## ST. LAWRENCE HIGH SCHOOL

**A JESUIT CHRISTIAN MINORITY INSTITUTION**

**WORK SHEET 25**

**Subject : PHYSICS**

30.6.20

CLASS : XII

Topic: $\vec{B}$ at any position, $\vec{B}$ at the centre of a circulating electro magnetic moment, Bohr magnaton.

Chapter : Magnetic properties of materials

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**Multiple Choice Questions :** **1x 15 = 15**

1. The result magnetic intensity at a point P ( r, θ) due to a dipole is

   (a) $B = \frac{\mu_o}{4\pi} \cdot \frac{M}{r^3}\sqrt{1 + 3\cos^2\theta}$ (b) $B = \frac{\mu_o}{4\pi} \cdot \frac{M}{r^3}$

   (c) $B = \frac{\mu_o}{4\pi} \cdot \frac{M}{r^3}\sqrt{1 + 3\sin^2\theta}$ (d) $B = 0$

2. For the above question, P is an axial point with respect to

   (a) $M_r$ (b) $M_\theta$ (c) neither $M_r$ nor $M_\theta$ (d) $M_r = M_\theta$

3. For question no : (1), P is a broadside - on position with respect to

   (a) $M_r$ (b) $M_\theta$ (c) neither $M_r$ nor $M_\theta$ (d) $M_r = M_\theta$

4. Magnetic intensity at any point P ( r, θ ) due to a short bar magnet or dipole denotes

   (a) intensity on end - on position, when $\theta = 0^0$

   (b) intensity on the broadside - on position, when $\theta = 90^0$

   (c) both (a) and (b)

   (d) none of the above

5. From θ : 3, $M_r = M\cos\theta$ and $M_\theta = M\sin\theta$, where

   (a) $M_r \perp M_\theta$ (b) $M_r \parallel M_\theta$ (c) $M_r = M_\theta$ (d) $M_r = 2M_\theta$

6. The electron of mass m and charge e is revolving in the orbit of radius r in anti - clockwise direction. So the equivalent current is

   (a) clockwise (b) anti - clockwise (c) zero (d) none of the above

7. Magnetic moment of the electron orbit

   (a) $M = \frac{I}{A}$ (b) $M = IA$ (c) $M = \frac{IA}{2}$ (d) $M = \frac{A}{I}$

8. Angular momentum of an electron rotating in a circular orbit

   (a) $L = \frac{mv}{r}$ (b) $L = \frac{r}{mv}$ (c) $L = mr^2\omega$ (d) $L = \frac{\omega}{Lr}$

9. The ratio of magnetic moment to the angular momentum of an orbiting electron is

(a) $M = \frac{2m}{e} L$ (b) $L = \frac{eL}{2m}$ (c) $M = mLe$ (d) $L = \frac{e}{2m} L$

10. Vector form of magnetic moment of an orbiting electron in a circular orbit

(a) $\vec{M} = - \frac{e}{2m} \vec{L}$ (b) $\vec{M} = \frac{e}{2m} \vec{L}$ (c) $\vec{M} = \frac{e}{m} \vec{L}$ (d) none of the above

11. According to Bohr's theory, in a stable orbit angular moment of the electron is

(a) $L = n \frac{h}{2\pi}$ (b) $L = \frac{h}{2\pi}$ (c) $L = \frac{2\pi}{h}$ (d) $L = 0$

12. Minimum value of magnetic moment of an electron rotating in a circular orbit

(a) $M = \frac{eh}{2\pi th}$ (b) $M = \frac{eh}{4\pi m}$ (c) $M = \frac{eh}{\pi m}$ (d) $M = \frac{4\pi th}{eh}$

13. Magnetic moment of the electron due to its orbital motion is given by

(a) $M = \frac{neh}{\pi m}$ (b) $M = \frac{4\pi m}{neh}$ (c) $M = n \left(\frac{eh}{4\pi m}\right)$ (d) $M = \frac{eh}{4\pi m}$

14. Bohr magneton is

(a) minimum value of the orbital magnetic moment
(b) maximum value of the orbital magnetic moment
(c) neither (a) nor (b)
(d) a megnet

15. 1 Bohr magneton is

(a) $9.00 \times 10^{-24}$ $Am^2$ (b) $9.27 \times 10^{-24}$ $Am^2$
(c) $92.7 \times 10^{-24}$ $Am^2$ (d) $927 \times 10^{-24}$ $Am^2$

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