**Practice for 20.2**

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| 1. a. 26.1 A of current flow north along a wire in a magnetic field of 0.0154 T that is 62.0o east of South. What force acts on the wire if it is 132 m long? (Magnitude and direction) (46.8 N vert down)  b. A 1.48 Amp current flows South in a wire that is 17.2 cm long. What is the magnetic field (Assume it is perpendicular) if the wire experiences a vertically upward force of 3.17 N? (Magnitude and direction) (12.5 T east)  c. A moving electron travels through a 2.43 T upward magnetic field, and experiences a force of 7.2 x 10-12 N to the east. What is the magnitude and direction of the particle’s velocity? (1.8x107 m/s south)  d. A mystery particle with a mass of 6.69 x 10-27 kg traveling 2.96 x 106 m/s in a 1.21 T magnetic field out of this page revolves clockwise with a radius 5.11 x 10-2 m. What is the **charge** of the particle, and is it **positive, or negative**? (3.20x10-19 C, positive)  e. What **electric field** in what **direction** would make the particle go straight down the page in the previous problem? (3.58x106 N/C right) |
| 2. a. 21.4 A of current flow west along a wire in a magnetic field of 0.0305 T that is 78.0o north of east. What force acts on the wire if it is 215 m long? (Magnitude and direction) (137 N vert down)  b. A current of 31.8 A flowing in a wire experiences a force to the North of 1.61 N in a region where there is a magnetic field of 0.597 T vertically upward. What is the length of the wire perpendicular to the magnetic field, and in what direction does the current flow? (0.0848 m, west)  c. A proton travels at 2.17 x 103 m/s vertically upward, and experiences a force of 8.1 x 10-16 N to the east. What is the magnitude and direction of the magnetic field exerting this force? (2.33 T south)  d. An electron is going 2.47 x 106 m/s in the plane of the page in a 0.128 T magnetic field out of this page. What is the **radius** of its path? Which **direction** does it circle, **ACW or CW**? (1.10x10-4 m, ACW)  e. What **electric field** in what **direction** would make the particle go straight to the right on the page(🡺) in the previous problem? (3.16x105 N/C up the page) |
| 3. a. 11.8 A of current flow east along a wire in a magnetic field of 0.0451 T that is 32.0o east of North. What force acts on the wire if it is 126 m long? (Magnitude and direction) (56.9 N vert up)  b. A vertical wire 35.7 cm long experiences a 0.821 N force to the East in a 0.0783 T Northerly magnetic field. What is the current flowing in the wire, and which way does it flow? (Assume it is perpendicular) (29.4 A vert down)  c. A moving electron travels through a 0.78 T westerly magnetic field, and experiences a force of 2.5 x 10-14 N vertically upward. What is the magnitude and direction of the particle’s velocity? (2.0x105 m/s south)  d. A proton traveling at 4.81 x 106 m/s in the plane of this page travels anti-clockwise in a circle with a radius of 2.87 mm (2.87 x 10-3 m). What is the **magnitude and direction** of the **magnetic** field that effects this? (17.5 T into the page)  e. What **electric field** in what **direction** would make the particle go straight to the left on the page (🡸) in the previous problem? (8.42x107 N/C up the page) |
| 4. a. 13.1 A of current flow south along a wire in a magnetic field of 0.0241 T that is 56.0o north of West. What force acts on the wire if it is 501 m long? (Magnitude and direction) (88.4 N vert down)  b. A 45.7 cm long wire experiences a force of 3.12 N to the North in a vertically upward 0.0382 T magnetic field. What is the current, and in what direction does it flow? (Assume it is perpendicular) (179 A West)  c. A proton travels at 5.2 x 103 m/s to the North through a vertically downward 0.45 T magnetic field. What is the magnitude and direction of the force acting on the particle? (3.7x10-16 N West)  d. An electron in a 0.00287 T magnetic field out of this page goes in a circle with a radius of 0.0781 m. What is the electron’s **velocity**, and which direction does it circle, **ACW or CW**? (3.94x107 m/s, ACW)  e. What **electric field** in what **direction** would make the particle go straight up the page in the previous problem? (1.13x105 N/C left) |
| 5. a. 15.2 A of current flow north along a wire in a magnetic field of 0.0127 T that is 23.0o south of East. What force acts on the wire if it is 157 m long? (Magnitude and direction) (vert down 27.9 N)  b. A 3.2 Amp current flows West in a wire that is 32.1 cm long. What is the magnetic field (Assume it is perpendicular) if the wire experiences a vertically downward force of 4.17 N? (Magnitude and direction) (4.1 T North)  c. An electron travels at 7.8x105 m/s to the South, and experiences a force of 4.3 x 10-14 N to the East. What is the magnitude and direction of the magnetic field exerting this force? (0.34 T vert up)  d. A proton in is going 3.71x105 m/s in the plane of the page. A magnetic field is making it travel in clockwise circles with a radius of 2.37 m. What is the **magnitude** and **direction** of the **magnetic field**? (0.00163T out of page)  e. What **electric field** in what **direction** would make the particle go straight down the page in the previous problem? (607 N/C right) |