INDIAN SCHOOL NIZWA - WORKSHEET

PHYSICS

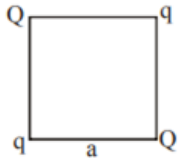
CH: 1,2 CBSE BOARD QUESTIONS

Name: _____ Date:_____ Class:XII Sec: A___

1.	Sketch the electric field lines for two point charges q_1 and q_2 for $q_1 = q_2$ and $q_1 > q_2$ separated by a distance d.	1
2.	What is the electric flux through a cube of side 1cm which encloses an electric dipole?	1
3.	How does the electric flux due to a point charge enclosed by a spherical Gaussian surface get affected when its radius is increased?	1
4.	A charge QμC is placed at the centre of a cube. What would be the flux through one face?	1
5.	Two identical conducting balls A and B have charges –Q and +3Q respectively. They are brought in contact with each other and then separated by a distance d apart. Find the nature of the Coulomb force between them. (2019 - CBSE question paper)	1
6.	A metallic spherical shell has an inner radius R_1 and outer radius R_2. A charge Q is placed at the centre of the shell. What will be the surface charge density on the (i) inner surface and (ii) outer surface of the shell? (2019 - CBSE question paper)	1
7.	Two concentric metallic spherical shells of radii R and 2R are given charges Q_1 and Q_2 respectively. The surface charge densities on the outer surfaces of the shells are equal. Determine the ratio Q_1: Q_2.	2
8.	Represent graphically the variation of electric field with distance for a uniformly charged plane sheet.	2
9.	Plot a graph showing the variation of coulomb force (F) versus $(1/r^2)$, where r is the distance between the two charges of each pair of charges: (1μC, 2μC) and (2μC, -3μC). Interpret the graphs obtained.	2
10.	Apply Gauss's law to show that for a charged spherical shell, the electric field outside the shell is, as if the entire charge were concentrated at the centre. (2019 - CBSE question paper)	2
11.	Two large parallel plane sheets have uniform charge densities +σ and –σ. Determine the electric field (i) between the sheets and, (ii) outside the sheets. (2019 - CBSE question paper)	2
12.	(a) An infinitely long positively charged straight wire has a linear density λcm^{-1}. An electron is revolving around the wire as its centre with constant velocity in a circular plane perpendicular to the wire. Deduce the expression for its kinetic energy. (b) Plot a graph of kinetic energy as a function of charge density λ.	3
13.	(a) An electrostatic field line is a continuous curve. That is, a field line cannot have sudden breaks. Why is it so? (b) Explain why two field lines never cross each other.	3
14.	Two uniformly large parallel thin plates having charge densities +σ and –σ are kept in the X Y plane at a distance d apart. Sketch an equipotential surface due to electric filed between the plates. If a particle of mass m and charge –q remains stationary between the plates, what is the magnitude and direction of this field?	3
15.	A parallel plate is charged by a battery. When the battery remains connected, a dielectric slab is inserted in the space between the plates. Explain what changes if any occur in the values of (a) potential difference between plates (b) electric filed strength between plates (c) capacitance (d) charge on the plates (e) energy stored in the capacitor.	3

16. A capacitor of unknown capacitance is connected across a battery of v volts. The charge stored in it is 360 μC. When capacitance across the capacitor is reduced by 120V, the charge stored in it becomes 120μC. Calculate 3
    (a) The potential V and unknown capacitance C
    (b) What will be the charge stored in the capacitor, if the voltage applied has increased by 120V?

17. Four point charges Q, q,Q and q are placed at the corners of a square of side 'a'. 3



Find the
    (a) Resultant electric force on charge Q
    (b) Potential energy of this system.

(2018 CBSE question paper)

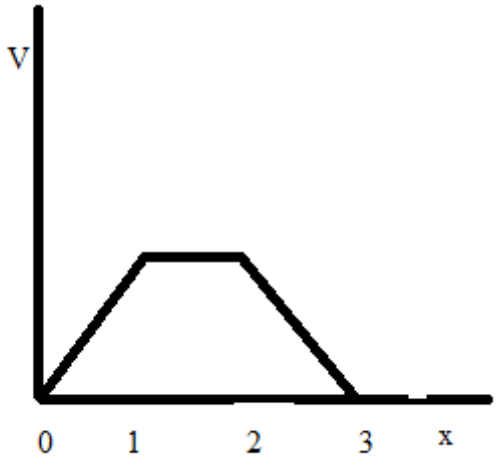
18. (a) Three point charges q, -4q and 2q are placed at the vertices of an equilateral triangle ABC of side 'l'. Obtain the expression for the magnitude of the resultant electric force acting on the charge q. 3
    (b) Find out the amount of work done to separate the charges at infinite distance.

(2018 CBSE question paper)

19. Define electric flux. Is it a scalar or vector quantity? 5
    (a) A point charge q is at a distance of d/2 directly above the centre of a square of side d, as shown in the figure. Use Gauss's law to obtain the expression for electric flux through the square.
    (b) If the point charge is now moved to a distance d from the centre of the square and the side of the square is doubled, explain how the electric flux will be affected?

(2018 CBSE question paper)

20. (a) When a parallel plate capacitor is connected across a dc battery, explain briefly how the capacitor gets charged. 5
    (b) A parallel plate capacitor of capacitance 'c' is charged to V volt by a battery. After sometime the battery is disconnected and the distance between the plates is doubled. Now a slab of dielectric constant 1< k< 2 is introduced to fill the space between the plates. How will the following be affected?
        (i) The electric field between the plates of the capacitor.
        (ii) The energy stored in the capacitor.
    (c) The electric potential as a function of distance 'x' is shown in the figure. Draw a graph of the electric field E as a function of x.



(2019 CBSE question paper)

21. (a) Derive an expression for the potential energy of an electric dipole in a uniform electric field. Explain conditions for stable and unstable equilibrium. 5

(b) Is the electrostatic potential necessarily zero at a point where the electric is zero? Give an example to support your answer.

(2019 CBSE question paper)