

Don Bosco Catholic High School and Preparatory- Dilla
2nd semester Physics Self-Assessment test 1 for Grade 12, 2012 E.C

Part one:

Read the Following questions Carefully and Write **true** for correct statements and **false** for incorrect one

1. Electric field lines are in the direction of the electric force on a positive charge, but the magnetic field lines are perpendicular to the magnetic force on a moving charge.
2. When a charged particle moves in a magnetic field, the magnetic field can alter the direction of the particle's velocity vector, but it cannot change its speed.
3. If a charged particle moves parallel to the magnetic field vector, the magnetic force acting on the particle is zero.
4. When a charged particle moves in a magnetic field, the work done by the magnetic force on the particle is nonezero.
5. The **Biot-Savart law** is analogous to Coulomb's law for the electric field of a point charge.

Part two: choose the correct answer only

1. The force on a proton moving with velocity $\mathbf{V} = 4 \times 10^6 \hat{i}$ m/s in a magnetic field $\mathbf{B} = 2.0 \text{ T}$ is _____?

A. $-1.2 \times 10^{-12} \text{ N} \hat{j}$	C. $-9.02 \times 10^{-17} \text{ N} \hat{j}$
B. $-9.02 \times 10^{-12} \text{ N} \hat{i}$	D. $1.2 \times 10^{-12} \text{ N} \hat{i}$
2. A proton of mass $m = 1.67 \times 10^{-27} \text{ kg}$ and charge $e \times 1.6 \times 10^{-19} \text{ C}$ moves in a circle of radius 21 cm perpendicular to a magnetic field $\mathbf{B} = 4000 \text{ G}$. The speed of the proton is _____?

A. $8.05 \times 10^6 \text{ m/s}$	B. $1.64 \times 10^6 \text{ m/s}$
C. $9.02 \times 10^{-6} \text{ m/s}$	D. none
3. An electron moving with velocity $\mathbf{v}$ to the right enters a region of uniform magnetic field that points out of the paper. After the electron enters this region, it will be

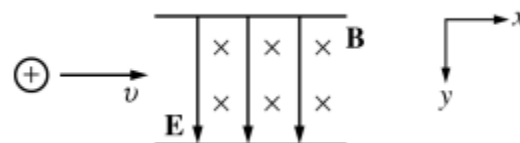
A. deflected out of the plane of the paper.	D. deflected downward.
B. deflected into the plane of the paper.	E. undeviated in its motion.
C. deflected upward.	

4. A positively charged particle is moving northward in a magnetic field. The magnetic force on the particle is toward the northeast. What is the direction of the magnetic field?

A. Up
B. West
C. South
D. Down
E. This situation cannot exist.

5. A beam of positive ions is initially moving in the $+x$ -direction with nonrelativistic velocity. The beam enters a velocity selector in which the electric field $\mathbf{E}$ is oriented along the $+y$ -direction and the magnetic field $\mathbf{B}$ is oriented along the $+z$ -direction, as shown above. Which of the following gives the critical speed V_c at which the ion beam is

not deflected as it moves through the velocity selector?



A. $V_c = EB$
B. $V_c = 1/EB$
C. $V_c = \frac{B^2}{E}$
D. $V_c = \frac{B}{E}$
E. $V_c = \frac{E}{B}$

6. A wire carries an electrical current straight up. What is the direction of the magnetic field due to the wire a distance of 2 m north of the wire?

A. North
B. East
C. West
D. South
E. Upward

7. The Biot--Savart law is similar to Coulomb's law in that both

A. are inverse square laws.
B. deal with forces on charged particles.
C. deal with excess charges.
D. include the permeability of free space.
E. are not electrical in nature.

8. Two wires lie as shown in Figure below in the plane of the paper and carry equal currents in opposite directions, as shown in the fig. At a point midway between the wires, the magnetic field is

A. zero.
B. into the page.
C. out of the page.
D. toward the top or bottom of the page.
E. toward one of the two wires.

