**Name of the Student**:_____
**Max. Marks : 22 Marks** **Time : 22 Minutes**

Mark Schemes

## Q1.

(a) (i) friction between the beads and pipe

*accept beads rub against the pipe*

**1**

(cause) <u>electrons</u> to transfer

*accept electrons are lost/gained*

*do **not** accept negatively charged atoms for electrons*

*3rd mark point only scores if 2nd mark scores*

**1**

from the pipe

*do **not** accept from the (negatively) charged pipe*

**or**

to the beads

*do **not** accept to the (positively) charged beads*

*accept negative charge transfer to the beads for **1** mark provided 2nd or 3rd marking point not awarded*

*mention of positive charge transfer negates last 2 marking points*

**1**

(ii) <u>volume</u> of beads

*accept (75)cm3*

**or**

<u>length</u> of pipe

*accept use the same pipe*

**or**

speed the beads are poured

*poured the same way is insufficient*

**or**

angle of pipe

**1**

(b) (i) the larger the beads the less charge

*do **not** accept inversely proportional*

*negative correlation is insufficient*

**1**

(ii) (total) charge decrease

*results would be lower/smaller would be insufficient*

**1**

Downloaded from www.merit-minds.com

beads in contact with pipe (walls) for less time

*accept less contact (between beads and pipe)*

*accept beads in pipe for less time*

**or**

smaller surface area (to rub against)

*accept less pipe to rub against*

*less friction is insufficient*

**1**

(c) (i) (pumping very) fine powders

*reason only scores if (very) fine powders given*

greater charge (build up)

*accept more static (electricity)*

*accept an answer that correctly relates back to the experimental data*

**or**

higher pd/voltage

**or**

greater energy

*accept larger surface area to volume (ratio)*

**1**

(ii) idea of earthing (the pipe)

*accept use metal pipes*

*do **not** accept use larger particles*

**1**

(d) to compare (the relative risks)

*fair test is insufficient*

*you can only have one*

*independent variable is insufficient*

**or**

different conditions change the MIE value

*accept different conditions change the results*

*do **not** accept avoid bias*

**1**

**[10]**

## Q2.

(a) electrons transfer / removed

*do **not** accept negatively charged atoms for electrons*

*this only scores if first mark given*

**1**

to the rod / from the cloth

*this does not score if there is reference to any original charge on cloth or rod*

*'it' refers to the rod*

*accept negative charge transfer to rod / removed from cloth for **1** mark*

*transfer of positive charge / positive electrons scores zero*

**1**

(b) (i) rods / charges repel

**1**

Downloaded from www.merit-minds.com

creating downward / extra force (on the balance)

*accept pushing (bottom) rod downwards*

*do not accept increasing the weight / mass*

*charges attracting scores zero*

**1**

(ii) the (repulsion) force increases as the distance between the charges decreases

*accept there is a negative correlation between (repulsion) force and distance between charges*

***or***

*(repulsion) force and distance between charges are inversely proportional*

*for both marks*

*examples of **1** mark answers*

*force increases as distance decreases*

*force and distance are inversely proportional*

*negative correlation between force and distance*

*repels more as distance decreases*

*if given in terms of attracting or attraction force this mark does not score*

**2**

**[6]**

## Q3.

(a) (i) also double

*increases is insufficient*

**1**

(ii) variable resistor

*accept rheostat / potentiometer*

**1**

(b) (i) the data / results / variables are continuous

*accept data / results / variables are not categoric / discrete*

**1**

(ii) misreading the ammeter

*do **not** accept misreading the meter / results*

*do **not** accept misreading the ammeter and / or voltmeter*

*reading / human error is insufficient*

**1**

(iii) straight line from the origin drawn passing close / through points at 1 V, 5 V, 6 V and ignoring anomalous point

*do **not** accept line drawn 'dot-to-dot'*

**1**

(iv) yes

*mark is for the reason*

supports prediction

**or**

(straight) line passes through the origin

*accept a mathematical argument, eg when p.d. went from 2 to 4 the*

Downloaded from www.merit-minds.com

*current went from 0.3 to 0.6*
*it's directly proportional is insufficient*

1

**[6]**

Downloaded from www.merit-minds.com