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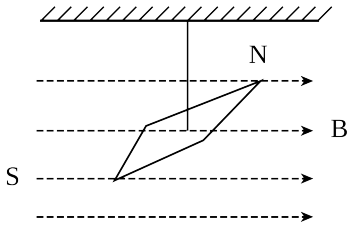
NEET MAGNETISM AND MATTER — PYQS

Max. Marks: 144 **Questions:** 36

Section A (MCQ) — 36 questions

Q.1 In a uniform magnetic field of 0.049 T, a magnetic needle performs 20 complete oscillations in 5 seconds as shown. The moment of inertia of the needle is 9.8×10^{-6} kg m^2. If the magnitude of magnetic moment of the needle is $x \times 10^{-5}$ A m^2, then the value of 'x' is : [NEET (UG) 2024]



(1) $5\pi^2$ (2) $128\pi^2$ (3) $50\pi^2$ (4) $1280\pi^2$

Scan or tap for the full solution

Q.2 Match **List I** with **List II**

List I (Material)		List II (Susceptibility (χ))	
A.	Diamagnetic	I.	$\chi = 0$
B.	Ferromagnetic	II.	$0 > \chi \geq -1$
C.	Paramagnetic	III.	$\chi \gg 1$
D.	Non-magnetic	IV.	$0 < \chi < \varepsilon$ (a small positive number)

Choose the correct answer from the options given below. [NEET (UG) 2024]

(1) A-II, B-III, C-IV, D-I
(2) A-II, B-I, C-III, D-IV
(3) A-III, B-II, C-I, D-IV
(4) A-IV, B-III, C-II, D-I

Solution

Q.3 An iron bar of length L has magnetic moment M. It is bent at the middle of its length such that the two arms make an angle 60° with each other. The magnetic moment of this new magnet is : [NEET (UG) 2024]

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

Scan or tap for the full solution

Q.4 The magnetic potential energy, when a magnetic bar of magnetic moment $\vec{m}$ is placed perpendicular to the magnetic field $\vec{B}$ is [RE-NEET (UG) 2024]

(1) $-\frac{mB}{2}$ (2) Zero (3) $-mB$ (4) mB

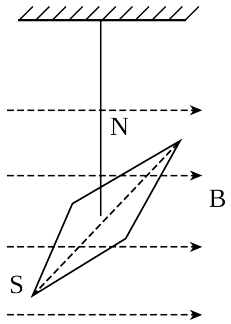
Scan or tap for the full solution

Q.5 The incorrect relation for a diamagnetic material (all the symbols carry their usual meaning and ε is a small positive number) is [RE-NEET (UG) 2024]

(1) $\mu < \mu_0$ (2) $0 \leq \mu_r < 1$
(3) $-1 \leq \chi < 0$ (4) $1 < \mu_r < 1 + \varepsilon$

Scan or tap for the full solution

Q.6 The magnetic moment and moment of inertia of a magnetic needle as shown are, respectively, 1.0×10^{-2} A m^2 and $\frac{10^{-6}}{\pi^2}$ kg m^2. If it completes 10 oscillations in 10 s, the magnitude of the magnetic field is [RE-NEET (UG) 2024]



(1) 0.4 T (2) 4 T (3) 0.4 mT (4) 4 mT

Scan or tap for the full solution

Q.7 The magnetic moment of an iron bar is M. It is now bent in such a way that it forms an arc section of a circle subtending an angle of 60° at the centre. The magnetic moment of this arc section is [RE-NEET (UG) 2024]

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

Scan or tap for the full solution

Q.8 The net magnetic flux through any closed surface is : [NEET (UG) 2023]

(1) Positive (2) Infinity

(3) Negative (4) Zero

Solution

Q.9 An iron rod of susceptibility 599 is subjected to a magnetizing field of 1200 A m^{-1}. The permeability of the material of the rod is :

($\mu_0 = 4\pi \times 10^{-7}$ T m A^{-1}) [NEET (UG) 2020]

(1) 8.0×10^{-5} T m A^{-1} (2) $2.4\pi \times 10^{-5}$ T m A^{-1}

(3) $2.4\pi \times 10^{-7}$ T m A^{-1} (4) $2.4\pi \times 10^{-4}$ T m A^{-1}

Scan or tap for the full solution

Q.10 At a point A on the earth's surface the angle of dip, $\delta = +25°$. At a point B on the earth's surface the angle of dip, $\delta = -25°$. We can interpret that : [NEET (UG) 2019]

(1) A is located in the southern hemisphere and B is located in the northern hemisphere.

(2) A is located in the northern hemisphere and B is located in the southern hemisphere.

(3) A and B are both located in the southern hemisphere.

(4) A and B are both located in the northern hemisphere.

Scan or tap for the full solution

Q.11 A thin diamagnetic rod is placed vertically between the poles of an electromagnet. When the current in the electromagnet is switched on, then the diamagnetic rod is pushed up, out of the horizontal magnetic field. Hence the rod gains gravitational potential energy. The work required to do this comes from [NEET 2018]

(1) The current source

(2) The magnetic field

(3) The lattice structure of the material of the rod

(4) The induced electric field due to the changing magnetic field

Scan or tap for the full solution

Q.12 If θ_1 and θ_2 be the apparent angles of dip observed in two vertical planes at right angles to each other, then the true angle of dip θ is given by [NEET 2017]

(1) $\tan^2\theta = \tan^2\theta_1 + \tan^2\theta_2$

(2) $\cot^2\theta = \cot^2\theta_1 - \cot^2\theta_2$

(3) $\tan^2\theta = \tan^2\theta_1 - \tan^2\theta_2$

(4) $\cot^2\theta = \cot^2\theta_1 + \cot^2\theta_2$

Scan or tap for the full solution

Q.13 The magnetic susceptibility is negative for [NEET 2016 (Phase 1)]

(1) ferromagnetic material only

(2) paramagnetic and ferromagnetic materials

(3) diamagnetic material only

(4) paramagnetic material only

Scan or tap for the full solution

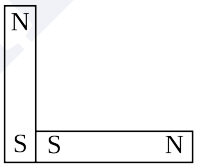
Q.14 A bar magnet is hung by a thin cotton thread in a uniform horizontal magnetic field and is in equilibrium state. The energy required to rotate it by 60° is W. Now the torque required to keep the magnet in this new position is [NEET 2016 (Phase 2)]

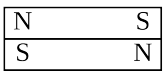
(1) $\frac{W}{\sqrt{3}}$ (2) $\sqrt{3}W$

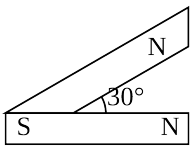
(3) $\frac{\sqrt{3}W}{2}$ (4) $\frac{2W}{\sqrt{3}}$

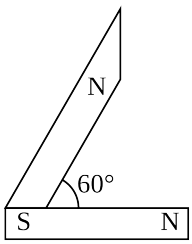
Scan or tap for the full solution

Q.15 Following figures show the arrangement of bar magnets in different configurations. Each magnet has magnetic dipole moment $\vec{m}$. Which configuration has highest net magnetic dipole moment ? [AIPMT 2014]

(1)


(2)


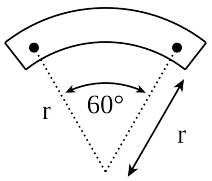
(3)


(4)


(1) (1) (2) (2) (3) (3) (4) (4)

Scan or tap for the full solution

Q.16 A bar magnet of length 'l' and magnetic dipole moment 'M' is bent in the form of an arc as shown in figure. The new magnetic dipole moment will be [NEET 2013]



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

Scan or tap for the full solution

Q.17 A bar magnet of magnetic moment M is placed at right angles to a magnetic induction B. If a force F is experienced by each pole of the magnet, the length of the magnet will be [NEET 2013 (Karnataka)]

(1) MB/F (2) BF/M (3) MF/B (4) F/MB

Scan or tap for the full solution

Q.18 A magnetic needle suspended parallel to a magnetic field requires $\sqrt{3}$ J of work to turn it through 60°. The torque needed to maintain the needle in this position will be [AIPMT 2012 (Mains)]

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

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

Scan or tap for the full solution

Q.19 A compass needle which is allowed to move in a horizontal plane is taken to a geomagnetic pole. It [AIPMT 2012 (Prelims)]

(1) will become rigid showing no movement

(2) will stay in any position

(3) will stay in north-south direction only

(4) will stay in east-west direction only

Scan or tap for the full solution

Q.20 A short bar magnet of magnetic moment 0.4 J T^{-1} is placed in a uniform magnetic field of 0.16 T. The magnet is in stable equilibrium when the potential energy is [AIPMT 2011 (Mains)]

(1) 0.064 J (2) −0.064 J

(3) zero (4) −0.082 J

Scan or tap for the full solution

Q.21 There are four light-weight-rod samples A, B, C, D separately suspended by threads. A bar magnet is slowly brought near each sample and the following observations are noted

(i) A is feebly repelled

(ii) B is feebly attracted

(iii) C is strongly attracted

(iv) D remains unaffected

Which one of the following is true ? [AIPMT 2011 (Prelims)]

(1) B is of a paramagnetic material

(2) C is of a diamagnetic material

(3) D is of a ferromagnetic material

(4) A is of a non-magnetic material

Solution

Q.22 The magnetic moment of a diamagnetic atom is [AIPMT 2010 (Mains)]

(1) much greater than one

(2) 1

(3) between zero and one

(4) equal to zero

Solution

Q.23 Electromagnets are made of soft iron because soft iron has [AIPMT 2010 (Prelims)]

(1) low retentivity and high coercive force

(2) high retentivity and high coercive force

(3) low retentivity and low coercive force

(4) high retentivity and low coercive force

Scan or tap for the full solution

Q.24 A vibration magnetometer placed in magnetic meridian has a small bar magnet. The magnet executes oscillations with a time period of 2 s in earth's horizontal magnetic field of 24 microtesla. When a horizontal field of 18 microtesla is produced opposite to the earth's field by placing a current carrying wire, the new time period of magnet will be [AIPMT 2010 (Prelims)]

(1) 1 s (2) 2 s (3) 3 s (4) 4 s

Scan or tap for the full solution

Q.25 If a diamagnetic substance is brought near the north or the south pole of a bar magnet, it is [AIPMT 2009]

(1) repelled by the north pole and attracted by the south pole

(2) attracted by the north pole and repelled by the south pole

(3) attracted by both the poles

(4) repelled by both the poles

Scan or tap for the full solution

Q.26 A bar magnet having a magnetic moment of 2×10^4 J T^{-1} is free to rotate in a horizontal plane. A horizontal magnetic field B = 6×10^{-4} T exists in the space. The work done in taking the magnet slowly from a direction parallel to the field to a direction 60° from the field is [AIPMT 2009]

(1) 12 J (2) 6 J (3) 2 J (4) 0.6 J

Scan or tap for the full solution

Q.27 Curie temperature above which [AIPMT 2008]

(1) paramagnetic material becomes ferromagnetic material

(2) ferromagnetic material becomes diamagnetic material

(3) ferromagnetic material becomes paramagnetic material

(4) paramagnetic material becomes diamagnetic material

Scan or tap for the full solution

Q.28 Nickel shows ferromagnetic property at room temperature. If the temperature is increased beyond Curie temperature, then it will show [AIPMT 2007]

(1) anti ferromagnetism (2) no magnetic property

(3) diamagnetism (4) paramagnetism

Scan or tap for the full solution

Q.29 Curie temperature is the temperature above which [AIPMT 2006]

(1) paramagnetic material becomes ferromagnetic material

(2) ferromagnetic material becomes diamagnetic material

(3) ferromagnetic material becomes paramagnetic material

(4) paramagnetic material becomes diamagnetic material

Scan or tap for the full solution

Q.30 If the magnetic dipole moment of an atom of diamagnetic material, paramagnetic material and ferromagnetic material are denoted by μ_d, μ_p and μ_f respectively, then [AIPMT 2005]

(1) $\mu_d = 0$ and $\mu_p \neq 0$ (2) $\mu_d \neq 0$ and $\mu_p = 0$

(3) $\mu_p = 0$ and $\mu_f \neq 0$ (4) $\mu_d \neq 0$ and $\mu_f \neq 0$

Scan or tap for the full solution

Q.31 A diamagnetic material in a magnetic field moves [AIPMT 2003]

(1) from stronger to the weaker parts of the field

(2) from weaker to the stronger parts of the field

(3) perpendicular to the field

(4) in none of the above directions

Scan or tap for the full solution

Q.32 According to Curie's law, the magnetic susceptibility of a substance at an absolute temperature T is proportional to [AIPMT 2003]

(1) 1/T (2) T (3) $1/T^2$ (4) T^2

Scan or tap for the full solution

Q.33 A bar magnet is oscillating in the Earth's magnetic field with a period T. What happens to its period and motion if its mass is quadrupled? [AIPMT 2003]

(1) motion remains simple harmonic with time period = $\frac{T}{2}$

(2) motion remains S.H.M. with time period = 2T

(3) motion remains S.H.M. with time period = 4T

(4) motion remains S.H.M. and period remains nearly constant

Scan or tap for the full solution

Q.34 Two bar magnets having same geometry with magnetic moments M and 2M, are firstly placed in such a way that their similar poles are same side then its time period of oscillation is T_1. Now the polarity of one of the magnets is reversed then time period of oscillation is T_2, then [AIPMT 2002]

(1) $T_1 < T_2$ (2) $T_1 = T_2$ (3) $T_1 > T_2$ (4) $T_2 = \infty$

Scan or tap for the full solution

Q.35 Among which the magnetic susceptibility does not depend on the temperature? [AIPMT 2001]

(1) diamagnetism (2) paramagnetism

(3) ferromagnetism (4) ferrite

Scan or tap for the full solution

Q.36 Tangent galvanometer is used to measure [AIPMT 2001]

(1) potential difference (2) current

(3) resistance (4) charge

Solution

ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	4	1	2	2	4	3	1	4	4	2	1
Ques.	12	13	14	15	16	17	18	19	20	21	22
Ans.	4	3	2	3	4	1	2	2	2	1	4
Ques.	23	24	25	26	27	28	29	30	31	32	33
Ans.	3	4	4	2	3	4	3	1	1	1	2
Ques.	34	35	36								
Ans.	1	1	2								