC voltage source key
10. An ammeter of resistance 0.81 ohm reads up to 1 A. The value of the required shunt to increase the range to 10 A is
- (a) 0.9 ohm
 (b) 0.09 ohm
 (c) 0.03 ohm
 (d) 0.3 ohm

SECTION - B

Short answer type question. Attempt any one question :-

Marks : $1 \times 3 = 3$

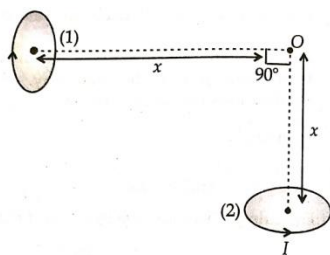
11. (a) Define mutual inductance and write its SI unit.
 (b) Two circular loops, one of small radius r and other of larger radius R , such that $R \gg r$, placed coaxially with centres coinciding, Obtain the mutual inductance of the arrangement .
12. The given figure shown a long straight wire of a circular cross-section (radius a) carrying steady current I . The current I is uniformly distributed across this cross – section. Calculate the magnetic field in the region $r < a$ and $r > a$



Long answer type question. Attempt any two question :-

Marks : $2 \times 5 = 10$

13. (i) Derive an expression for the magnetic field at point on the axis a current carrying circular loop
 (ii) A coil of 100 turns (tightly bound) and radius 10 cm, carries a current of 1 A. What is the magnitude of the magnetic field at the centre of the coil
14. Two very small identical circular loops (1) and (2) carrying equal current I are placed vertically (with respect to the plane of the paper) with their geometrical axes perpendicular to each other as shown in the figure. Find the magnitude and direction of the net magnetic field produced at the point O .



15. Draw a labelled diagram of a moving coil galvanometer and explain its working, what is the function of radial magnetic field inside the coil ?
