St John Baptist De La Salle Catholic School, Addis Ababa

Grade 10 Physics Midterm Reexamination

3rd Quarter

March, 2023

Notes, and use of other aids is **NOT** allowed. Read all directions carefully and **write your answers in the answer sheet**. To receive full credit, you must show all of your work.

Name:_____ Roll Number:_____ Section:____Time Allowed: **1 hour**

Multiple Choice Questions

1. Which of the following is true about the difference between electric and magnetic fields?
   A. Magnetic fields are closed loops while electric fields don't necessarily need to be like that.
   B. Magnetic fields can exist only from monopoles while electric fields need both parities to emerge.
   C. Electric fields give rise to conservative fields while magnetic fields give rise to dissipative fields.
   D. Electric fields and magnetic fields are the same.

2. What is the SI unit of magnetic field strength?
   A. Weber B. Volt C. Tesla D. Coulomb

3. A cosmic ray electron moves at $7.5 \times 10^6 m/s$ perpendicular to the Earth's magnetic field at an altitude where field strength is $1.00 \times 10^{-5} T$. What is the radius of the circular path the electron follows?
   A. 4.27m B. 3m C. 2m D. 3.2m

4. A positive charge moving to the right with a constant velocity enters a region of a uniform magnetic field pointing into the page. What is the direction of the magnetic force on the charge?
   A. Left B. Right C. To the top D. To the bottom E. N/A

5. A DC power line for a light-rail system carries 1000 A at an angle of 30^0 to the Earth's $5 \times 10^{-5} T$ field. What is the force on a 100-m section of this line?
   A. 2.50 N B. 3.2 N C. 1 N D. 2 N

6. For a charge to experience a force due to a magnetic field, it has to:
   A. be moving B. have a charge C. move perpendicular to the field D. All

7. Who was the first person to have discovered that current carrying wires induce magnetic fields?
   A. Oersted B. Faraday C. Henry D. Curie

8. Why are magnets named magnets?
   A. Because they were discovered at a place called Magnesia
   B. Because they were discovered by a person called Magnesia

C. Because they were discovered at an era called Magnesia

D. All

9. What is the angle between a wire carrying an 8.00-A current and the 1.20-T field it is in if 50.0 cm of the wire experiences a magnetic force of 2.40 N?
A. $\frac{\pi}{3}$ B. $\frac{\pi}{6}$ C. $\frac{\pi}{2}$ D. $\frac{\pi}{4}$

10. An AC appliance cord has its hot and neutral wires separated by 4.00 mm and carries a 6.00-A current. Which of the following is true?

A. The force between the two wires is attractive.

B. The force between the two wires is repulsive.

C. Since the force is large, we need to design specific features to minimize the force.

D. Since the force is small, no specific design features are necessary.

Workout Problems

11. How strong is the magnetic field inside a solenoid with 10,000 turns per meter that carries 20.0 A?

12. An electron in a TV CRT moves with a speed of $8.00 \times 10^7 m/s$, in a direction perpendicular to the Earth's field, which has a strength of $5 \times 10^{-5} T$.

1. What strength electric field must be applied perpendicular to the Earth's field to make the electron moves in a straight line?

2. If this is done between plates separated by 4.00 cm, what is the voltage applied?

13. Show that the units of Nm and Am^2T are the same.

14. Show that the charge to mass ratio of a charge accelerated by a voltage V is $\frac{2V}{B^2R^2}$