Physics

Chapterwise Practise Problems (CPP) for NEET

Chapter - Magnetism and Matter

1. A bar magnet of magnetic dipole moment 10 Am^2 is in stable equilibrium. The work done to rotate the magnet through 60° in a magnetic field of 0.2T is

   (1) $\frac{1}{2}$J (2) 2J

   (3) 1J (4) 4J

2. Time period of a thin bar magnet in uniform magnetic field is T_1. Now the magnet is cut into two identical halves so that its length becomes half and time period of each small magnet in the same magnetic field is T_2. The ratio of T_1 and T_2 is

   (1) 2 (2) $\sqrt{2}$

   (3) $2\sqrt{2}$ (4) 4:1

3. If ϕ_1 and ϕ_2 are the apparent angles of dip observed in two vertical planes at right angles to each other and the true angle of dip is ϕ at that place, then

   (1) $\tan^2\phi = \tan^2\phi_1 + \tan^2\phi_2$

   (2) $\tan^2\phi = \cot^2\phi_1 + \cot^2\phi_2$

   (3) $\cot^2\phi = \cot^2\phi_1 + \cot^2\phi_2$

   (4) $\cos^2\phi = \cos^2\phi_1 + \cos^2\phi_2$

4. Isoclinic lines are

   (1) Line joining places of equal angle of dip

   (2) Line joining places of zero angle of dip

   (3) Line joining places of equal angle of declination

   (4) Line joining places of zero angle of declination

5. Magnetic field inside substance is B and that in free space is B_0, then for $B < B_0$, the substance is

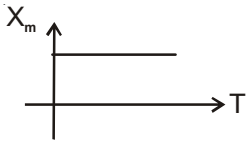
   (1) a paramagnetic

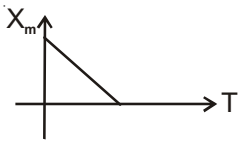
   (2) a diamagnetic

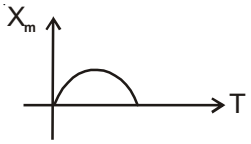
   (3) a ferromagnetic

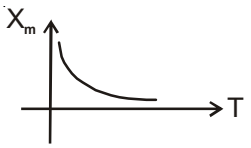
   (4) (1) and (2) both are possible

6. Magnetic susceptibility of a paramagnetic substance is plotted against absolute temperature(T). The correct graph is

   (1) 

   (2) 

   (3) 

   (4) 

7. A short bar magnet has point A and B along its axis at a distance of 24 cm and 48 cm from centre on the opposite sides. Ratio of magnitude of magnetic fields at these points will be

   (1) 2 (2) 8

   (3) 3 (4) 4

8. A magnet when suspended at an angle of 30° to magnetic meridian, the dip needle makes an angle 45° with horizontal. The dip angle measured in magnetic meridian will be

   (1) $\tan^{-1}\frac{1}{\sqrt{3}}$

   (2) $\tan^{-1}\sqrt{3}$

   (3) $\tan^{-1}\frac{\sqrt{3}}{2}$

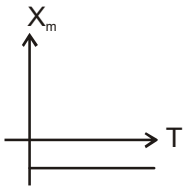
   (4) $\tan^{-1}\left(\frac{2}{\sqrt{3}}\right)$

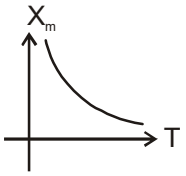
9. A bar magnet has coercivity 4×10^3 Am^{-1}. It is desired to demagnetise it by inserting inside a solenoid 12 cm long and having 60 turns. The current that should be sent through solenoid is

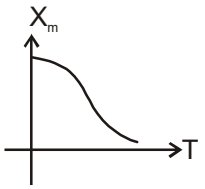
(1) 2A (2) 4A

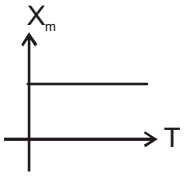
(3) 6A (4) 8A

10. The variation of magnetic susceptibility (X_m) for a diamagnetic material with temperature is best represented by which of the following curve with respect to temperature variations

(1) 

(2) 

(3) 

(4) 

11. A thin magnetic needle oscillate in the horizontal plane with a time period of 2.0 sec. If the needle is broken in 4 equal parts perpendicular to its length then time-period of each part will be

(1) 0.5 sec (2) 1.05 sec

(3) 1.5 sec (4) 2.0 sec

12. The magnetic moment produced in a substance of 1g is 6×10^{-7} Am^2. If its density is 5g/cm^3, then the intensity of magnetisation in A/m will be

(1) 8.3×10^6 (2) 3.0

(3) 1.2×10^{-7} (4) 3×10^{-6}

13. A short magnetic dipole of magnetic moment 1.44 Am^2 is placed horizontally with its north pole pointing towards north. The distance of the neutral point from the dipole, if the horizontal component of earth's magnetic field is 18 μT, is

(1) 20 cm (2) 40 cm

(3) 10 cm (4) 50 cm

14. A small bar magnet has a magnetic moment 1.25 Am^2. The magnetic field at a distance 0.1m on its axis will be

(1) 1.2×10^{-4} T (2) 2.5×10^{-4} T

(3) 2.5×10^4 T (4) 1.2×10^4 T

15. Two magnets placed one above the other oscillates with a period of 6 sec. If one of them is reversed, the time period becomes 2 sec. The ratio of their magnetic moment is nearest to

(1) $7/3$ (2) $5/4$

(3) $7/4$ (4) $7/5$

16. At the magnetic pole of earth, the value of angle of dip is

(1) 0° (2) 30°

(3) 45° (4) 90°

17. A paramagnetic sample shows intensity of magnetisation of 0.8 A/m, when placed in an external magnetic field of strength 0.8T at a temperature 5K. When the same sample is placed in an external magnetic field of 0.4T at a temperature of 20K, the magnetisation is ;

(1) 0.8 Am^{-1} (2) 0.8 Am^{-2}

(3) 0.4 Am^{-1} (4) 0.1 Am^{-1}

18. A magnet of length L and of pole strength m is cut into half breadth wise and half lengthwise and thus, four identical pieces are obtained. Magnetic moment of each piece will become

(1) $\frac{mL}{8}$ (2) $\frac{mL}{4}$

(3) $\frac{mL}{2}$ (4) mL

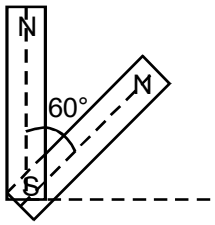
19. Magnitude Magnetic moment of two magnets are equal (M) and are placed at an angle of 60° as shown in figure. Then resultant magnetic moment of combination will be

(1) $\sqrt{2}\,M$

(2) $\sqrt{3}\,M$

(3) $\frac{M}{\sqrt{2}}$

(4) $(\sqrt{3}+1)\,M$

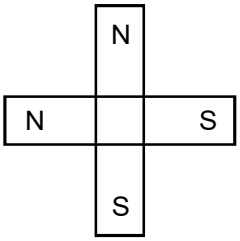


20. In tan A position of a deflection magnetometer, a short magnet placed at 10 cm from the centre produces a deflection of 30°. If another short magnet of dipole moment sixteen times the previous magnet is kept at 20 cm from the centre in tan B position, the deflection will be

(1) 60° (2) 45°

(3) 30° (4) 0°

21. Two magnets each of dipole moment P_m and length ℓ are placed perpendicularly as shown in figure. The magnitude of dipole moment of the combination will be



(1) $2P_m$

(2) $\sqrt{2}\,P_m$

(3) $\frac{P_m}{\sqrt{2}}$

(4) $\frac{P_m}{2l}$

22. At a place, angle of dip and horizontal component of earth's magnetic field are 30° and 0.5 oersted respectively. The total magnetic field of earth at the place is

(1) $\sqrt{3}$ (2) 1

(3) $\frac{1}{\sqrt{3}}$ (4) $\frac{1}{2}$

23. In vibration magnetometer time period of magnet is 2 s. The time period of a magnet whose magnetic moment is four times that of the first and same moment of inertia is

(1) 1 s (2) 4 s

(3) 8 s (4) 0.5 s

24. A bar magnet suspended has a time period of oscillation T. If the magnet is broken into four equal pieces parallel to its length and one of the pieces is made to oscillate in the same field, then the new time period is

(1) 4T (2) 2T

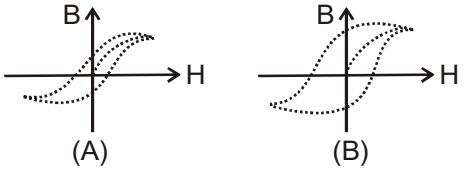
(3) T (4) $\frac{T}{4}$

25. A magnetising field of $1200 Am^{-1}$ produces a net magnetic flux $2.4\pi\times10^{-7}$ weber in a paramagnetic bar of cross-sectional area 0.2 cm^2. The susceptibility of the bar will be

(1) 17.75 (2) 25

(3) 24 (4) 26

26. Hysteresis loops for two magnetic materials A and B are given below



(1) Coercivity of A is greater than B but retentivity of B is greater than A ;

(2) Coercivity and retentivity of B is greater than A;

(3) A is suitable for making permanent and B is suitable for making electromagnet

(4) Both (2) and (3)

27. A dip needle vibrates in a vertical plane perpendicular to the geographical meridian. The time period of vibration is found to be 2 second. The same needle is then allowed to vibrate in the horizontal plane and the time period is again found to be 2 second. If the angle of declination is 60°, then the true angle of dip is

(1) $\tan^{-1}\left(\frac{1}{\sqrt{2}}\right)$ (2) $\tan^{-1}(2)$

(3) 45° (4) $\tan^{-1}\left(\frac{1}{2}\right)$

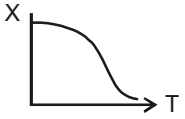
28. Apparent dips when dip circle is placed in two mutully perpendicular directions are 30° and 45°. What is the actual dip at that place?

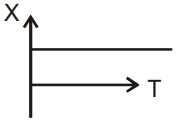
(1) $\tan^{-1}(2)$ (2) $\tan^{-1}\left(\frac{1}{2}\right)$

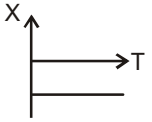
(3) $\tan^{-1}\left(\sqrt{2}\right)$ (4) 60°

29. The variation of magnetic susceptibility(X) with temperature for a diamagnetic substance is best represented by figure

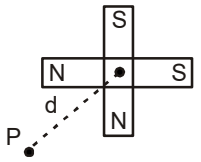
(1) 

(2) 

(3) 

(4) 

30. Two short bar magnets of equal dipole moment M each are fastened perpendicularly at their centres. The magnitude of the resultant magnetic field at a distance d from the centre on the bisector of the right angle is



(1) $\frac{\mu_o}{4\pi}\frac{2\sqrt{2}M}{d^3}$ (2) $\frac{\mu_o}{4\pi}\frac{2M}{d^3}$

(3) $\frac{\mu_o}{4\pi}\frac{M}{d^3}$ (4) $\frac{\mu_o}{4\pi}\frac{\sqrt{2}M}{d^3}$

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

(1) $\frac{T}{2}$ (2) $\frac{T}{4}$

(3) $\sqrt{2}T$ (4) 2P

32. When bar magnet is made to vibrate in horizontal plane, the time preiod of vibration is $3\sqrt{2}s$. Angle of dip is 60°. Find time of vibration when it vibrates in vertical plane parallel to the magnetic meridian at the same place

(1) 3s (2) 4s

(3) $\frac{1}{\sqrt{3}}$ sec (4) $\sqrt{3}$ s

33. At a given place in the earth's surface, the horizontal component of earth's magnetic field is 3×10^{-5} T and resultant magnetic field is 6×10^{-5}T. Angle of dip at this palce is

(1) 30° (2) 40°

(3) 50° (4) 60°

34. Two tangent galvanometers having coils of the same radius are connected in series. A current flowing in them produces deflections of 60° and 45° respectively. The ratio of the number of turns in the coils is

(1) $\frac{4}{3}$ (2) $\frac{\left(\sqrt{3}+1\right)}{1}$

(3) $\frac{\sqrt{3}+1}{\sqrt{3}-1}$ (4) $\frac{\sqrt{3}}{1}$

35. Two magnetic isolated north poles each of strength in ampere-meter are placed one at each of two vertices of an equilateral triangle of side a. The resultant magnetic induction at third vertex is

(1) $\frac{\mu_0}{4\pi}\cdot\frac{m}{a^2}$ (2) $\frac{\mu_0}{4\pi}\cdot\frac{\sqrt{2}m}{a^2}$

(3) $\frac{\mu_0}{4\pi}\cdot\frac{\sqrt{3}m}{a^2}$ (4) $\frac{\mu_0}{4\pi}\cdot\frac{m}{a^2}$

36. If a magnet is suspended at an angle 30° to the magnetic meridian, the dip needle makes an angle of 60° with the horizontal. The true value of dip is

(1) $\tan^{-1}\left(\frac{2}{3}\right)$ (2) $\tan^{-1}\left(\frac{3}{2}\right)$

(3) $\tan^{-1}(3)$ (4) $\tan^{-1}(2)$

37. The magnetic field due to a small bar magnet at end on position is making an angle θ with magnetic moment. The value of angle θ is

(1) Zero (2) 90°

(3) 180° (4) $\tan^{-1}\left(\sqrt{2}\right)$

38. A bar magnet is cut into three equal parts perpendicular to its length and each part has magnetic moment M. The magnetic moment of the bar magnet was

(1) M (2) $\frac{M}{3}$

(3) 3M (4) $(M)^{1/3}$

39. A magnetised wire of magnetic moment M and length l is bent in the form of a semicircle of radius r. The new magnetic moment is

(1) M (2) $\frac{2M}{\pi}$

(3) $\frac{M}{\pi}$ (4) $\frac{M}{2}$

40. A magnetic needle lying parallel to magnetic field requires W unit of work to turn it through 60°. The torque needed to maintain the needle in this final position will be

(1) $\sqrt{3}W$ (2) W

(3) $\frac{\sqrt{3}W}{2}$ (4) 2W

41. If the vertical component of earth's magnetic field at a place is 0.75 times the horizontal component at same place, then the angle of dip at that place is

(1) 45° (2) 37°

(3) 53° (4) 60°

42. What should be the deflection of tangent galvanometer, so that the reading obtained through it has maximum accuracy?

(1) 45° (2) 30°

(3) 37° (4) 29.2°

43. In a vertical plane inclined at an angle 60° with magnetic meridian, the angle of dip is found to be 45°. If δ is true angle of dip at that place, then the value of $\tan\delta$ is

(1) 0.5 (2) 2

(3) 0.75 (4) 1.33

44. In tangent galvanometer, the deflection is 30° when 2 A current passes through it. What will be the current, if deflection is 60°?

(1) 2 A (2) $2\sqrt{3}$ A

(3) 6 A (4) 1.5 A

45. According to Gauss' law in magnetism $\oint_S \vec{B}.\vec{ds}$ is equal to

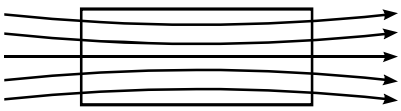
(1) Zero

(2) Positive

(3) Negative

(4) Positive, negative or zero

46. It is found that when a substance is placed in a magnetic field; field lines passing through it are shown in figure. Then substance may be



(1) Diamagnetic (2) Paramagnetic

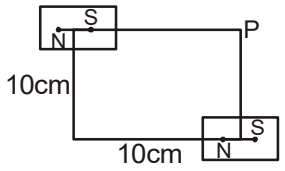
(3) Superconductor (4) All of these

47. The intensity of magnetisation (I) of paramagnetic material is related to absolute temperature T as

(1) $I \propto T$ (2) $I \propto T^2$

(3) $I \propto \frac{1}{T^2}$ (4) $I \propto \frac{1}{T}$

48. Two short magnets of magnetic moment 1000 Am^2 are placed as shown at the corners of square of side 10cm. The net magnetic induction at P is



(1) 0.1T (2) 0.2T

(3) 0.3T (4) 0.4T

49. In a tangent galvanometer a current of 0.1A produces a deflection of 30°. The current required to produce deflection of 60° is

(1) 0.2A (2) 0.3A

(3) 0.4A (4) 0.5A

50. A vibration magnetometer consists of two identical bar magnets placed one over the other such that they are perpendicular and bisect each other. The time period of oscillation in a horizontal magnetic field is $2^{5/4}$ sec. One of the magnets is removed and if the other magnet oscillates in the same field, then the time period in second is

(1) $2^{\frac{1}{4}}$ (2) $2^{\frac{1}{2}}$

(3) 2 (4) $2^{\frac{5}{4}}$

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CPP-05
ONE YEAR
MEDICAL

ANSWERS

1.	(3)	2.	(1)	3.	(3)	4.	(1)	5.	(2)	6.	(4)	7.	(1)
8.	(3)	9.	(4)	10.	(1)	11.	(1)	12.	(2)	13.	(1)	14.	(2)
15.	(2)	16.	(4)	17.	(4)	18.	(2)	19.	(2)	20.	(3)	21.	(2)
22.	(3)	23.	(1)	24.	(3)	25.	(3)	26.	(2)	27.	(4)	28.	(2)
29.	(4)	30.	(1)	31.	(2)	32.	(1)	33.	(4)	34.	(4)	35.	(3)
36.	(2)	37.	(1)	38.	(3)	39.	(2)	40.	(1)	41.	(2)	42.	(1)
43.	(1)	44.	(4)	45.	(1)	46.	(2)	47.	(4)	48.	(1)	49.	(2)
50.	(3)												

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