AQA – Electric fields – 2022 A2 Physics P2

1. June /2022/Paper_ 7408/2/No.3(3.1 _ 3.2)

| 0 | 3 |

An isolated solid conducting sphere is initially uncharged.
Electrons are then transferred to the sphere.

| 0 | 3 |.| 1 |

State and explain the location of the excess electrons.
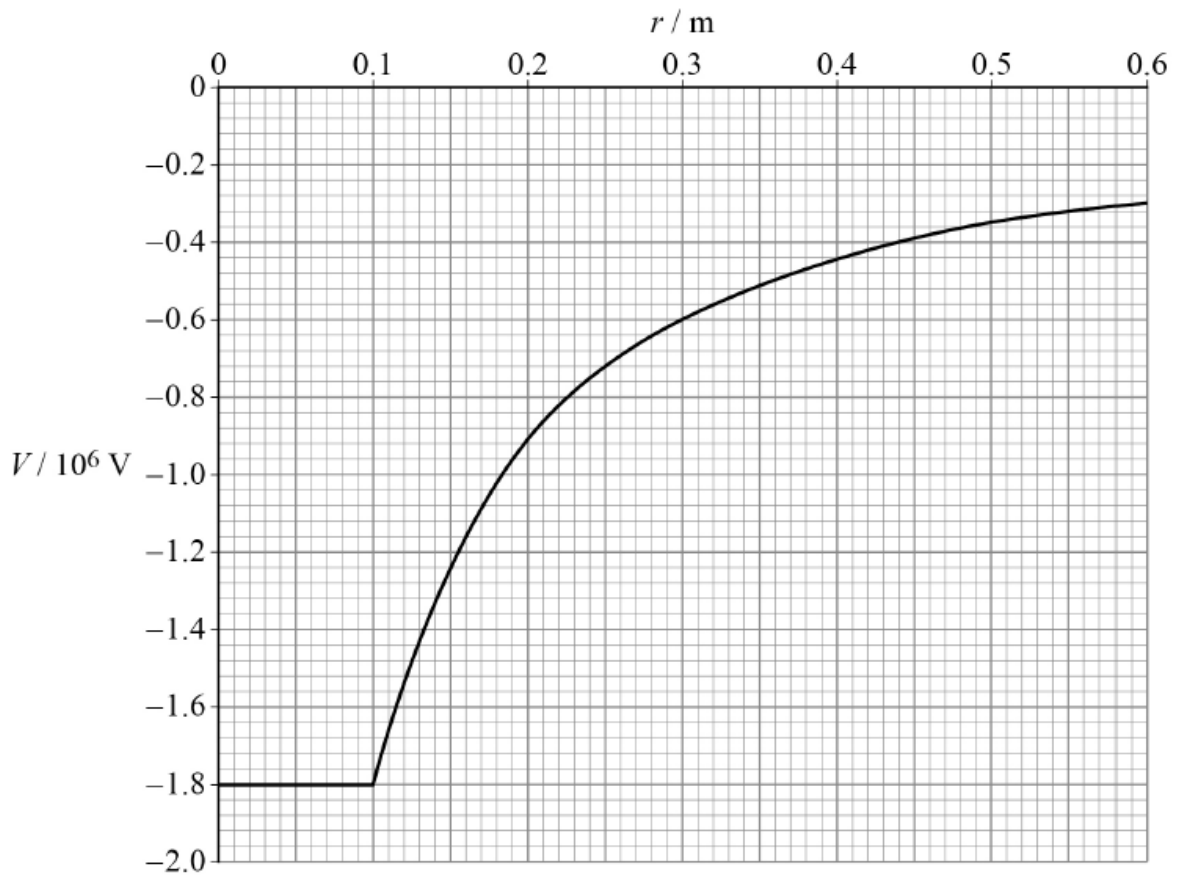
[2 marks]

_____

_____

_____

_____

Figure 3 shows how the electric potential V varies with distance r from the centre of the sphere.
The radius of the sphere is 0.10 m.

Figure 3

| 0 | 3 |.| 2 | The magnitude of the electric field strength E is related to V by $E = \dfrac{\Delta V}{\Delta r}$.

Determine, using this relationship, the magnitude of the electric field strength at a distance 0.30 m from the centre of the sphere.

State an appropriate SI unit for your answer.

[4 marks]

electric field strength = _____ unit _____

2. June /2022/Paper_ 7408/2/No.15

A particle of mass m and charge Q is accelerated from rest through a potential difference V. The final velocity of the particle is u.

A second particle of mass $\dfrac{m}{2}$ and charge $2Q$ is accelerated from rest through a potential difference $2V$.

What is the final velocity of the second particle?

[1 mark]
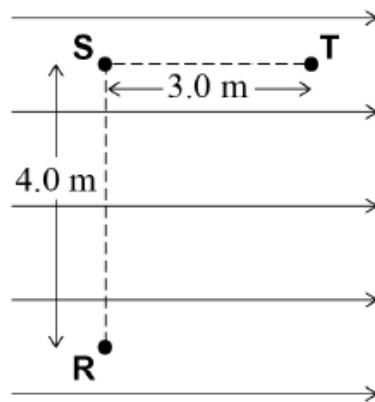
A $\sqrt{2}u$ ⬭

B $2\sqrt{2}u$ ⬭

C $4u$ ⬭

D $8u$ ⬭

3. June /2022/Paper_ 7408/2/No.16

The diagram shows a uniform electric field of strength 15 V m^{-1}.
The length **RS** is perpendicular to the field and the line **ST** is parallel to the field.

What is the total change in electrical potential energy for a charge of 3.0 μC moving from **R** to **T**?

[1 mark]

A 135 μJ ○

B 180 μJ ○

C 225 μJ ○

D 315 μJ ○