St. Mary's School, Dwarka
Holiday Homework
Class XII
Subject: Physics
Week 3
Worksheet 3

No. of questions: 10   **M.M: 25**

Objective:

- Revision of concepts
- Skills to carry out research and develop scientific aptitude
- Encouraging learning through experiences

Instructions:

- Neatly write all the answers in your Physics note book.
- Attempt the questions keeping in mind the weightage of each question.
- Assignment 'Summer Holiday Homework' will be created on TEAMS. PDF of handwritten work should be uploaded on it.
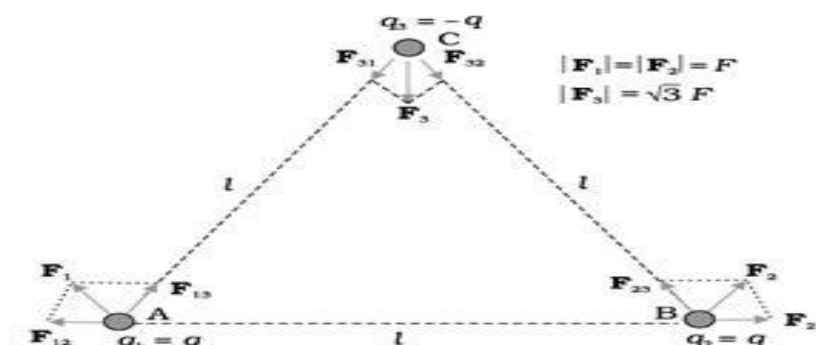
Q1. A polythene piece rubbed with wool is found to have a negative charge of 3×10^{-7} c.(i) Estimate the number of electrons transferred .(ii) Is there a transfer of mass from wool to polythene?   2

Q2. A charge q is placed at centre of the line joining two equal charges Q. Show that the system of three charges will be in equilibrium if $q - Q/4$.   2

Q3. How many electrons should be removed from a coin of mass 1.6g, so that it may just float in an electric field of intensity 10^9 NC^{-1}, directed upward?   2

Q4. (i) State if the force acting between two electric point charges q_1 and q_2 kept at some distance   apart in air is attractive or repulsive when (i) $q_1 q_2 > 0$ (ii) $q_1 q_2 < 0$?(ii) The distance between two equal point charges is tripled and their individual charges are doubled, what would happen to the force between them?   2

Q5. consider the charges q, q and $-q$ placed at the vertices of an equilateral triangle, as shown in figure. What is the force on each charge?   2

Q6. Two point charges q_1 = +0.2C and q_2 = +0.4C are placed 0.1m apart. Calculate the electric field at (a) the midpoint between the charges. (b) A point on the line joining q_1 and q_2 such that it is 0.05 m away from q_2 and 0.15m away from q_1. 3

Q7. Two point chares q_A = 3 μC and q_B = - 3 μC are located 20 cm apart in vacuum. (i)What is the electric field at the midnight O of the line AB joining the two charges?(ii) If a negative test charge of magnitude 1.5 $\times 10^{-9}$ C is placed at this point , what is the force experienced by the test charge ? 3

Q8. Two charges 5 x 10^{-8} C and -3 x 10^{-8} C are located 16 cm apart. At what points on the line joining the two charges is the electric potential zero? Take the potential at infinity to be zero. 3

Q9.(i) Force between two point charges kept at a distance d apart in air is F. If these charges are kept at the same distance in water, how will the electric force between them change? (ii) Plot F vs (1/r) where F is Coulomb's force between two point charges kept r distance apart. 3

Q10.(i)What is the force between two small charged spheres having charges of 2 x 10^{-7} C and 3 x 10^{-7} C placed 30 cm apart in air?(ii) The electrostatic force on a small sphere of charge 0.4 μC due to another small sphere of charge -0.8 μC in air is 0.2 N. 3