KENDRIYA VIDYALAYA VSN NAGPUR HOME WORK FOR STUDENTS

SUMMER VACATION

2018-19

Truth does not change according to our ability to stomach it. -- Flannery O'Connor

1. What happens if I push two positive charges together?

2. A student vigorously rubs a balloon with a bit of fur or cloth. After this has been done, the balloon is stuck to the wall. Why does this happen?

3. Define conductors and insulators. (a) Why is Styrofoam an insulator? (b) Why are metals usually conductors?

4. what is charge ?

5. What is the law of conservation of electric charge?

6. What does “grounded” refer to in terms of electrostatics?

7. I place a charged object near an electroscope and the leaves collapse. Is the objects charge positive, negative or can I tell?

8. I find a balloon that has a 6 nC (nanoCoulomb, or -6 x 10-9 C) charge, how many excess electrons does it have on its surface?

9. I rub a balloon on my hair, and the balloon has a charge of -3.5 x 10-12C, what charge does my hair have?

10. what is conservation of charge ?

Text book:-

1.1 What is the force between two small charged spheres having charges of 2 × 10–7C and 3 × 10–7C placed 30 cm apart in air?

1.2 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. (a) What is the distance between the two spheres? (b) What is the force on the second sphere due to the first?

1.3 Check that the ratio ke2 /G memp is dimensionless. Look up a Table of Physical Constants and determine the value of this ratio. What does the ratio signify?

1.4 (a) Explain the meaning of the statement 'electric charge of a body is quantised'. (b) Why can one ignore quantisation of electric charge when dealing with macroscopic i.e., large scale charges?

1.5 When a glass rod is rubbed with a silk cloth, charges appear on both. A similar phenomenon is observed with many other pairs of bodies. Explain how this observation is consistent with the law of conservation of charge.

1.6 Four point charges qA = 2 μC, qB = −5 μC, qC = 2 μC, and qD = −5 μC are located at the corners of a square ABCD of side 10 cm. What is the force on a charge of 1 μC placed at the centre of the square?

1.7 (a) An electrostatic field line is a continuous curve. That is, a field line cannot have sudden breaks. Why not? (b) Explain why two field lines never cross each other at any point?

1.8 Two point charges qA = 3 μC and qB = −3 μC are located 20 cm apart in vacuum. (a) What is the electric field at the midpoint O of the line AB joining the two charges? (b) If a negative test charge of magnitude 1.5 × 10−9 C is placed at this point, what is the force experienced by the test charge?

1.9 A system has two charges q A = 2.5 × 10−7 C and q B = −2.5 × 10−7 C located at points A: (0, 0, −15 cm) and B: (0,0, +15 cm), respectively. What are the total charge and electric dipole moment of the system?

1.10 An electric dipole with dipole moment 4 × 10−9 C m is aligned at 30° with the direction of a uniform electric field of magnitude 5 × 104 NC−1 . Calculate the magnitude of the torque acting on the dipole. 1.11 A polythene piece rubbed with wool is found to have a negative charge of 3 × 10−7 C. (a) Estimate the number of electrons transferred (from which to which?) (b) Is there a transfer of mass from wool to polythene?