BTU1113 PHYSICS: REVISION 5

Magnetics

1. Draw magnetic lines and direction for a single bar and a single positive charge.
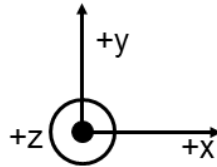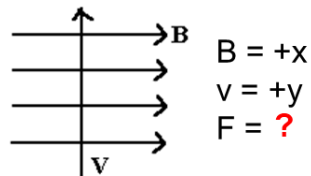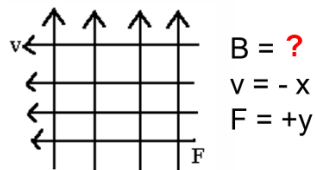

Figure 5

2. Based on the coordinate axis given in Figure 5, determine the direction of the unknown variables for an electron in the following figures. Given **B** is the magnetic field direction, **V** is the direction of the velocity and **F** is the direction of the force.

   i.

B = +x
v = +y
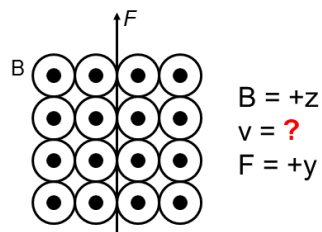F = ?

   ii.

B = ?
v = - x
F = +y

   iii.

B = +z
v = ?
F = +y

3. A long, straight wire carries a current of 5A is shown in **Figure 1**. At one instant, a proton, 4 mm from the wire travels at 1500 m/s parallel to the wire and in the same direction as the current. Given vacuum permeability constant, $\mu_o = 1.26x10^{-6}$
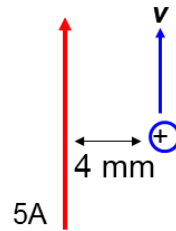

Figure 1

i.   Find the magnitude and of the magnetic force acting on the proton due to the field caused by the current carrying wire.

ii. Based on the coordinate axis given in **Figure 1**, determine the direction of the force acting on the proton.