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DPP – 1 (Magnetism & Matter)

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Q 1. A magnetic wire of dipole moment $4\pi\ Am^2$ is bent in the form of semicircle. The new magnetic moment is:
(a) $4\pi\ Am^2$ (b) $8\pi\ Am^2$
(c) $4\ Am^2$ (d) $8\ Am^2$

Q 2. A magnet of magnetic moment M and pole strength m is divided in two equal parts, then magnetic moment of each part will be
(a) M (b) M/2
(c) M/4 (d) 2M

Q 3. Magnetic induction due to a short bar magnet on its axial line (at a distance 'r') is inversely proportional to
(a) r^3 (b) $\frac{1}{r^3}$
(c) r^2 (d) $\frac{1}{r^2}$

Q 4. Points A and B are situated along the extended axis of 2 cm long bar magnet at a distance x and 2x cm respectively. From the pole nearer to the points, the ratio of the magnetic field at A and B will be
(a) 4 : 1 exactly (b) 4 : 1 approx.
(c) 8 : 1 exactly (d) 8 : 1 approx.

Q 5. A very long bar magnet (length L) has a pole strength of 10A-m. Find the magnetic field at a point on the axis of the magnet at a distance of 5cm from the north pole of the magnet (L >>> 5cm)
(a) 4×10^{-4} T (b) 8×10^{-4} T
(c) 4×10^{-6} T (d) 8×10^{-8} T

Q 6. Calculate the magnetic field due to a bar magnet 2cm long and having pole strength of 100 A-m at a point 10 cm from each pole on the equatorial line
(a) 2×10^{-2} T (b) 3×10^{-3} T
(c) 2×10^{-4} T (d) 5×10^{-6} T

Q 7. A bar magnet is 0.10 m long and its pole strength is 120 Am. Find magnitude of magnetic field at a point on its axis at a distance 20 cm from its center
(a) 6.8×10^{-5} T (b) 3.4×10^{-4} T
(c) 2.1×10^{-4} T (d) 5.2×10^{-6} T

Q 8. The magnetic potential at a point on the axial line of a bar magnet of dipole moment M is V. What is the magnetic potential due to a bar magnet of dipole moment $\frac{M}{4}$ at the same distant axial point?

(a) 4V (b) 2V
(c) V/2 (d) V/4

Q 9. The pole strength of a bar magnet is 48 ampere-meter and the distance between its poles is 25 cm. The moment of the couple by which it can be placed at an angle of 30^0 with the uniform magnetic intensity of flux density 0.15 Newton/ampere-meter will be

(a) 12 Newton × metre (b) 18 Newton × metre
(c) 0.9 Newton × metre (d) None of the above

Q 10. The work done in rotating a magnet of magnetic moment 2 Am^2 in a magnetic field 5×10^{-3} T from the direction along the magnetic field to opposite direction to the magnetic field, is

(a) zero (b) 2×10^{-2} J
(c) 10^{-2} J (d) 10 J

Q 11. Magnetic moment of bar magnet is M. The magnitude of work done to turn the magnet by 90^0 of magnet in direction of magnetic field B will be

(a) zero (b) $\frac{MB}{2}$
(c) MB (d) $2MB$

Q 12. Find the magnetic field due to a dipole of magnetic moment 1.2 Am^2 at a point 1m away from it in a direction making an angle of 60^0 with the dipole-

(a) $2 \times 10^{-6}T$ (b) $3.2 \times 10^{-6}T$
(c) $4 \times 10^{-7}T$ (d) $1.6 \times 10^{-7}T$

Q 13. The magnitude of magnetic field , due to a dipole of magnetic moment 2.4 Am^2, at a point 200 cm away from it in the direction making an angle of 90^0 with the dipole axis is

(a) 3×10^{-6}T (b) 3×10^{-7}T
(c) 3×10^{-8}T (d) 0.3×10^{-8}T

Q 14. Two small bar magnets are placed in a line with like poles facing each other at a certain distance d (d >> length of magnets) apart. If the length of each magnet is negligible as compared to d, the force between them will be inversely proportional to

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

Q 15. A long magnet is cut in two parts in such a way that the ratio of their lengths is 2:1. The ratio of pole strengths of both the section is

(a) In the ratio of 1 : 1 (b) In the ratio of 2 : 1
(c) In the ratio of 1 : 2 (d) In the ratio of 4 : 1

Q 16. A magnet of magnetic moment $50\,\hat{\imath}\,Am^2$ is placed along the x-axis in a magnetic field $\vec{B} = (0.5\,\hat{\imath} + 3.0\,\hat{\jmath})$T. The torque acting on the magnet is

(a) 175 $\hat{k}$ N-m (b) 150 $\hat{k}$ N-m

(c) 75 $\hat{k}$ N-m (d) 25 $\hat{k}$ N-m

Answer Key

Q.1 d	**Q.2 b**	**Q.3 a**	**Q.4 d**	**Q.5 a**
Q.6 c	**Q.7 b**	**Q.8 d**	**Q.9 c**	**Q.10 b**
Q.11 c	**Q.12 d**	**Q.13 c**	**Q.14 c**	**Q.15 a**
Q.16 b				