**Electrostatics Electric Fields**

1. A space exploring physicist is exploring space. She is armed with only a pocket full of assorted test-charges and a Force-metre. From the data gathered at each of the locations shown below, determine the net electric field at each point. All charges are in mC. Give answers to 2 sig. figs.

Q F

+1 2N R

+4 8N R

-7 14N L

-3 6N L

D

Q F

+2 6N R

+5 15N R

-2 6N L

-3 9N L

A

B

Q F

+2 6N L

+5 15N L

-2 6N R

-3 9N R

Q F

+12 0.6N D

+5 0.25N D

-20 1N U

-10 0.50N U

E

Q F

+0.2 6N U

+0.5 15N U

-0.2 6N D

-0.3 9N D

C

2. A large conducting sphere (r=24cm) ha a net charge of -6.75 μC. Determine the magnitude and direction of the electric field at the following locations.

B

15.0cm

40.0cm

A

30.0cm

D

5.0cm

C

3.

10.0nC

A

8.00mm

- 5.0nC

B

19.0mm

Find the electric field at point A and point B.

4. An electron is placed in a uniform electric field. The electron is released from rest, and in 1.0s it is travelling at 4.0x106m/s north. Find the electric field.

5. A charged sphere is suspended from the ceiling by a string. The sphere has a mass of 25.0g. In the region there exists a uniform leftward electric field of 780N/C. The sphere hangs in equilibrium as shown.

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What is the charge on the sphere?

6. How much time would it take a helium nucleus (2 protons and 2 neutrons) to accelerate from 1.4x104m/s to 3.5x106m/s in a uniform 1500N/C electric field?

7. What is the electric field at the centre of a conducting sphere that carries 6.4x1014 excess electrons?

8. From the diagrams below, describe the final charge on sphere A and B.

Negative rod

A B A B A B

9. Sketch the field for the region below:

- -6.0µC

+ 4.0µC

+ 2.0µC