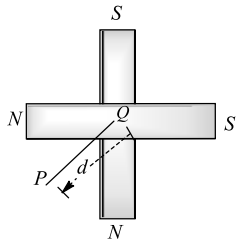
DPP
DAILY PRACTICE PROBLEMS

Class : XIIth **Subject : PHYSICS**
Date : **DPP No. :7**

Topic :- MAGNETISM AND MATTER

1. With a standard rectangular bar magnet the time period of a vibration magnetometer is 4 s. The bar magnet is cut parallel to its length into four equal pieces. The time period of vibration magnetometer when one piece is used (in second) (bar magnet breadth is small) is
   a) 16 b) 8 c) 4 d) 2
2. A rigid circular loop of radius r and mass m lies in the $x-y$ plane of a flat table and has a current i flowing in it. At this particular place the earth's magnetic field is $\boldsymbol{B} = B_x\hat{\boldsymbol{i}} + B_z\hat{\boldsymbol{k}}$. The value of i so that the loop start tilting is
   a) $\frac{mg}{\pi r\sqrt{B_x^2+B_z^2}}$ b) $\frac{mg}{\pi r B_x}$ c) $\frac{mg}{\pi r B_z}$ d) $\frac{mg}{\pi r\sqrt{B_x B_z}}$
3. Magnetic permeability is maximum for
   a) Diamagnetic substance b) Paramagnetic substance
   c) Ferromagnetic substance d) All of these
4. At a certain place, a magnet makes 30 oscillations per min. At another place where the magnetic field is double, its time period will be
   a) 4 s b) 2 s c) 1/2 s d) $\sqrt{2}$ s
5. When the N-pole of a bar magnet points towards the south and S-pole towards the north, the null points are at the
   a) Magnetic axis b) Magnetic centre
   c) Perpendicular divider of magnetic axis d) N and S poles
6. The angle of dip at the magnetic equator is
   a) 0° b) 45° c) 30° d) 90°
7. The mathematical equation for magnetic field lines of force is
   a) $\vec{\nabla}\cdot\vec{B}=0$ b) $\vec{\nabla}\cdot\vec{B}\neq 0\ 1$ c) $\vec{\nabla}\cdot\vec{B}>0$ d) $\vec{\nabla}\cdot\vec{B}<0$
8. Using a bar magnet P, a vibration magnetometer has time period $2 seconds$. When a bar Q (identical to P in mass and size) is placed on top of P, the time period is unchanged. Which of the following statements is true
   a) Q is of non-magnetic material
   b) Q is a bar magnet identical to P, and its north pole is placed on top of P's north pole
   c) Q is of unmagnetized ferromagnetic material
   d) Nothing can be said about Q's properties

9. Two short bar magnets of equal dipole moment M are fastened perpendicularly at their centers, figure. The magnitude of resultant of two magnetic field at a distance d from the center on the bisector of the right angle is



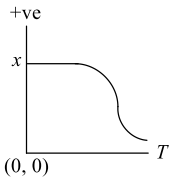
a) $\frac{\mu_0}{4\pi}\frac{2\sqrt{2}M}{d^3}$ b) $\frac{\mu_0}{4\pi}\frac{2M}{d^3}$ c) $\frac{\mu_0}{4\pi}\frac{M}{d^3}$ d) $\frac{\mu_0}{4\pi}\frac{2\sqrt{2}M}{d^3}$

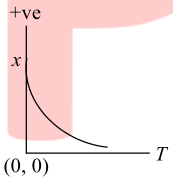
10. A superconducting material is
a) Ferromagnetic b) Ferroelectric c) Diamagnetic d) Paramagnetic

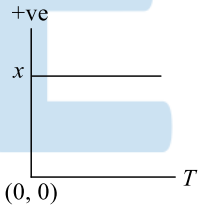
11. Two normal uniform magnetic fields contain a magnetic needle making an angle 60° with F. Then the ratio of $\frac{F}{H}$ is
a) $1:2$ b) $2:1$ c) $\sqrt{3}:1$ d) $1:\sqrt{3}$

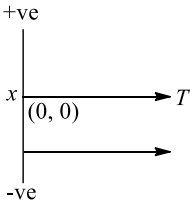
12. Permanent magnet has properties retentivity and coercivity respectively
a) High-high b) Low-low c) Low-high d) High-low

13. The variation of magnetic susceptibility $(\mathcal{X})$ with absolute temperature T for a ferromagnetic is given in figure , by

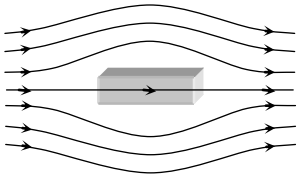
a) 

b) 

c) 

d) 

14. The given figure represents a material which is



a) Paramagnetic b) Diamagnetic c) Ferromagnetic d) None of these

15. Direction of magnetic field at equatorial point is
a) Parallel to **M** b) Perpendicular to **M**
c) Making an angle of angle 45° with **M** d) Antiparallel to **M**

16. A bar magnet is oscillating in the Earth's magnetic field with a period T. What happens to its period of motion if its mass is quadrupled?
a) Motion remains SHM with time period $=T/2$ b) Motion remains SHM and period remains nearly constant
c) Motion remains SHM with time period $=2T$ d) Motion remains SHM with time period$=4\,T$

17. Susceptibility of Mg at 300 K is 1.2×10^{-5}. The temperature at which susceptibility will be 1.8×10^{-5} is
    a) 450 K b) 200 K c) 375 K d) None of these
18. Water is
    a) Diamagnetic b) Paramagnetic c) Ferromagnetic d) None of these
19. The magnetic field due to short bar magnet of magnetic dipole moment M and length $2l$, on the axis at a distance z (where $z >> l$) from the center of the magnet is given by formula
    a) $\frac{\mu_0 M}{4\pi z^3}\widehat{\mathrm{M}}$ b) $\frac{2\mu_0 M}{4\pi z^3}\widehat{\mathrm{M}}$ c) $\frac{4\pi M}{\mu_0 z^2}\widehat{\mathrm{M}}$ d) $\frac{\mu_0 M}{2\pi z^3}\widehat{\mathrm{M}}$
20. At a certain place the horizontal component of the earth's magnetic field is B_0 and the angle of dip is 45° then total intensity of field at that place will be
    a) B_0^2 b) $2B_0$ c) $\sqrt{2}B_0$ d) B_0