DPP

DAILY PRACTICE PROBLEMS

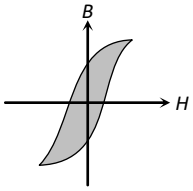
Class : XIIth **Subject : PHYSICS**

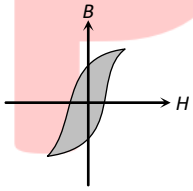
Date : **DPP No. : 4**

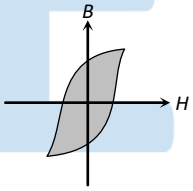
Topic :- MAGNETISM AND MATTER

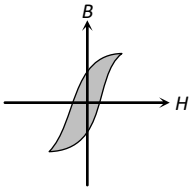
1. The magnetic moment of a magnet is 0.1 amp $\times$ m^2. It is suspended in a magnetic field of intensity3×10^{-4} Wbm^{-2}. The couple acting upon it when deflected by 30° from the magnetic field is
   a) 1×10^{-5}N m b) 1.5×10^{-5}N m c) 2×10^{-5}N m d) 2.5×10^{-5}N m
2. A small bar magnet A oscillates in a horizontal plane with a period T at a place where the angle of dip is 60°. When the same needle is made to oscillate in a vertical plane coinciding with the magnetic meridian, its period will be
   a) $\frac{T}{\sqrt{2}}$ b) T c) $\sqrt{2}T$ d) $2T$
3. A magnet oscillating in a horizontal plane has a time period of 2 *second* at a place where the angle of dip is 30° and 3 *seconds* at another place where the angle of dip is 60°. The ratio of resultant magnetic fields at the two places is
   a) $\frac{4\sqrt{3}}{7}$ b) $\frac{4}{9\sqrt{3}}$ c) $\frac{9}{4\sqrt{3}}$ d) $\frac{9}{\sqrt{3}}$
4. A straight wire carrying current i is turned into a circular loop. If the magnitude of magnetic moment associated with it in M.K.S. unit is M, the length of wire will be
   a) $4\pi iM$ b) $\sqrt{\frac{4\pi M}{i}}$ c) $\sqrt{\frac{4\pi i}{M}}$ d) $\frac{M\pi}{4i}$
5. The magnetising field required to be applied in opposite direction to reduce residual magnetism to zero is called
   a) Coercivity b) Retentivity c) Hysteresis d) None of these
6. What happens to the force between magnetic poles when their pole strength and the distance between them are both doubled
   a) Force increases to two times the previous value
   b) No change
   c) Force decreases to half the previous value
   d) Force increases to four times the previous value
7. Two short magnets having magnetic moments in the ratio 27 : 8, when placed on opposite sides of a deflection magnetometer, produce no deflection. If the distance of the weaker magnet is 0.12 m from the centre of deflection magnetometer, the distance of the stronger magnet from the centre is

a) 0.06 m b) 0.08 m c) 0.12 m d) 0.18 m

8. A magnet 20 cm long with its poles concentrated at its ends is placed vertically with its north pole on the table. At a point due 20 cm south (magnetic) of the pole, a neutral point is obtained. If H =0.3 G, then the pole strength of the magnet is approximately
   a) 185 ab-amp-cm b) 185 amp-m c) 18.5 ab-amp-cm d) 18.5 amp-cm
9. A magnetic needle lying parallel to a magnetic field requires W units of work to turn it through 60°. The torque required to keep the needle in this position will be
   a) $2W$ b) W c) $\frac{W}{\sqrt{2}}$ d) $\sqrt{3}W$
10. Which of the following statements is incorrect about hysteresis
    a) This effect is common to all ferromagnetic substances
    b) The hysteresis loop area is proportional to the thermal energy developed per unit volume of the material
    c) The hysteresis loop area is independent of the thermal energy developed per unit volume of the material
    d) The shape of the hysteresis loop is characteristic of the material
11. The area of hysteresis loop of a material is equivalent to 250 $joule$. When 10 kg material is magnetized by an alternating field of 50 Hz then energy lost in one hour will be (density of material is 7.5 gm/cm^3)
    a) $6 \times 10^4 J$ b) $6 \times 10^4 erg$ c) $3 \times 10^2 J$ d) $3 \times 10^2 erg$
12. For substances hysteresis (B-H) curves are given as shown in figure. For making temporary magnet which of the following is best
    a) 

    b) 

    c) 

    d) 

13. The effective length of a magnet is 31.4 cm and its pole strength is 0.5 Am. Calculate its magnetic moment. If it is bent in form of semicircle, then magnetic moment will be
    a) 0.157 Am^2, 0.01 Am^2 b) 0.357 Am^2, 0.01 Am^2
    c) 1.157 Am^2, 1.01 Am^2 d) None of these
14. A short bar magnet of magnetic moment 255 JT^{-1} is placed with its axis perpendicular to earth's field direction. At what distance from the center of the magnet, the resultant field is inclined at 45° with earth's field, $H = 0.4 \times 10^{-4}$ T ?
    a) 5 m b) 0.5m c) 2.5 m d) 0.25 m
15. When a piece of a ferromagnetic substance is put in a uniform magnetic field, the flux density inside it is four times the flux density away from the piece. The magnetic permeability of the material(in N/A^2) is
    a) 1 b) 2 c) 3 d) 4
16. Each atom of an iron bar ($5cm \times 1cm \times 1cm$) has a magnetic moment $1.8 \times 10^{-23} Am^2$. Knowing that the density of iron is $7.78 \times 10^3\ kg\ m^{-3}$, atomic weight is 56 and Avogadro's number of 6.02×10^{23} the magnetic moment of bar in the state of magnetic saturation will be
    a) 4.75 Am^2 b) 5.74 Am^2 c) 7.54 Am^2 d) 75.4 Am^2

17. Susceptibility of ferromagnetic substance is

a) >1 b) <1 c) Zero d) 1

18. The period of oscillations of a magnet is 2 s. When it is magnetized that the pole strength is 4 times, its period will be

a) 4 s b) 1 s c) 2 s d) $\frac{1}{2}$ s

19. The needle of a deflection galvanometer shows a deflection of 60° due to a short bar magnet at a certain distance in tan *A* position. If the distance is double the deflection is

a) $\sin^{-1}\left[\frac{\sqrt{3}}{8}\right]$ b) $\cos^{-1}\left[\frac{\sqrt{3}}{8}\right]$ c) $\tan^{-1}\left[\frac{\sqrt{3}}{8}\right]$ d) $\cot^{-1}\left[\frac{\sqrt{3}}{8}\right]$

20. Magnets *A* and *B* are geometrically similar but the magnetic moment of *A* is twice that of *B*. If T_1 and T_2 be the time periods of the oscillation when their like poles and unlike poles are kept together respectively, then $\frac{T_1}{T_2}$ will be

a) $\frac{1}{3}$ b) $\frac{1}{2}$ c) $\frac{1}{\sqrt{3}}$ d) $\sqrt{3}$