Topic :- MAGNETISM AND MATTER

1. If magnetic lines of force are drawn by keeping magnet vertical, then number of neutral points will be
   a) One b) Two c) Four d) Five

2. Three identical bar magnets each of magnetic moment M are placed in the form of an equilateral triangle as shown. The net magnetic moment of the system is
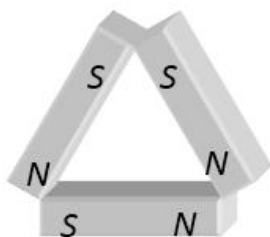
   a) Zero b) $2M$ c) $M\sqrt{3}$ d) $\dfrac{3M}{2}$

3. At a certain place, horizontal component is $\sqrt{3}$ times the vertical component. The angle of dip at this place is
   a) Zero b) $\pi/3$ c) $\pi/6$ d) None of these

4. The value of the horizontal component of the earth's magnetic field and angle of dip are $1.8 \times 10^{-5} weber/m^2$ and 30° respectively at some place. The total intensity of earth's magnetic field at that place will be
   a) $2.08 \times 10^{-5} weber/m^2$ b) $3.67 \times 10^{-5} weber/m^2$
   c) $3.18 \times 10^{-5} weber/m^2$ d) $5.0 \times 10^{-5} weber/m^2$

5. Due to a small magnet, intensity at a distance x in the end on position is $9\ gauss$. What will be the intensity at a distance $\dfrac{x}{2}$ on broad side on position
   a) $9\ gauss$ b) $4\ gauss$ c) $36\ gauss$ d) $4.5\ gauss$

6. A small bar magnet has a magnetic moment $1.2\ A\text{-}m^2$. The magnetic field at a distance $0.1\ m$ on it axis will be: ($\mu_0 = 4\pi \times 10^{-7}\text{-}m/A$)
   a) $1.2 \times 10^{-4} T$ b) $2.4 \times 10^{-4} T$ c) $2.4 \times 10^4 T$ d) $1.2 \times 10^4 T$

7. Which of the following is the most suitable material for making permanent magnet
   a) Steel b) Soft iron c) Copper d) Nickel

8. Two bar magnets of the same mass, same length and breadth but having magnetic moments M and 3M are joined together pole for pole and suspended by a string.
   The time period of assembly in a magnetic field of strength H is 3 s. If now the polarity of one of the magnets is reversed and the combination is again made to oscillate in the same field, the time of oscillation is
   a) 3 s   b) $3\sqrt{3}$ s   c) $3/\sqrt{3}$ s   d) 6 s

9. Two short magnets AB and CD are in the X-Y plane and are parallel to X-axis and co-ordinates of their centers respectively are (0, 2) and (2, 0). Line joining the north-south poles of CD is opposite to that of AB and lies along the positive X-axis. The resultant field induction due to AB and CD at a point $P(2, 2)$ is 100×10^{-7} T. When the poles of the magnet CD are reversed, the resultant field induction is 50×10^{-7} T. The value of magnetic moments of AB and CD (in Am^2) are
   a) 300; 200   b) 600; 400   c) 200; 100   d) 300; 150

10. When $\sqrt{3}$ *ampere* current is passed in a tangent galvanometer, there is a deflection of 30° in it. The deflection obtained when 3 *amperes* current is passed, is
    a) 30°   b) 45°   c) 60°   d) 75°

11. The true value of angle of dip at a place is 60°, the apparent dip in a plane inclined at an angle of 30° with magnetic meridian is
    a) $\tan^{-1}\dfrac{1}{2}$ b) $\tan^{-1}(2)$ c) $\tan^{-1}\left(\dfrac{2}{3}\right)$ d) None of these

12. Demagnetisation of magnets can be done by
    a) Rough handling   b) Heating
    c) Magnetising in the opposite direction   d) All the above

13. Two magnets A and B are identical and these are arranged as shown in the figure. Their length is negligible in comparison to the separation between them. A magnetic needle is placed between the magnets at point P which gets deflected through an angle θ under the influence of magnets. The ratio of distance d_1 and d_2 will be
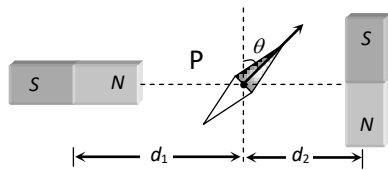
    a) $(2\tan\theta)^{1/3}$ b) $(2\tan\theta)^{-1/3}$ c) $(2\cot\theta)^{1/3}$ d) $(2\cot\theta)^{-1/3}$

14. A bar magnet is equivalent to
    a) Torroid carrying current   b) Straight conductor carrying current
    c) Solenoid carrying current   d) Circular coil carrying current

15. A bar magnet of length 10 cm and having pole strength equal to 10^{-3} Wb is kept in a magnetic field having magnetic induction B equal to $4\pi \times 10^{-3}$T. It makes an angle of 30° with the direction of magnetic induction. The value f the torque acting on the magnet is
    a) 0.5 Nm   b) $2\pi \times 10^{-5}$ Nm   c) $\pi \times 10^{-5}$ Nm   d) 0.5×10^{-5} Nm

16. If a piece of metal was thought to be magnet, which one of the following observations would offer conclusive evidence
    a) It attracts a known magnet   b) It repels a known magnet
    c) Neither (a) nor (b)   d) It attracts a steel screw driver

17. The strength of the magnetic field in which the magnet of a vibration magnetometer is oscillating is increased 4 times its original value. The frequency of oscillation would then become

    a) Twice its original value   b) Four times it original value

    c) Half its original value   d) One-fourth its original value

18. The magnet of a vibration magnetometer is heated so as to reduce its magnetic moment by 19%. By doing this the periodic time of the magnetometer will

    a) Increase by 19%   b) Decrease by19%   c) Increase by 11%   d) Decrease by 21%

19. A permanent magnet

    a) Attracts all substances

    b) Attracts only magnetic substances

    c) Attracts magnetic substances and repels all non-magnetic substances

    d) Attracts non-magnetic substances and repels magnetic substances

20. At a temperature of 30° C, the susceptibility of a ferromagnetic material is found to be X. Its susceptibility at 333° C is

    a) X b) $0.5\ X$ c) $2\ X$ d) $0.09\ X$