DPP

DAILY PRACTICE PROBLEMS

Class : XIIth **Subject : PHYSICS**
Date : **DPP No. : 8**

Topic :- MAGNETISM AND MATTER

1. The north pole of the earth's magnet is near the geographical

   a) South b) East c) West d) North

2. A magnet makes 5 oscillations per min in $B = 0.3 \times 10^{-4}$ T. By what amount should the field be increased so that number of oscillations is 10 in the same time?

   a) 0.3×10^{-4} T b) 0.6×10^{-4} T c) 0.9×10^{-4} T d) 1.2×10^{-4} T

3. Resultant force acting on a diamagnetic material in a magnetic field is in direction
   a) From stronger to the weaker part of the magnetic field
   b) From weaker to the stronger part of the magnetic field
   c) Perpendicular to the magnetic field
   d) In the direction making 60° to the magnetic field

4. The use of study of hysteresis curve for a given material is to estimate the

   a) Voltage loss b) Hysteresis loss c) Current loss d) All of these

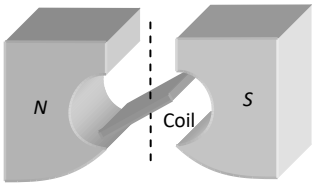
5. In a vibration magnetometer, the time period of a bar magnet oscillating in horizontal component of earth's magnetic field is 2 s. When a magnet is brought near and parallel to it, the time period reduces to 1 s. The ratio $\frac{F}{H}$ of the fields, F due to magnet and H, the horizontal component will be

   a) $\sqrt{3}$ b) $\frac{1}{\sqrt{3}}$ c) $\frac{1}{3}$ d) 3

6. If a diamagnetic solution is poured into a U-tube and one arm of this U-tube is placed between the poles of a strong magnet, with the meniscus in line with the field, then the level of solution will

   a) Rise b) Fall c) Oscillate slowly d) Remain as such

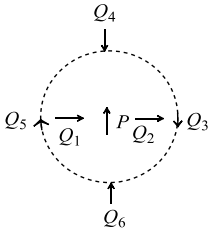
7. The figure below shows the north and south poles of a permanent magnet in which n turn coil of area of cross-section A is resting, such that for a current i passed through the coil, the plane of the coil makes an angle θ with respect to the direction of magnetic field B. If the plane of the magnetic field and the coil are horizontal and vertical respectively, the torque on the coil will be



a) $\tau = niAB\cos\theta$ b) $\tau = niAB\sin\theta$

c) $\tau = niAB$ d) None of the above, since the magnetic field is radial

8. The figure shows the various positions (labelled by subscripts) of small magnetised needless P and Q. The arrows show the direction of their magnetic moment. Which configuration corresponds to the lowest potential energy among all the configurations shown



a) PQ_3 b) PQ_4 c) PQ_5 d) PQ_6

9. The space inside a toroid is filled with tungusten shoes susceptibility is 6.8×10^{-5}. The percentage increase in the magnetic field will be

a) 0.0068% b) 0.068% c) 0.68% d) None of these

10. A rod of ferromagnetic material with dimensions 10 cm × 0.5 cm × 0.2 cm is placed in a magnetic field of strength $0.5 \times 10^4 \text{A} - \text{m}^{-1}$ as a result of which of which a magnetic moment of $0.5\ \text{A} - \text{m}^{-2}$ is produced in rod. The value of magnetic induction will be

a) 0.54 T b) 6.28 T c) 0.358 T d) 2.591 T

11. The magnetic needle of a vibration magnetometer makes 12 oscillations per minute in the horizontal component of earth's magnetic field. When an external short bar magnet is placed at some distance along the axis of the needle in the same line, it makes 15 oscillations per minute. If the poles of the bar magnet are interchanged, the number of oscillations it makes per minute is

a) $\sqrt{61}$ b) $\sqrt{63}$ c) $\sqrt{65}$ d) $\sqrt{67}$

12. Ferromagnetic show their properties due to

a) Filled inner subshells b) Vacant inner subshells

c) Partially filled inner subshells d) All the subshells equally filled

13. The time period of a thin bar magnet in earth's magnetic field is T. If the magnet is cut into equal parts perpendicular to its length, the time period of each part in the same field will be

a) $T/2$ b) $T/4$ c) $\sqrt{2}\,T$ d) $2\,T$

14. Relative permittivity and permeability of a material are ε_r and μ_r, respectively. Which of the following values of these quantities are allowed for a diamagnetic material?
    a) $\varepsilon_r = 0.5, \mu_r = 1.5$ b) $\varepsilon_r = 1.5, \mu_r = 0.5$ c) $\varepsilon_r = 0.5, \mu_r = 0.5$ d) $\varepsilon_r = 1.5, \mu_r = 1.5$
15. Two identical thin bar magnets each of length l and pole strength m are placed at right angle to each other with north pole of one touching south pole of the other. Magnetic moment of the system is
    a) ml b) $2ml$ c) $\sqrt{2}ml$ d) $\frac{1}{2}ml$
16. Magnetic field intensity is defined as
    a) Magnetic moment per unit volume
    b) Magnetic induction force acting on a unit magnetic pole
    c) Number of lines of force crossing per unit area
    d) Number of lines of force crossing per unit volume
17. The intensity of magnetic field due to an isolated pole of strength m at a point distance r from it will be
    a) $\frac{m}{r^2}$ b) mr^2 c) $\frac{r^2}{m}$ d) $\frac{m}{r}$
18. Two like magnetic poles of strength 10 and 45 SI units are separated by a distance 30 cm. The intensity of magnetic field is zero on the line joining them
    a) At a point 10 cm from the stronger pole b) At a point 20 cm from the stronger pole
    c) At the mid-point d) At infinity
19. The only property possessed by ferromagnetic substance is
    a) Hysteresis b) Susceptibility
    c) Directional property d) Attracting magnetic substances
20. The hysteresis curve is studied generally for
    a) Ferromagnetic materials b) Paramagnetic materials
    c) Diamagnetic materials d) All of the above