D.A.V. LOHAGHAT
CLASS TEST - II (2025-26)
SUBJECT - PHYSICS

MM : 30 **CLASS-XII** **Time: 1:00 hours**

Section A - MCQ

Q 1. Two equal point charges each of 3 μC are separated by a certain distance in metres. If they are located at $(\hat{i}+\hat{j}+\hat{k})$ and $(2\hat{i}+3\hat{j}+\hat{k})$ then the electrostatic force between them is [1]

A. 9×10^3 N B. 16×10^{-3} N C. 10^{-3} N D. 9×10^{-2} N

Q 2. In an experiment three microscopic latex spheres are sprayed into a chamber and became charged with charges $+3e$, $+5e$ and $-3e$ respectively. All the spheres came in contact simultaneously for a moment and got separated. Which one of the following possible values for the final charge on spheres? [1]

A. $+5e,\ -4e,\ +5e$
B. $+6e,\ +6e,\ -7e$
C. $-4e,\ +3.5e,\ +5.5e$
D. $+5e,\ -8e,\ +7e$

Q 3. 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 5×10^4 NC^{-1} The torque acting on the dipole is [1]

A. 1×10^{-4} Nm B. 5×10^{-8} Nm C. 11×10^{-12} Nm D. 25×10^{-19} Nm

Q 4. The electric field intensity just sufficient to balance the earth's gravitational attraction on an electron will be: (given mass and charge of an electron respectively are 9.1×10^{-31} kg and 1.6×10^{-19} C.) [1]

A. -5.6×10^{11} N/C
B. -4.8×10^{15} N/C
C. -1.6×10^{-19} N/C
D. -3.2×10^{-19} N/C

Q 5. A closed surface in vacuum encloses charges $-q$ and $+3q$. Another charge $-2q$ lies outside the surface. Total electric flux over the surface is [1]

A. Zero B. $\frac{2q}{\epsilon_0}$ C. $\frac{-3q}{\epsilon_0}$ D. $\frac{4q}{\epsilon_0}$

Q 6. If the electric flux entering and leaving an enclosed surface respectively is ϕ_1 and ϕ_2, the electric charge inside the surface will be [1]

A. $(\phi_1+\phi_2)\times\epsilon_0$ B. $(\phi_2-\phi_1)\times\epsilon_0$ C. $(\phi_1-\phi_2)\times\epsilon_0$ D. Zero

Q 7. Each of two point charges is doubles and their distance is halved. Force of interaction becomes n times, where n is [1]

A. 4 B. 1 C. 18 D. 16

Section B - Very Short Answer Questions

Q 8. Write any four properties of electric field lines. [2]

Q 9. A surface element $d\vec{S} = 20\hat{i}$ is placed in an electric field $\vec{E} = 4\hat{i} + 8\hat{j} + 14\hat{k}$. What is the electric flux emanating from the surface? [2]

Q 10. An infinite line charge produces a field of 9×10^4 N/C at a distance of 0.02 m. Calculate the linear charge density. [2]

Q 11. A charge of 17.7×10^{-4} C is distributed over a large sheet of area 400 cm^2. Calculate the electric field intensity at a distance of 10 cm from it. [2]

Section C - Short Answer Questions

Q 12. Using Gauss theorem obtain an expression for electric field intensity at a point due to infinitely long line charge distribution. Sketch graphically variation of E with distance r. [3]

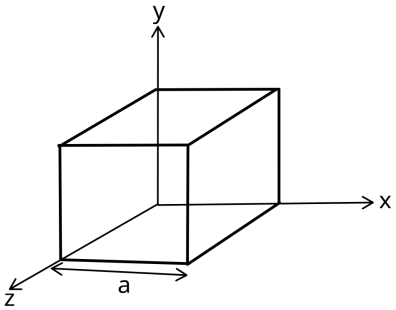
Q 13. Two point charges of $+1$ μC and $+4$ μC are kept 30 cm apart. How far from the $+1$ μC charge on the line joining the two charges will the net electric field be zero? [3]

Q 14. State Gauss's theorem in electrostatics. How will you prove it for spherically symmetric surfaces? [3]

Q 15. (a) Obtain the expression for the torque experienced by an electric dipole of dipole moment $\vec{p}$ in a uniform electric field, $\vec{E}$. [3]

(b) What will happen, if the field were not uniform?

Q 16. Given the electric field in the region $\vec{E} = 2x\hat{i}$, find the net electric flux through the cube and the charge enclosed by it. [3]



End of exam.