5 **(a)** State what is meant by *electric field strength*.

.....

.....

..... [2]

(b) Two point charges A and B are situated a distance 15 cm apart in a vacuum, as illustrated in Fig. 5.1.

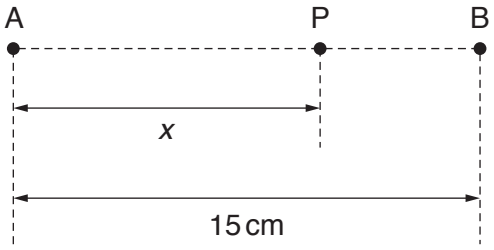

Fig. 5.1

Point P lies on the line joining the charges and is a distance x from charge A.

The variation with distance x of the electric field strength E at point P is shown in Fig. 5.2.

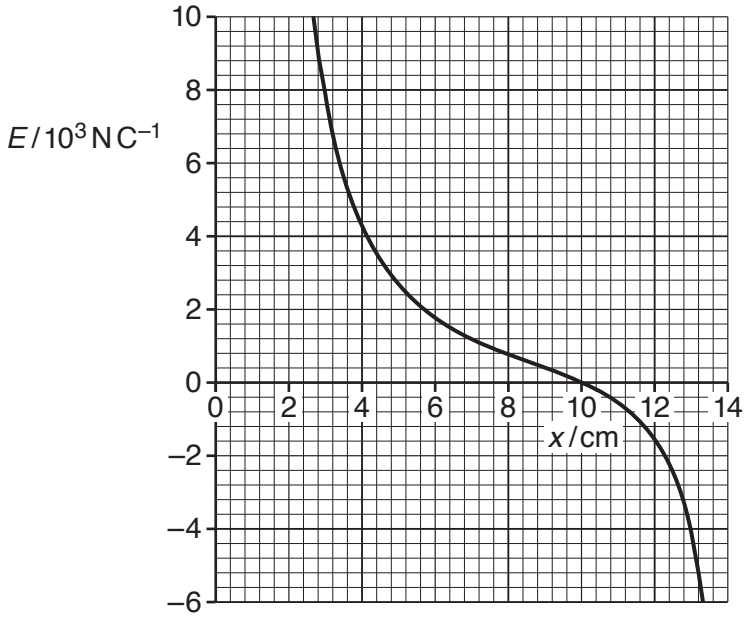

Fig. 5.2

(i) By reference to the direction of the electric field, state and explain whether the charges A and B have the same, or opposite, signs.

.....

.....

..... [2]

(ii) State why, although charge A is a point charge, the electric field strength between $x = 3\,\text{cm}$ and $x = 7\,\text{cm}$ does not obey an inverse-square law.

.....

..... [1]

(iii) Use Fig. 5.2 to determine the ratio

$$\frac{\text{magnitude of charge A}}{\text{magnitude of charge B}}.$$

ratio = ... [3]

[Total: 8]