

## Checkpoint

- State whether the following statements about electric field are correct or not.
  - Whenever a charge is placed in an electric field, only electric force acts on it.
  - In a distribution of three point charges, the electric fields set up by the charges do not exert electric forces on one another.
- State whether the following statements about electric field strength are correct or not.
  - Electric field strength is a vector quantity.
  - Electric field strength is defined as the electric force per unit positive charge at a point.
  - According to the equation  $E = F_E / q$ , electric field strength at a point is inversely proportional to the magnitude of a point charge placed at that point.

- The direction of the electric field strength at a point **must** be the same as that of the electric force on a point charge placed at that point.

3. 

the Earth's surface

Fig. Q3

A uniform electric field is applied to a region near the Earth's surface. A point charge of mass 1.50 g and charge  $+24.0 \mu\text{C}$  is placed at point  $P$  inside that region and 'floats' on  $P$  in midair as shown. Find the magnitude and direction of the electric field strength at  $P$ . Take  $g = 9.81 \text{ m s}^{-2}$ .

Eg. 22.1 p.51

## Exercise

- $P$  is a point in an electric field. Which of the following statements is correct?
  - If there is no charge at  $P$ , the electric field strength at  $P$  is zero.
  - The stronger the electric field at  $P$ , the greater the electric force on a point charge placed at  $P$  is.
  - The direction of the electric field strength at  $P$  is the same as that of the force on a point charge placed at  $P$ .
  - If the magnitude of a point charge placed at  $P$  is halved, the electric field strength at  $P$  is also halved.
- A point charge is placed at point  $P$  in an electric field and experiences an electric force. When the point charge is replaced by another point charge, the new charge experiences an electric force that differs in both magnitude and direction from that experienced by the previous one. How can the electric forces caused by the same electric field be different? Briefly explain this phenomenon.

- When a **positively charged rod** is brought near an insulated **neutral solid conductor**, charges are induced **on the neutral conductor** as shown.

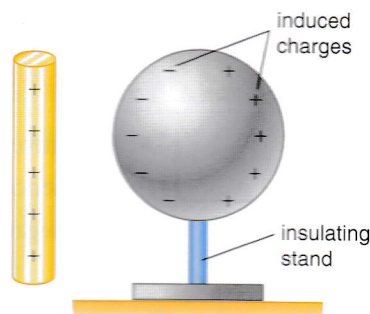


Fig. Q3

- Briefly explain this phenomenon with the **concept of electric field**.
  - What can you say about the electric field **inside the conductor** when the charge **distribution in the conductor** is steady? Briefly **explain your answer**.
- A **small charge** experiences an electric force of magnitude  $3.10 \times 10^{-5} \text{ N}$  when placed at a point of electric field strength  $7.30 \times 10^5 \text{ N C}^{-1}$ . Calculate the magnitude of the charge.