LAKSHYA (JEE)

Magnetism and Matter

DPP-02

1. The distance of two points on the axis of a magnet from its centre is 10 cm and 20 cm respectively. The ratio of magnetic intensity at these points is 12.5 : 1. The length of the magnet will be

(A) 5 cm (B) 25 cm

(C) 10 cm (D) 20 cm

2. The magnetic field at a point x on the axis of a small bar magnet is equal to the field at a point y on the equator of the same magnet. The ratio of the distances of x and y from the centre of the magnet is

(A) 2^{-3} (B) $2^{-1/3}$

(C) 2^{3} (D) $2^{1/3}$

3. The small magnets each of magnetic moment 10 A-m^2 are placed end-on position 0.1 m apart from their centres. The force acting between them is

(A) 0.6×10^7 N (B) 0.06×10^7 N

(C) 0.6 N (D) 0.06 N

4. 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 point?

(A) $4V$ (B) $2V$

(C) $\frac{V}{2}$ (D) $\frac{V}{4}$

5. Two identical magnetic dipoles of magnetic moments 1.0 A-m^2 each, placed at a separation of 2 m with their axis perpendicular to each other. The resultant magnetic field at a point midway between the dipoles is

(A) 5×10^{-7} T (B) $\sqrt{5} \times 10^{-7}$ T

(C) 10^{-7} T (D) None of these

6. Two identical short bar magnets, each having magnetic moment of 10 Am^2, are arranged such that their axial lines are perpendicular to each other and their centres be along the same straight line in a horizontal plane. If the distance between their centres is 0.2 m, the resultant magnetic induction at a point midway between them is

($\mu_0 = 4\pi \times 10^{-7}$ Hm^{-1})

(A) $\sqrt{2} \times 10^{-7}$ Tesla (B) $\sqrt{5} \times 10^{-7}$ Tesla

(C) $\sqrt{2} \times 10^{-3}$ Tesla (D) $\sqrt{5} \times 10^{-3}$ Tesla

7. The distance between the poles of a horse shoe magnet is 0.1 m and its pole strength is 0.01 amp-m. The induction of magnetic field at a point midway between the poles will be

(A) 2×10^{-5} T (B) 4×10^{-6} T

(C) 8×10^{-7} T (D) Zero

8. A magnet of magnetic moment 20 C.G.S. units is freely suspended in a uniform magnetic field of intensity 0.3 C.G.S. units. The amount of work done in deflecting it by an angle of 30° in C.G.S. units is

(A) 6 (B) $3\sqrt{3}$

(C) $3(2 - \sqrt{3})$ (D) 3

9. A magnetic needle lying parallel to a magnetic field requires W units of work to turn it through 60°. The torque required to maintain the needle in this position will be

(A) $\sqrt{3}$ W (B) W

(C) $\frac{\sqrt{3}}{2}$ W (D) 2 W

10. A bar magnet of magnetic moment 10^4J/T is free to rotate in a horizontal plane. The work done in rotating the magnet slowly from a direction parallel to a horizontal magnetic field of 4×10^{-5} T to a direction 60° from the field will be

(A) 0.2 J (B) 2.0 J

(C) 4.18 J (D) 2×10^2 J

11. If a magnet of length 10 cm and pole strength 40 A-m is placed at an angle of 45° in an uniform induction field of intensity 2×10^{-4} T, the couple acting on it is

(A) 0.5656×10^{-4} N-m

(B) 0.5656×10^{-3} N-m

(C) 0.656×10^{-4} N-m

(D) 0.656×10^{-5} N-m

12. A bar magnet is held perpendicular to a uniform magnetic field. If the couple acting on the magnet is to be halved by rotating it, then the angle by which it is to be rotated is

(A) 30° (B) 45°

(C) 60° (D) 90°

ANSWER KEY

1. **(C)**
2. **(D)**
3. **(C)**
4. **(D)**
5. **(B)**
6. **(D)**
7. **(C)**
8. **(C)**
9. **(A)**
10. **(A)**
11. **(B)**
12. **(C)**

Note - If you have any query/issue

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