ST. XAVIER'S SENIOR SECONDARY SCHOOL, DELHI – 110054

Class 12 Time : 1 hr.

22-7-2014 First Unit Test in PHYSICS M. Marks : 20

1. Define electric dipole moment of an electric dipole. Is it a vector quantity or scalar quantity? (1)

2. Write a difference between polar and non-polar dielectric. (1)

3. Sketch a graph to show how charge given to a capacitor varies with the potential difference. What does the slope of the graph signify? (2)

4. A dielectric slab of thickness 't' is introduced between the plates each of area 'A' of a capacitor. Deduce the expression for the new capacitance. Assume that t<d. Where 'd' is the separation between the plates. (2)

5. A charge 'Q' is given to a large conducting sphere of radius 'R'. Another small conducting sphere of radius 'r' carrying a charge 'q' is placed inside the large sphere. Show that potential of the small sphere is more that potential of the large sphere. (2)

6. There point charges q_1, q_2, and q_3 separated from each other form a system of charges. Obtain an expression for the potential energy stored in the system of charges. (2)

7. Three charges $2x10^{-11}$ coulomb, $3x10^{-11}$ coulomb and $2x10^{-11}$ coulomb are placed at the corners of square of side 10cm respectively, Calculate the intensity of electric field at the fourth corner. (2)

8. Two identical particles, each having a charge of $2.0x10^{-4}$C and mass of 10g, are kept at a separation of 10cm and then released. What would be the speed of the particles when the separation becomes very large? (2)

9. State Gauss's theorem. Give its mathematical expression. Derive an expression for the electric field intensity at a point due to an infinite plane charge sheet. (3)

10. Two charges of 'q' and '–q' are placed at (a, 0, 0) and (-a, 0, 0) respectively. Derive an expression for the electric field intensity at a point (0, r, 0). (3)

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