அறம் பயிற்சி மையம், மடத்துக்குளம்.
தொகுப்பு: ந.சண்முகசுந்தரம் (அறம் ஆசிரியர்)   அ.எண்: 96598 38789

HIGHER SECONDARY SECOND YEAR
PHYSICS (VOLUME – I)
Unit -1: ELECTROSTATICS
[IMPORTANT QUESTIONS – 2023]

I Multiple choice questions

1. Which charge configuration produces a uniform electric field?
(a) point charge (b) uniformly charged infinite line
(c) uniformly charged infinite plane
(d) Uniformly charged spherical shell

2. Two identical conducting balls having positive charges q_1 and q_2 are separated
 by a centre to centre distance r. If they are made to touch each other and then separated to the same distance, the force between them will be
(a) less than before   (b) same as before
(c) more than before   (d) zero

3. Two points A and B are maintained at a potential of 7 V and -4 V respectively. The work done in moving 50 electrons from A to B is
(a)8.80×10^{-17}J   (b) -8.80×10^{-17}J
(c) 4.40×10^{-17}J   (d) 5.80×10^{-17}J

4. If voltage applied on a capacitor is increased from V to $2V$, choose the correct conclusion.
(a) Q remains the same, C is doubled
(b) Q is doubled, C doubled
(c) C remains same, Q doubled
(d) Both Q and C remain same

5. Two metallic spheres of radii 1cm and 3cm are given charges of -1×10^{-2}C and 5×10^{-2}C respectively. If these are connected by a conducting wire, the final charge on the bigger sphere is
(a) 3×10^{-2}C   (b) 4×10^{-2}C
(c) 1×10^{-2}C   (d) 2×10^{-2}C

II. Short Answer Questions

6. What is meant by quantisation of charges?
7. What are the differences between Coulomb force and gravitational force?
8. Define 'electrostatic potential".
9. What are the properties of an equipotential surface?

10. Give the relation between electric field and electric potential.
11. Define 'capacitance'. Give its unit.

III Long Answer questions

12. Explain in detail Coulomb's law and its various aspects.
13. Derive an expression for the torque experienced by a dipole due to a uniform electric field.
14. Obtain an expression for potential energy due to a collection of three point charges which are separated by finite distances.
15. Obtain the expression for electric field due to an charged infinite plane sheet.
16. Obtain the expression for energy stored in the parallel plate capacitor.
17. Explain in detail how charges are distributed in a conductor, and the principle behind the lightning conductor.
18. Explain in detail the construction and working of a Van de Graaff generator.

Exercises:

19. The total number of electrons in the human body is typically in the order of 10^{28}. Suppose, due to some reason, you and your friend lost 1% of this number of electrons. Calculate the electrostatic force between you and your friend separated at a distance of 1m. Compare this with your weight. Assume mass of each person is 60 kg and use point charge approximation.

20. Suppose a charge $+q$ on Earth's surface and another $+q$ charge is placed on the surface of the Moon. (a) Calculate the value of q required to balance the gravitational attraction between Earth and Moon (b) Suppose the distance between the Moon and Earth is halved,would the charge q change?