

- 2 (a) Define *electric potential* at a point.

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.....

.....

..... [2]

- (b) A thin hollow conducting sphere A of radius 0.050 m has an electric potential V of 400 V and an electric field strength E of 8000 N C^{-1} at its surface as shown in Fig. 2.1.

distance from centre of A / m	V / V	$E / \text{N C}^{-1}$
0.050	400	8000
0.200		

Fig. 2.1

Complete Fig. 2.1 for the electric potential V and electric field strength E at 0.200 m from the centre of sphere A.

[2]

- (c) Sphere A is placed inside a second thin hollow conducting sphere B of radius 0.200 m carrying a charge of the same magnitude but opposite sign as the charge on A. The spheres have a common centre as shown in Fig. 2.2(a) and Fig. 2.3(a).

Without further calculations, use values in (b) to sketch graphs of the variation with distance r from the common centre for (c)(i) and (c)(ii) below.

Take the positive direction of electric field strength E to be in the positive horizontal axis.

- (i) When only sphere A is present.

1. electric potential on Fig. 2.2(b). Label V_A . [2]

2. electric field strength on Fig. 2.2(c). Label E_A . [2]

- (ii) When both spheres A and B are present.

1. electric potential on Fig. 2.3(b). Label V_R . [1]

2. electric field strength on Fig. 2.3(c). Label E_R . [1]

[Total: 10]

[Turn over]

Fig. 2.2(a)

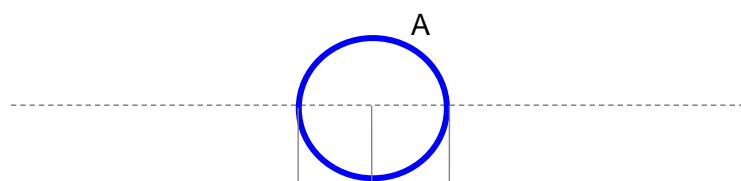


Fig. 2.2(b)

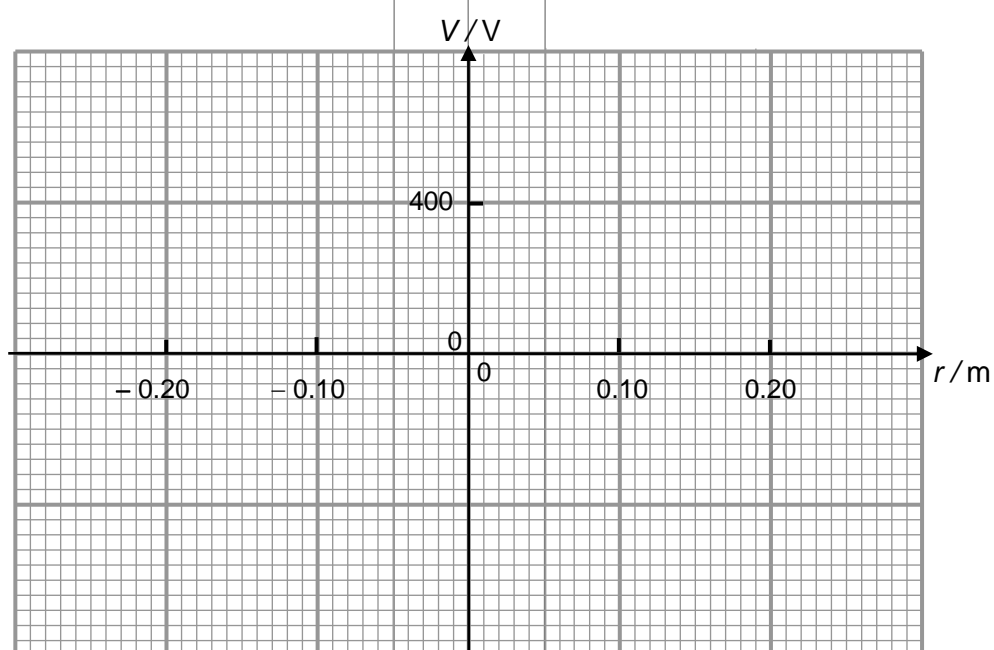


Fig. 2.2(c)

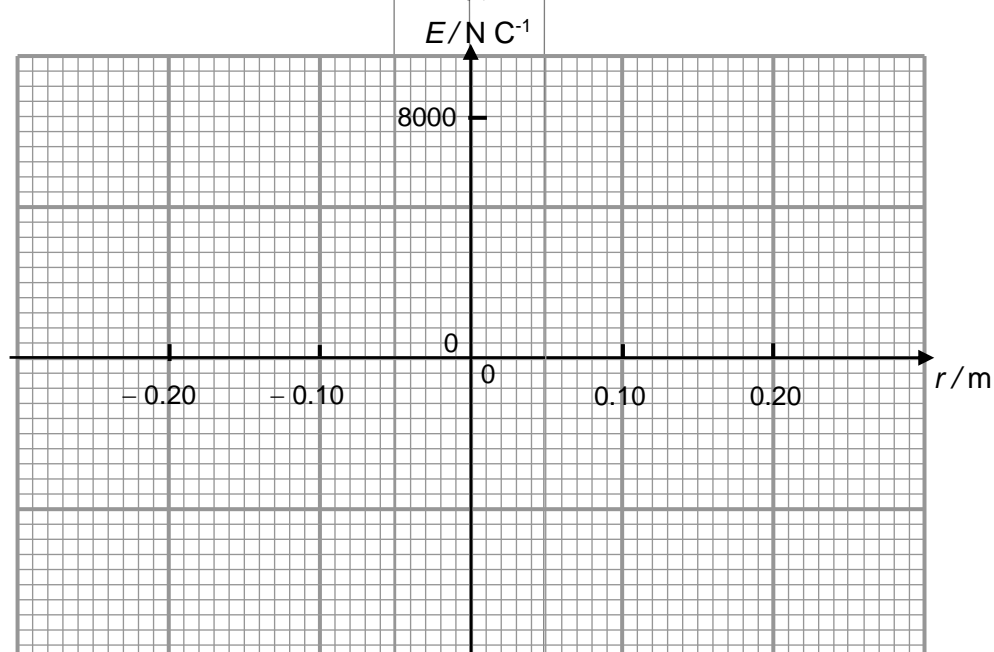


Fig. 2.3(a)

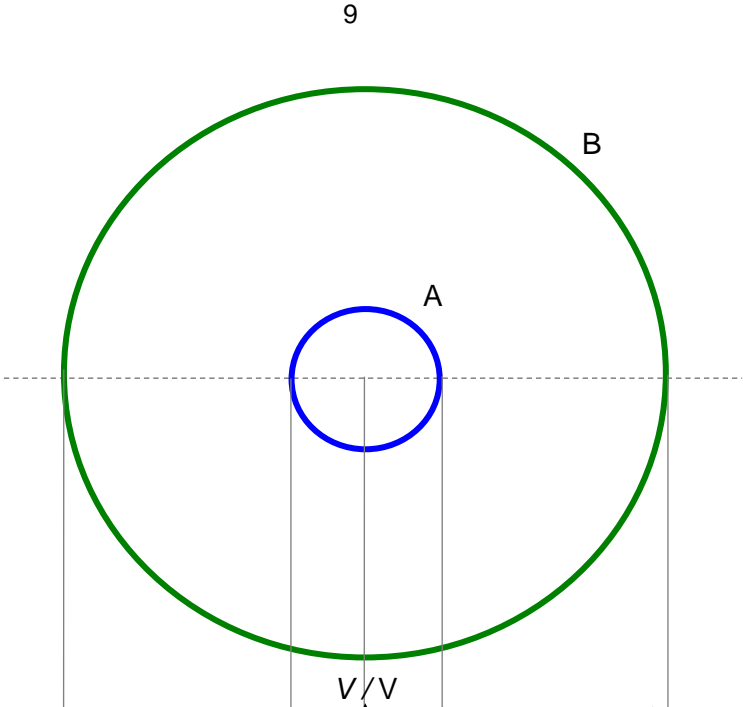


Fig. 2.3(b)

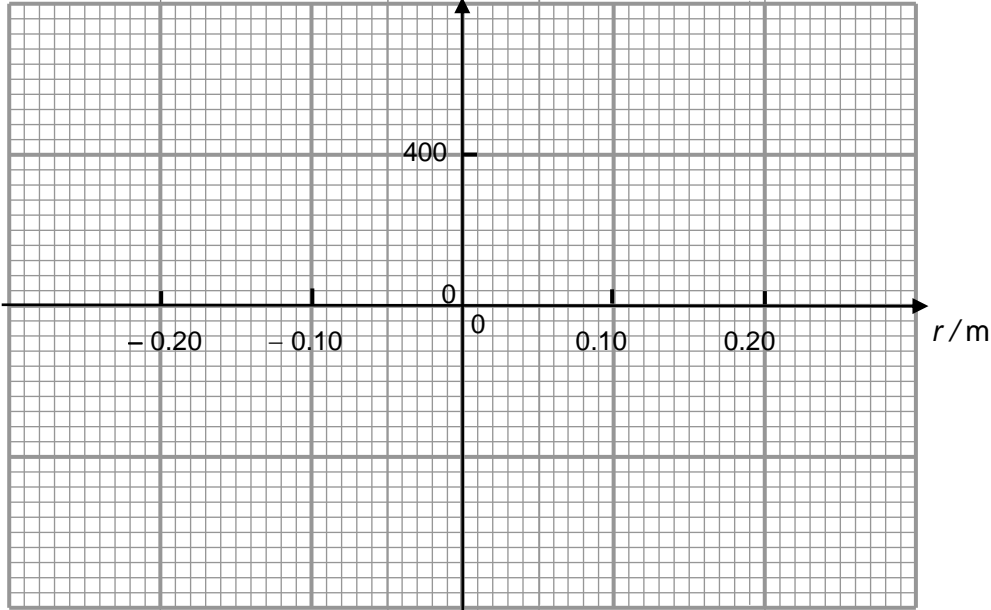


Fig. 2.3(c)

