

11. Figure Q11 shows an electric field which is represented by electric field lines. X , Y and Z are points on one of the field lines. It would be correct to say that

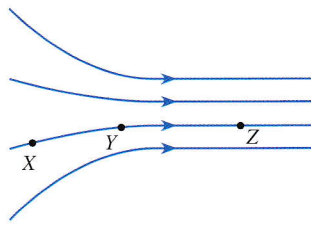


Fig. Q11

- the electric field is due to a point charge.
- a negative charge placed at Z would accelerate in a direction tangential to the field line at Z .
- the force exerted on a charge placed at Y is greater than that on the same charge placed at X .

- A. (1) only B. (3) only
C. (2) and (3) only D. (1), (2) and (3)

Structured Questions

12. Figure Q12 shows several field lines in an electric field. A and B are two points in the field while \vec{F} is the electric force on a negative point charge at A .

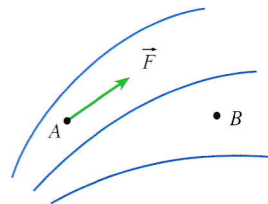


Fig. Q12

- Draw arrows on the field lines to show the directions of the electric field strengths. (1 mark)
- Compare the magnitudes of the electric field strength at A and B . Explain briefly. (2 marks)
- If two identical point charges are placed at A and B respectively, compare the electric forces on them. Explain briefly. (2 marks)

13. Two tiny spheres, A and B , carry charges of $+2.0$ nC and -2.0 nC respectively. The spheres are hung vertically from a ceiling side by side with a separation of 4 cm when a horizontal uniform electric field is applied to the system simultaneously (Fig. Q13).

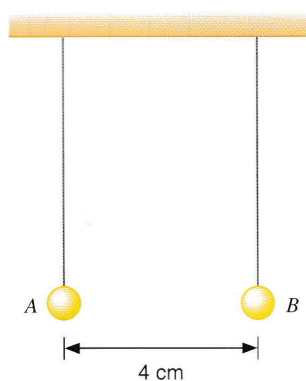


Fig. Q13

- Find the direction and magnitude of the applied electric field. (3 marks)

- Can we apply a uniform electric field in a direction other than the horizontal direction such that spheres A and B can still be hung vertically from the ceiling side by side? Briefly explain your answer. (2 marks)
- If A and B carry same charges, can we apply a uniform electric field such that A and B can still be hung vertically from the ceiling side by side? Briefly explain your answer. (2 marks)

14. Charges -1 nC and $+2$ nC are fixed on a straight line with a separation of 2 m as shown.

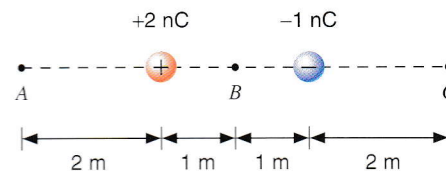


Fig. Q14

- Find the electric field strengths at points A , B and C respectively. (7 marks)
- Sketch the electric field lines for the distribution of charges. (3 marks)

15. Three point charges are fixed at three of the corners of a rectangle as shown.

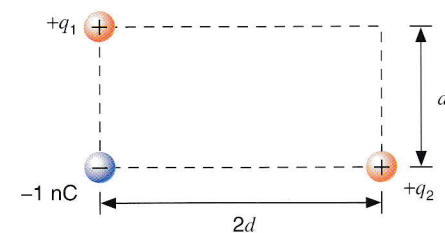


Fig. Q15

- If the electric field strength at the remaining corner is zero, find the magnitudes of the charge of q_1 and q_2 . (5 marks)

16. The following schematic diagram (Fig. Q16) shows the internal structure of a continuous inkjet printer.

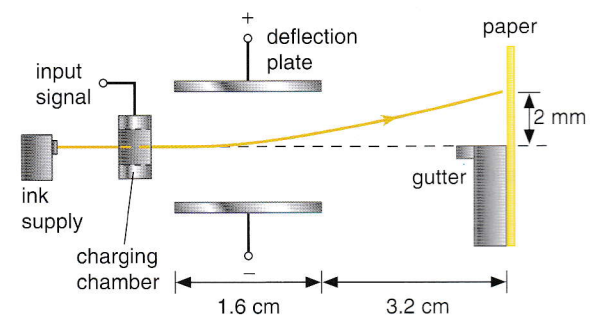


Fig. Q16