Worksheet: Magnetism and Matter

Madhya Pradesh State Board · Class 12 · Physics · 9 questions · 26 marks

Name: _____ Date: _____ Score: _____ / 26

Q1. A bar magnet of moment 0.40 J per tesla is placed at 30 degrees to a uniform field of 0.25 T. Find the torque on it. *[2 marks]*

Q2. A solenoid of 500 turns and cross-sectional area 2.0 x 10^-4 m squared carries a current of 3.0 A. Find its magnetic moment. *[2 marks]*

Q3. A short bar magnet of moment 0.25 J per tesla is placed with its axis along the x-direction. Find the field at 20 cm along the axis. *[2 marks]*

Q4. A magnet of moment 0.60 J per tesla sits in a field of 0.40 T. Find its potential energy when aligned with the field and when antiparallel to it. *[3 marks]*

Q5. A magnet of moment 1.2 J per tesla lies aligned with a field of 0.30 T. Find the work needed to turn it through 90 degrees. *[3 marks]*

Q6. For a short bar magnet of moment 0.48 J per tesla, find the ratio of the axial field to the equatorial field at the same distance, and compare their directions. *[3 marks]*

Q7. A magnetic material of susceptibility 4.0 x 10^-4 is placed in a magnetic intensity of 500 A per metre. Find its magnetisation, relative permeability, and class. *[4 marks]*

Q8. A solenoid of 800 turns and area 2.5 x 10^-4 m squared carries 3.0 A and is free to turn in a horizontal field of 0.25 T, its axis at 30 degrees to the field. Find its moment and the torque on it. *[4 marks]*

Q9. State Gauss's law for magnetism and use it to explain what happens when a bar magnet is cut into two pieces. *[3 marks]*