● **Example 13.2** *Four particles each of mass 'm' are placed at the four vertices of a square of side 'a'. Find net force on any one of the particle.*

Solution. We are finding net force on the particle at D.

$$F_{DC} = F_{DA} = \frac{G(m)(m)}{a^2} = \frac{Gm^2}{a^2} = F \text{ (say)}$$

$$F_{DB} = \frac{G(m)(m)}{(\sqrt{2}a)^2} = \frac{1}{2}\frac{Gm^2}{a^2} = \frac{F}{2}$$

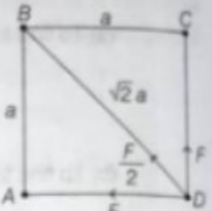

Fig. 13.7

Now, resultant of F_{DA} and F_{DC} is $\sqrt{2}F$ in the direction of DB.

$$\therefore \quad F_{net} = \sqrt{2}F + \frac{F}{2} = \left(\sqrt{2} + \frac{1}{2}\right)F$$

$$= \left(\sqrt{2} + \frac{1}{2}\right)\frac{Gm^2}{a^2} \quad \text{(towards } DB\text{)}$$

Ans.