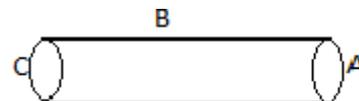


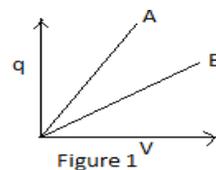
KENDRIYA VIDYALAYA NO 2, DELHI CANTT
SUMMER VACATION HW 2018
CLASS XII SC SUB PHYSICS

1. A metallic pumpkin and another metallic lady's finger are given same charges. Which one may probably lose charge?
2. You are given an isolated capacitor of capacitance C (without dielectric) charged to a potential difference V . Find how many times will each of the following become if a dielectric slab of dielectric constant 4 is inserted between its plates, completely filling the gap between the plates: a. capacitance, b. potential difference, c. field between the plates, d. energy stored by the plates.
3. An oil drop of mass ' m ' and charge ' $-q$ ' is to be held stationary in the gravitational field of the earth. What is the magnitude and direction required for this purpose?
4. A charge q is placed at the corner of a cube. What will be the electric flux passing through all the six faces of the cube?
5. What is the dielectric constant of metals?
6. A hollow cylinder has a charge q coulomb within it. If Φ is the flux associated with the curved surface B, what will be the flux associated with the plane surface A?

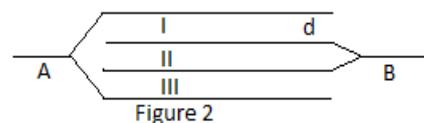


7. Two charged conducting spheres of radii a and b are connected to each other by a conducting wire. What is the ratio of (i) charges on the spheres and (ii) electric fields on the surface of the two spheres?
8. An electric technician requires a capacitance of $2\mu\text{F}$ in a circuit across a potential difference of 1 kV. A large number of $1\mu\text{F}$ capacitors are available to him, each of which can withstand a potential difference not more than 400V. Suggest an arrangement that requires a minimum number of capacitors.
9. The two plates of a parallel plate capacitors are 4mm apart. A slab of dielectric constant 3 and thickness 3mm is introduced between the plates with its faces parallel to them. The distance between the plates is so adjusted that the capacitance of the capacitor becomes $2/3^{\text{rd}}$ of its original value. What is the new capacitance?
10. Two equal positive charges, each of magnitude $5 \times 10^{-5}\text{C}$, are fixed at points A and B separately by a distance of 6m. An equal and opposite charge moves towards them along the line COD, the perpendicular bisector of AB. The moving charge, when it reaches the point C at a distance of 4m from O, has a kinetic energy of 4J. Calculate the distance of the farthest point D from O up to which the charge goes before returning towards C.
11. What is the work done by electric force in taking a charged particle of charge 1C by 10 cm along the equator of a dipole?
12. A particle of mass m and charge q is placed at rest in a uniform electric field E and then released. What will be the kinetic energy after the particle has travelled a distance y .
13. A proton and an electron are released in an electric field. Which one will experience greater force? Which one has greater acceleration?
14. The force between two charges at a distance ' r ' is ' F '. What will happen to the force if a metal rod is inserted between the charges?
15. Three equal charges, $2 \times 10^{-6}\text{C}$ each are held fixed at three corners of an equilateral triangle of side 5 cm. Find the Coulomb force experienced by any one of the charges due to the other two.
16. A small particle carrying a negative charge of $1.6 \times 10^{-19}\text{C}$ is suspended in equilibrium between the horizontal metal plates 5 cm apart, having a potential difference of 3000V across them. Find the mass of the particle.

17. A sphere S_1 of radius r_1 encloses a charge Q . If there is another concentric sphere S_2 of radius $r_2 (> r_1)$ and no additional charge between S_1 and S_2 , find the ratio of electric flux through S_1 and S_2 .
18. Show graphically variation of potential and electric field at a point with distance due to a point charge in the same plot.
19. The given graph shows the variation of charge q versus potential difference V for two capacitors C_1 and C_2 . The two capacitors have same plate separation but the plate area of C_2 is double that of C_1 . Which of the lines in the graph corresponds to capacitors C_1 and C_2 and why?



20. A parallel plate capacitor is charged by connecting to a battery. After charging the battery is disconnected and the plates of the capacitor are moved apart. What change do you expect in its potential and capacitance? What will happen if the battery is kept connected?



21. Is it possible to create an electric field in which all lines of force are parallel but electric field strength increases from left to right?

22. What is the capacitance of arrangement of 4 plates of area A at a distance d in air as shown in the figure?
23. Why does the terminal potential difference of a cell becomes zero when it is short circuited?

24. How will you make a potentiometer of given wire length more sensitive by using a resistance box?
25. In a meter bridge, the balance point is found to be at 39.5cm from the end A, when the resistance Y is of 12.5Ω . Determine the resistance X . Why are the connections between resistors in a meter bridge made of thick copper stripes?

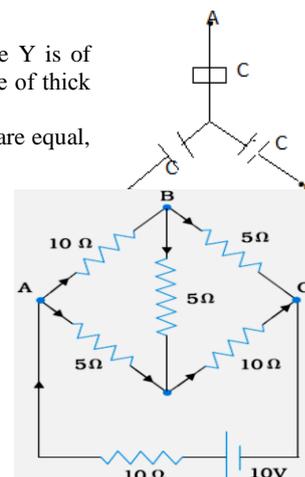
26. Three identical capacitors are connected as shown in the figure. If potential of the points A, B and C are equal, find out the effective capacitance.

27. A battery is used to charge a capacitor till the potential difference between the plates of the capacitor becomes equal to the electromotive force of the battery. What is the ratio of energy stored in the capacitor and the work done by the battery?

28. Write the expression for balance condition of a 'meter bridge'. When the sensitivity of a meter bridge is maximum?

29. Two small balls having equal positive charge ' q ' Coulomb are suspended by two insulating strings of equal length ' l ' m from a hook fixed to a stand. The whole set up is taken to a satellite into a space where there is no gravity. What is the angle between two strings and the tension in each string?

30. Determine the current in each branch of the network shown in Fig.
31. A storage battery of emf 8.0 V and internal resistance 0.5Ω is being charged by a 120 V dc supply using a series resistor of 15.5Ω . What is the terminal voltage of the battery during charging? What is the purpose of having a series resistor in the charging circuit?



32. Define the term resistivity of the conductor. Give its S. I. unit. Show that the resistance R of a conductor is given by $\frac{ml}{ne^2\tau A}$