

**Static Electricity GCSE AQA Higher Physics Past Papers**

**Answers**

01.

| Question     | Answers   | Extra information   | Mark        | AO / Spec. Ref.   |
|--------------|---|---|-------------|-------------------|
| 1            | negatively charged<br>electrons are transferred<br>from the (neutral) object  |   | 1<br>1<br>1 | AO1/1<br>4.2.5.1  |
| 2            | minimum of four lines drawn<br>perpendicular to surface of<br>sphere<br><br>minimum of one arrow shown<br>pointing away from sphere | judge by eye<br><br>do <b>not</b> accept any arrow pointing<br>inwards. | 1<br><br>1  | AO1/1<br>4.2.5.2  |
| 3            | Q   |   | 1           | AO3/1a<br>4.2.5.2 |
| <b>Total</b> |   |   | <b>6</b>    |                   |

| 02. Question | Answers  | Extra information   | Mark                | AO/<br>Spec. Ref                     |
|--------------|--|---|---------------------|--------------------------------------|
| 1            | transfer of <u>electrons</u><br><br>from the carpet to the student   | mention of positive charge<br>moving negates both marks                                   | 1<br><br>1          | AO1<br>4.2.5.1                       |
| 2            | three arrows perpendicular to<br>sphere's surface with all arrows<br>directed inwards and distributed<br>evenly around sphere  |   | 1                   | AO1<br>4.2.5.2                       |
| 3            | there is a potential difference<br>between the student and the tap<br><br>which causes electrons /<br>charges to transfer from the<br>student<br>or<br>which causes electrons /<br>charges to transfer to the tap<br><br>which earths the charge | do <b>not</b> accept the tap / sink is<br>charged<br><br><br><br>allow the tap is earthed | 1<br><br>1<br><br>1 | AO1<br>4.2.1.2<br>4.2.1.3<br>4.2.5.1 |
| 4            | carpet / copper has a low<br>resistance<br><br>lower / no build-up of charge (on<br>the student)<br>or<br>(so there is a) smaller / no<br>potential difference between<br>student and tap / earth  | allow carpet is a conductor<br>or<br>copper is a conductor                                | 1<br><br>1          | AO3<br>4.2.5.1<br>4.2.1.3            |
| <b>Total</b> |  |   | <b>8</b>            |                                      |

03.

| Question     | Answers  | Extra information  | Mark       | AO / Spec. Ref.           |
|--------------|--|--|------------|---------------------------|
| 1            | non-contact (force)  | allow electrostatic (force)  | 1          | 4.2.5.2<br>AO1            |
|              | attraction (between hair and balloon)  | allow repulsion between the hairs on the head  | 1          |                           |
| 2            | 0.0050 = Q × 2500  | an answer of $2.0 \times 10^{-6}$ (C) scores 3 marks<br>an answer of $2 \times 10^{-3}$ (C) scores 2 marks |            | 4.2.4.2<br>AO2            |
|              | $Q = \frac{0.0050}{2500}$  | this mark may be awarded if pd is incorrectly or not converted   | 1          |                           |
|              | Q = $2.0 \times 10^{-6}$ (C)<br>or<br>Q = 0.0000020 (C)                        | this mark may be awarded if pd is incorrectly or not converted<br><br>these answers only                   | 1<br><br>1 |                           |
| 3            | 0.16 = I × $4.0 \times 10^{-3}$<br>or<br>$I = \frac{0.16}{4.0 \times 10^{-3}}$ | an answer of 120 (Ω) scores 5 marks<br><br>this mark may be awarded if time is incorrectly / not converted |            | 4.2.1.2<br>4.2.1.3<br>AO2 |
|              | I = 40 (A)   | this value only  | 1          |                           |
|              | 4800 = 40 × R  | allow 4800 = their calculated I × R  | 1          |                           |
|              | $R = \frac{4800}{40}$  | allow R = 4800 / their calculated I  | 1          |                           |
|              | R = 120 (Ω)  | allow an answer consistent with their calculated I   | 1          |                           |
| <b>Total</b> |  |  | <b>10</b>  |                           |

04.

| Question     | Answers  | Extra information   | Mark                | AO /<br>Spec. Ref.      |
|--------------|--|---|---------------------|-------------------------|
| 1            | (very high p.d. means) very low currents<br><br>which means less (thermal) energy is transferred to surroundings<br><br>which increases the efficiency of power transmission | allow less power loss in cables   | 1<br><br>1<br><br>1 | AO1<br>4.2.4.3          |
| 2            | electric field strength is very high<br><br>causing the air to become ionised<br><br>(the kite / string) conducts charge to the person / earth                               | allow the air breaks down<br>allow the air becomes a conductor<br>allow the air conducts charge<br><br>ignore answers referring to the kite touching the power cables | 1<br><br>1<br><br>1 | AO1<br>4.2.5.2          |
| 3            | straight line passing through the origin<br><br>line drawn below existing line for all values  |   | 1<br><br>1          | AO3<br>4.2.5.2          |
| 4            | the potential difference across the wires/cable is the same<br><br>(but) the resistance of the steel wire is greater (and so less current in the steel)                      |   | 1<br><br>1          | AO1<br>4.2.2<br>4.2.1.4 |
| <b>Total</b> |  |   | <b>10</b>           |                         |

05.

| Question | Answers   | Extra information   | Mark | AO / Spec. Ref. |
|----------|---|---|------|-----------------|
| 05.1     | electrons transferred from the cloth (to the rod)                       | any mention of transfer of positive charge scores 0<br>any mention of positive electrons scores 0 | 1    | AO1<br>4.2.5.1  |
|          | electrons are negatively charged  | this mark only scores if linked to the first marking point  | 1    |                 |
|          | (so) there are more positive charges than negative charges on the cloth | ignore more protons than electrons unqualified  | 1    |                 |

| Question | Answers   | Extra information                               | Mark | AO / Spec. Ref. |
|----------|---|---|------|-----------------|
| 05.2     | there is an additional (downwards) force on the balance (increasing the mass reading)         | allow both rods have the same (negative) charge | 1    | AO3             |
|          | (because) the (held) rod is negatively charged  |   | 1    | AO3<br>AO1      |
|          | (and rods with) like charges repel<br>or<br>(and rods with) negative charges repel each other |   | 1    | 4.2.5.1         |

| Question | Answers   | Extra information                           | Mark | AO / Spec. Ref. |
|----------|---|---|------|-----------------|
| 05.3     | only the change in reading / mass is being observed | allow difference / increase for 'change in' | 1    | AO3<br>4.2.5.1  |

| Question | Answers   | Extra information  | Mark | AO / Spec. Ref. |
|----------|---|--|------|-----------------|
| 4        | the (large) potential difference between the two objects        | allow (strong) electric field causes breakdown of air<br><br>do not accept earthed conductor is positively charged | 1    | AO1<br>4.2.5.2  |
|          | (causes negative) electrons / charges to move (through the air) | allow there is a current in the air (between the two objects)  | 1    |                 |
|          | (from the rod) to the conductor                                 |  | 1    |                 |

|   |  |    |
|---|--|----|
| Total Question <input type="checkbox"/> |  | 10 |
|---|--|----|