ASSIGNMENT 5
Batch : S1
M.M. : 18

IIT PHYSICS CENTRE

Date : 29/09/23
Time : 15 Min.

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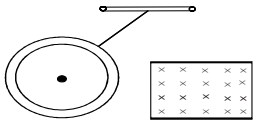
1. A metallic ring connected to a rod oscillates freely like a pendulum. If now a magnetic field is applied in hori zontal direction so that the pendulum now swings through the field, the pendulum will



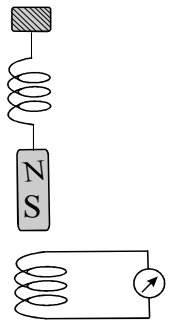
(A) Keep oscillating with the old time period
(B) Keep oscillating with a smaller time period
(C) Keep oscillating with a larger time period
(D) Come to rest very soon

2. In the diagram shown if a bar magnet along the com mon axis of two single turns coils A and B in the direc tion of arrow

(A) Current is induced only in A & not in B
(B) Induced current in A & B are in the same direction
(C) Current is induced only in B & not in A
(D) Induced current in A & B are in opposite direction

3. A magnet is dropped down an infinitely long vertical copper tube
(A) The magnet moves with continuously increasing velocity and ultimately acquires a constant terminal velocity
(B) The magnet moves with continuously decreasing velocity and ultimately come to rest
(C) The magnet moves with continuously increasing velocity but constant acceleration
(D) The magnet moves with continuously increasing velocity and acceleration

4. A magnet NS is suspended from a spring and while it oscillated, the magnet moves in and out of the coil C. The coil is connected to a galvanometer G. Then as the magnet oscillates,



(A) G shows deflection to the left and right with constant amplitude
(B) G shows deflection on one side
(C) G shows no deflection
(D) G shows deflection to the left and right but the amplitude steadily decreases

5. A short bar magnet placed with its axis at $30°$ with a uniform external magnetic field of 0.25 T experiences a torque of magnitude equal to $4.5\times10^{-2}J$, then the magnitude of magnetic moment of the magnet is ?
(A) 0.36 J/T (B) 3.6 J/T
(C) 8.6 J/T (D) 0.86 J/T

6. The magnetic field of the earth can be modelled by that of a point dipole placed at the centre of the earth. The dipole axis makes an angle of $11.3°$ with the axis of the earth. At Mumbai, declination is nearly zero. Then
(A) the declination varies between $11.3°$ W to $11.3°$ E
(B) the least declination is $0°$
(C) the plane defined by dipole axis and Earth axis passes through Greenwich
(D) declination averaged over Earth must be always nagative

7. In a permanent magnet at room temperature
(A) magnetic momentg of earth molecule is zero
(B) the individual molecules have nonzero magnetic moment which are all perfectly alignet
(C) domains are partially aligned
(D) domains are all perfectly aligned

8. Consider the two idealized systems : (i) a parallel plate capacitor with large plates and small separation and (ii) a long solenoid of length L >> R, radius of cross-section. In (i) E is ideally treated as a constant between plates and zero outside. In (ii)magnetic field is constant inside the solenoid and zero outside. These idealised assumptions, however, contradict fundamental laws as below
(A) case (i) contradicts Gauss's law for electrostatic fields
(B) case (i) contradicts Gauss's law for magnetic fields
(C) case (i) agrees with $\int \mathbf{E}d\mathbf{l} = 0$
(D) case (ii) contradics $\int H.d\mathbf{l} = I_{en}$

9. A circular current loop of magnetic moment is in an arbitrary orientation in an external magnetic field B. The work done to rotatethe loop by $30°$ about an axis perpendicular to is planers
(A) MB (B) $\sqrt{3}$ MB
(C) $\frac{MB}{2}$ (D) 0