6 Fig. 6.1 shows how the electric potential *V* between two small spherical charged insulators C and D varies along the distance *d* joining their centres. The electric potential is a maximum at point P. The distance from point P to the centre of C and centre of D is *x* and *y* respectively. The distance between the two insulators is very large compared to the radii of the insulators.

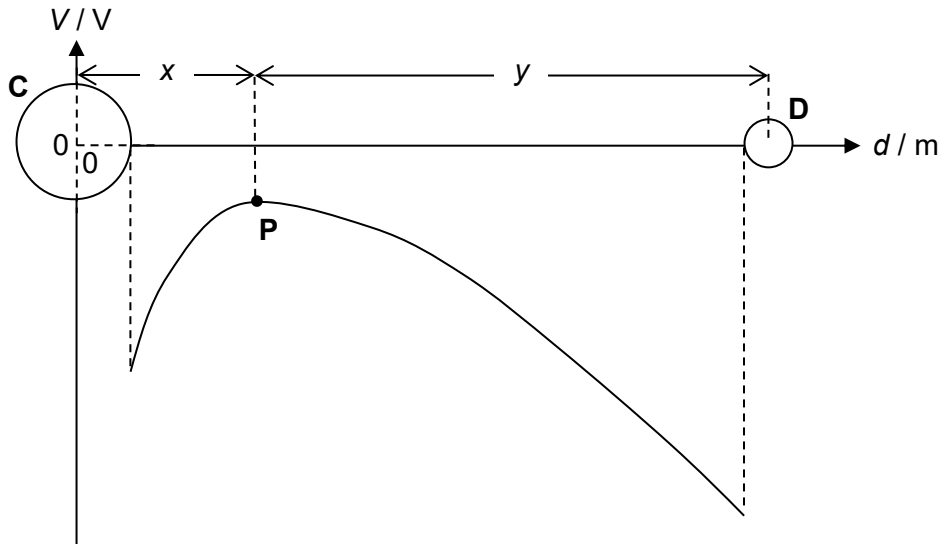

Fig. 6.1

(a) Using Fig. 6.1, sketch the variation with distance *d* of potential *V* for charged insulator D only.

[1]

(b) Using Fig. 6.1, state and explain the signs of the charge of insulators C and D.

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..... [2]

(c) Explain why the graph has a maximum at point P.

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.....

..... [2]

(d) By considering the electric field strength at P, determine the ratio

$$\frac{\text{magnitude of charge of C}}{\text{magnitude of charge of D}}$$

in terms of x and y.

[3]