

PYQSide

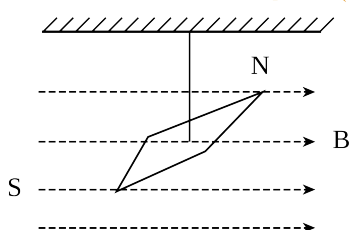
NEET MAGNETISM AND MATTER — MAGNETIC DIPOLE IN A UNIFORM FIELD — PYQS

Max. Marks: 44

Questions: 11

Section A (MCQ)

- 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 $9.8 \times 10^{-6} \text{ kg m}^2$. If the magnitude of magnetic moment of the needle is $x \times 10^{-5} \text{ A m}^2$, 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



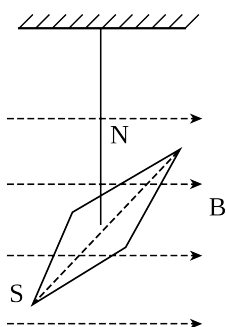
- Q.2** The magnetic potential energy, when a magnetic bar of magnetic moment $\vec{m}$ is placed perpendicular to the magnetic field $\vec{B}$ is [RE-NEET (UG) 2024]

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

Scan or tap for the full solution



- Q.3** The magnetic moment and moment of inertia of a magnetic needle as shown are, respectively, $1.0 \times 10^{-2} \text{ A m}^2$ and $\frac{10^{-6}}{\pi^2} \text{ kg m}^2$. 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.4** 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.5** 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.6** A magnetic needle suspended parallel to a magnetic field requires $\sqrt{3} \text{ J}$ of work to turn it through 60° . The torque needed to maintain the needle in this position will be [AIPMT 2012 (Mains)]

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

Scan or tap for the full solution



- Q.7** 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

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- Q.8** 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.9** A bar magnet having a magnetic moment of $2 \times 10^4 \text{ J T}^{-1}$ is free to rotate in a horizontal plane. A horizontal magnetic field $B = 6 \times 10^{-4} \text{ T}$ 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.10** 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.11** 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



ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	4	2	3	2	1	2	2	4	2	2	1