Sri Pratyangira Institute

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Class - 12th

Electric Charges and Fields

DPP – 03

Topics:

- **Principle of Superposition of Electrostatic Forces.**

1. State the superposition principle for electrostatic force on a charge due to a number of charges.
2. Three equal charges, each having a magnitude of 2.0×10^{-6} C, are placed at the three corners of a right angle triangle of sides $3\ cm, 4\ cm$ and $5\ cm$. Find the force on the charge at the right-angle corner.
3. Three equal charges, 2.0×10^{-6} C each, are held fixed at the three corners of an equilateral triangle of side $5\ cm$. Find the Coulomb force experienced by one of the charges due to the rest two.
4. Charges of $+5$ μC, $+10$ μC and -10 μC are placed in air at the corners A, B and C of an equilateral triangle ABC, having each side equal to $5\ cm$. Determine the resultant force on the charge at A.
5. Three point charges of $+2$ μC, -3 μC and -3μC are kept at the vertices A, B and C respectively of an equilateral triangle of side $20\ cm$ as shown in figure. What should be the sign and magnitude of the charge to be placed at the midpoint (M) of side BC so that the charge at A remains in equilibrium.
6. Four equal point charges each 16 μC are placed on the four corners of a square of side $0.2\ m$. Calculate the force on any one of the charges.
7. Four charges $+q, +q, -q$ and $-q$ are placed respectively at the four corners A, B, C and D of a square of side a. Calculate the force on a charge Q placed at the centre of the square.
8. Consider three charges q_1, q_2 and q_3 each equal to q at the vertices of an equilateral triangle of side l. What is the force on a charge Q (with the same sign as q) placed at the centroid of the triangle?
9. Three point charges $+q$ each are kept at the vertices of an equilateral triangle of side $'l'$. Determine the magnitude and sig of the charge to be kept at its centroid so that the charges at the vertices remain in equilibrium.