QB365 Question Paper Software
12th Standard - Physics
Magnetism and Matter Assertion and reason

Exam Time: 00:20 Hrs | Date: 2025-09-30
Total Marks: 5

Questions:

1. **Assertion (A) :** Magnetic moment of an atom is due to both, the orbital motion and spin motion of every electron.
   Reason (R) : A charged particle produces a magnetic field.
   Codes:
   (a) Both A and R are true and R is the correct explanation of A
   (b) Both A and R are true but R is NOT the correct explanation of A
   (c) A is true but R is false
   (d) A is false and R is also false

2. **Assertion (A) :** The ends of a magnet suspended freely point out always along north south.
   Reason (R) : Earth behaves as a huge magnet.
   Codes:
   (a) Both A and R are true and R is the correct explanation of A
   (b) Both A and R are true but R is NOT the correct explanation of A
   (c) A is true but R is false
   (d) A is false and R is also false

3. **Assertion (A)** : Magnetic moment is measured in joule/tesla or amp m^2.
   Reason (R) : Joule/tesla is equivalent to amp m^2.
   (a) Both A and R are true and R is the correct explanation of A
   (b) Both A and R are true but Ris NOT the correct explanation of A
   (c) A is true but R is false
   (d) A is false and R is also false

4. **Assertion (A) :** There is only one neutral points on a horizontal board when a magnet is held vertically on the board.
   Reason (R) : At the neutral point the net magnetic field due to the magnetic and magnetic field of the earth is zero.
   Codes:
   (a) Both A and R are true and R is the correct explanation of A
   (b) Both A and R are true but R is NOT the correct explanation of A
   (c) A is true but R is false
   (d) A is false and R is also false

5. **Assertion (A)** Diamagnetic substances exhibit magnetism.
   Reason (R) Diamagnetic materials do not have permanent magnetic dipole moment.
   (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
   (b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
   (c) Assertion is true but Reason is false.
   (d) Assertion is false but Reason is true

Answers Key:

1. **(c):** In an atom, electrons revolve around the nucleus and as such the circular orbits of electrons may be considered as the small current loops. In addition to orbital motion, an electron has got spin motion also. So the total magnetic moment of electron is the vector sum of its magnetic moments due to orbital and spin motion.
2. **(a):** Earth's magnetic field can be represented as the field of a huge bar magnet. If the magnet is freely suspended its north-pole points towards geographic north pole (really a south magnet pole of earth).
3. **(a):** Magnetic moment $= \frac{\text{joule}}{\text{tesla}} = \frac{W}{B} = \frac{W}{F/qv}$
   $= \frac{Wqv}{F} = \frac{[ML^2T^{-2}][AT][LT^{-1}]}{[MLT^{-2}]}$
   $= \left[\mathrm{AL}^2\right] = \mathrm{ampm}^2$
4. **(b):** There will be only one neutral point on the horizontal board. This is because field of earth magnetic field is from south to north; and the field of pole on the board is radially outwards. At any point towards south of magnetic pole, field of earth and field of pole will cancel out to give a neutral point.
5. (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.