

Electric fields – A2 Physics P2

1. No.3(3.1 _ 3.2)

0 3

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

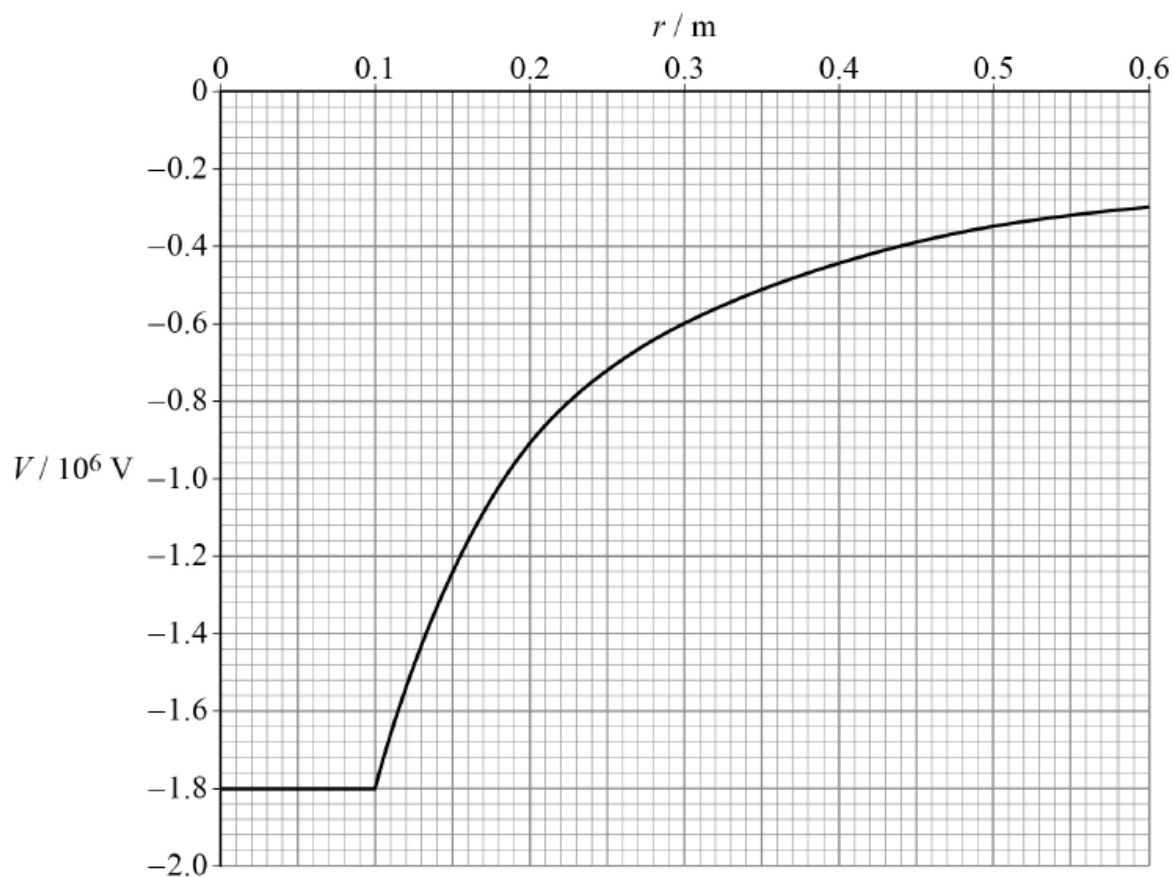
0 3 . 1

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 $E = \frac{\Delta V}{\Delta r}$.

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. 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 $\frac{m}{2}$ 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 $4u$

☐

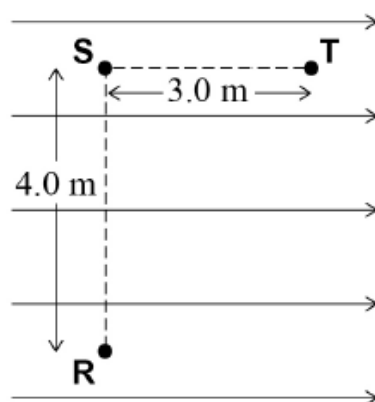
D $8u$

☐

3. 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 $3.0 \mu\text{C}$ moving from **R** to **T**?

[1 mark]

A $135 \mu\text{J}$

☐

B $180 \mu\text{J}$

☐

C $225 \mu\text{J}$

☐

D $315 \mu\text{J}$

☐