**ST. LAWRENCE HIGH SCHOOL**

**A JESUIT CHRISTIAN MINORITY INSTITUTION**

**WORK SHEET 20**

**Subject : PHYSICS**

CLASS : XII

22.6.20

Chapter : Electromagnetism

Topic : **B** for solenoid and toroid by circuital law, force on a moving charge by **B** — Lorenz force

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

1. Magnetic field inside a long straight solenoid is

   (a) $B = \mu_o nI$ (b) $B = \frac{\mu_o}{nI}$ (c) $B = \mu_o I$ (d) $B = \frac{\mu_o nI}{4\pi}$

2. To increase the magnetic field inside a solenoid

   (a) no. of turns to be increased (b) to make the turns very close to each other

   (c) both (a) and (b) (d) none of the above

3. C.G.S expression for magnetic intensity inside a solenoid

   (a) $H = 4\pi ni$ (b) $H = \frac{ni}{4\pi}$ (c) $H = \mu_o ni$ (d) $H = \frac{\mu_o}{4\pi}.ni$

4. A toroid is

   (a) endless solenoid (b) a long straight solenoid

   (c) a long insulated coudneting wire (d) none of the above

5. Magnetic intensity of a toroid with core permeability $\mu$ is

   (a) $B = \mu_o nI$ (b) $B = \mu nI$ (c) $B = \frac{\mu}{4\pi} nI$ (d) $B = \frac{\mu_o}{4\pi} nI$

6. Force on a moving charge in magnetic field is

   (a) $\vec{F} = q\vec{v} \times \vec{B}$ (b) $\vec{F} = \vec{B} \times q\vec{v}$ (c) $F = \frac{B}{qv}$ (d) $\vec{F} = q\vec{v}.\vec{B}$

7. For any point inside the empty space surrounded by toroid as well as outside the toroid, magnetic field B is

   (a) infinity (b) Zero (3) 1 (d) none of the above

8. Dimension of $\vec{B}$

   (a) $[ML^oT^{-2}A^{-1}]$ (b) $[M^oLT^{-2}A^{-1}]$ (c) $[ML^oT^{-1}A^{-2}]$ (d) $[MLT^{-2}A^{-1}]$

9. Lorentz force expression is

   (a) $\vec{F} = q[\vec{E} + (\vec{v} \times \vec{B})$ (b) $\vec{F} = q[\vec{E} + (\vec{B} \times \vec{v})$ (c) $\vec{F} = q\vec{E}$ (d) $\vec{F} = q(\vec{v} \times \vec{B})$

10. A beta ($\beta$) particle is moving parallel to magnetic field, then force exerted on it will be

    (a) zero (b) 0.1 newton (c) 1 newton (d) none of these

11. What is the magnitude of the force experienced by a stationary charge when placed in an uniform magnetic field?

(a) $F = qvB \sin\theta$ (b) $F = qvB$ (c) $F$ = zero (d) none of these

12. A beam of protons projected along positive $x$-axis experiences a force, due to a magnetic field, along the negative $y$-axis. Then the magnetic field must be

(a) along the $z$-axis (b) along the negative $z$-axis

(c) on the $xy$-plane (d) on the $xz$-plane

13. A charged particle of charge $q$ moves with a volocity $\vec{v} = a\hat{i} + b\hat{j}$ in a magnetic field $\vec{B} = c\hat{i} + d\hat{j}$. The force acting on the particle has magnitude $F$, where

(a) $F = 0$ if $ad = bc$ (b) $F = 0$ if $ad = -bc$

(c) $F = 0$ if $ac = -bd$ (d) $F\alpha(a^2 + b^2)^{1/2} \times (c^2 + d^2)^{1/2}$

14. A unifom electric field and a uniform magnetic field are acting along the same direction in a certain region. If an electron is projected in the region such that its velocity is pointed along the direction of fields, then the electron

(a) will turn towards right of direction of motion

(b) speed will decrease

(c) speed will increase

(d) will turn towards left of direction of motion

15. A charged particle moving in a magnetic field experiences a resultant force

(a) in a direction of magnetic field

(b) in the direction opposite to the magnetic field

(c) in the direction perpendicular to both the magnetic field and its velocity

(d) none of the above.

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