

5 (a) Define electric potential at a point.

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.....

..... [2]

(b) An isolated solid metal sphere of radius r is given a positive charge.

The potential at the surface of the sphere is $9.0 \times 10^4 \text{ V}$. At a distance of $3r$ from the centre of the sphere, the electric field strength is $2.0 \times 10^5 \text{ NC}^{-1}$.

(i) Determine the electric field strength at the surface of the sphere.

electric field strength = NC^{-1} [2]

(ii) Show that the radius of the sphere is 5.0 cm.

[2]

(iii) Calculate the charge on the sphere.

charge = C [2]

(iv) Use your answer in (b)(iii) to determine the capacitance of the sphere.

capacitance = F [2]

[Total: 10]