INDIAN SCHOOL DARSAIT
DEPARTMENT OF PHYSICS

Subject: PHYSICS	Topic: <u>MAGNETISM & MATTER</u>	Date of Worksheet: 21.5.19
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Name of the Student: _____	Class & Division: _____	Roll Number: ___

1.	(a) Draw a plot showing variation of intensity of magnetisation with the applied magnetic field intensity for bismuth. (b) Under what condition does diamagnetic material exhibit perfect conductivity and perfect diamagnetism? (c) What is the characteristic property of a diamagnetic material?
2.	Why are field lines repelled when a diamagnetic material is placed in an external uniform magnetic field?
3.	Name the three element of earth's magnetic field. Where on the surface of the earth is the vertical component of the earth's magnetic field zero?
4.	In which direction would a compass needle free to move in the vertical plane points to, if located right on the geomagnetic north or south pole?
5.	Where on the earth's surface is the value of angle of dip maximum? (**2011**)
6.	A magnetic needle, free to rotate in vertical plane, orients itself vertically at a certain place on the Earth. What are the values of horizontal component of Earth's magnetic field and angle of dip at this place? (**2012**)
7.	What is the angle of dip at a place where the horizontal and vertical components of Earth's magnetic field are equal? (**2012**)
8.	(a) Define the term magnetic permeability of a magnetic material. (b) Write any two characteristics of a magnetic substance if it is to be used to make a permanent magnet. Give an example of such a material. (c) Soft iron is preferred for making electromagnets. Give one reason.
9.	The vertical component of earth's magnetic field at a place is $\sqrt{3}$ times the horizontal component. What is the value of angle of dip at this place?
10.	The susceptibility of a magnetic material is 2.6×10^{-5}. Identify the type of magnetic material and state its two properties. (**2012**)

11.	Distinguish between diamagnets and Ferro magnets with respect to their intensity of magnetisation, behaviour in non-uniform magnetic field and susceptibility.
12.	Three identical specimens of magnetic materials Nickel, antimony and aluminium are kept in non-uniform magnetic field. Draw the modification in field lines in each case.
13.	If χ- stands for the magnetic susceptibility of a given material, identify the class of materials for which (i)-1≥χ<0 (ii) 0<χ<ε. Write the range of magnetic permeability of these materials. (**2008**)
14.	What is the basic difference between the atom or molecule of a diamagnetic and a paramagnetic material? Why are elements with even atomic number more likely to be diamagnetic?
15.	(a) How does a paramagnetic material behave in presence of external magnetic field? (b) Explain with the help of an appropriate diagram what happens when the temperature of a paramagnetic sample is lowered? (c) To which of the two- a polar dielectric or a non-polar dielectric – does a paramagnetic material correspond? Justify your answer.

16.	The following figure shows the variation of intensity of magnetisation versus applied magnetic field intensity for two magnetic materials A and B.
	    (a) Identify the materials A and B.
	    (b) Why does the material B have a larger susceptibility than A for a given field at constant temperature?

17.	When two materials are placed in an external magnetic field, the behaviour of magnetic field lines is as shown in the figure. Identify the magnetic nature of each of these two materials.
18.	A small compass needle of magnetic moment M is free to turn about an axis perpendicular to the direction of uniform magnetic field B. The moment of inertia of the needle about the axis is I. The needle is slightly disturbed from its stable position and then released. Prove that it executes simple harmonic motion. Hence, deduce, the expression for its time period.
19.	A magnetised needle of magnetic moment .048J/T is placed at 30^0 with the direction of uniform magnetic field of magnitude 0.03T. What is the torque acting on the needle?

20.	A short bar magnet placed with its axis at 30^0 to a uniform magnetic field of 0.2T experiences a torque of 0.06Nm.
	    (i) Calculate the magnetic moment of the magnet.
	    (ii) Find out orientation of the magnet corresponds to the stable equilibrium in the magnetic field.