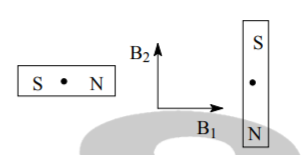
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| **STANDARD 12** | **PHYSICS** | **MAGNETISM &MATTER** | **WORK SHEET 5** |

1. What is the magnitude of the equatorial and axial fields due to a bar magnet of length 5cm at a distance of 50cm from the midpoint? The magnetic moment of the bar magnet is 0.40Am2.
2. Two identical short bar magnets, each having magnetic moments 10Am2, are arranged such that their axial lines and perpendicular to each other and their centers be along the same strength line in horizontal plane. If the distance between their centre is 0.2m. What is the resultant magnetic field at the point mid-way between the dipoles?



1. A short bar magnet placed with its axis at 30ᵒ to a uniform magnetic field of 0.2 T experiences a torque of 0.06Nm. (i) Calculate the magnetic moment of the magnet. (ii) Find out the orientation of the magnet corresponds to its stable equilibrium in the magnetic field.
2. A current of 7.0A is flowing in a plane circular coil of radius 1.0cm having 100 turns. The coil is placed in a uniform magnetic field of 0.2Wbm-2. If the coil is free to rotate, what orientation would corresponds to its (i) stable equilibrium and (ii) unstable equilibrium? Calculate the potential energy of the coil in these cases.
3. In the magnetic meridian of a certain place, the horizontal component of earth’s magnetic field is 0.26G and the dip angle is 60ᵒ. What is the magnetic field of the earth in this location?
4. The horizontal and vertical components of earth’s field at a place are 0.22G and 0.38G respectively. Calculate the angle of dip and resultant intensity of earth’s field.
5. If the horizontal component of earth’s magnetic field at a place where the angle of dip is 60ᵒ is 0.4x10-4 T, calculate the vertical component and the resultant magnetic field at that place.
6. A magnetising field of 1500A/m produces a magnetic flux of 2.4x10-5Wb in a bar of iron of cross-section 0.5cm2. Calculate the permeability and susceptibility of the iron bar used.
7. A solenoid of 500 turns/m is carrying a current of 3A. Its core is made of iron which has a relative permeability of 5000. Determine the magnitudes of the magnetic intensity, magnetisation and the magnetic field inside the core.
8. A magnetic needle is free to oscillate in a uniform magnetic field. The magnetic needle has magnetic moment 6.7Am2 and the moment of inertia is 7.5x10-6kgm2. It performs 10 complete oscillations in 6.70s. What is the magnitude of the field?
9. A coil of N turns and radius R carries a current I. it is unwound and rewound to make another coil is radius R/2, current remaining the same. Calculate the ratio of the magnetic moments of the new coil and the original coil.
10. If χ stands for the magnetic susceptibility of a given material, identify the class materials for which
11. -1χ<0
12. 0<χ<ε, (ε stands for a small positive number)
13. Write the range of relative magnetic permeability of these materials
14. Draw the pattern of the magnetic field lines when these materials are placed in an external magnetic field.
15. A circular coil of 16 turns and radius 10cm carrying a current of 0.75A rests with its plane normal to an external field of magnitude 5x10-2T. The coil is free to turn about an axis in its plane perpendicular to the field direction. When the coil is turned slightly and released, it oscillates about its stable equilibrium with a frequency of 2s-1. What is the moment of inertia of the coil about its axis of rotation?
16. If the horizontal and vertical component of earth’s magnetic field are equal at a place, find the angle of dip.
17. If the ratio of the horizontal component of earth’s magnetic field to the resultant magnetic field at a place is, what is the angle of dip at that place?