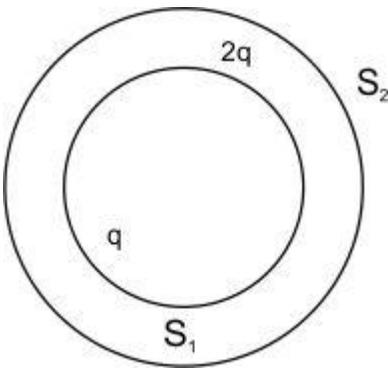




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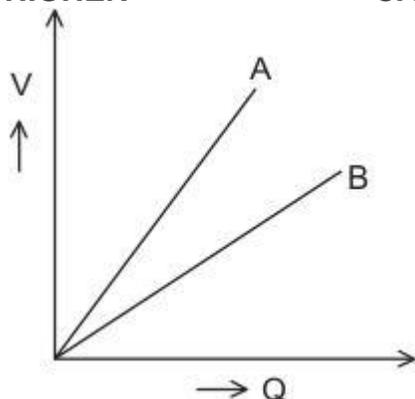
PLOT 5C, 2ND FLOOR, GANAPATI COMPLEX, SEC-13, OPP. JAIPURIA SCHOOL, VASUNDHARA, GHAZIABAD  
XII PHYSICS (ELECTRIC CHARGE)

- 1). Force of attraction b/w two point charges placed at distance 'd' apart in a medium is 'F'. What should be the distance apart in the same medium so that the force of attraction b/w them becomes 9F? (2 marks)
- 2). Two fixed point charges +4e and +e units are separated by a distance 'a'. Where should the third point charge be placed for it to be in equilibrium? (2 marks)
- 3). Derive expressions for the electric field due to a uniformly charged spherical shell at a point (I) INSIDE and (II) OUTSIDE the shell? (2 marks)
- 4).  $S_1$  and  $S_2$  are two hollow concentric spheres enclosing charges q and 2q respectively.



- (i) What is the ratio of electric flux through  $S_1$  and  $S_2$ ?
  - (ii) How will the electric flux through sphere  $S_1$  change if a medium of dielectric constant 5 is introduced in the sphere  $S_1$  in place of air? (2 marks)
- 5). Two point charges  $3 \times 10^{-8}$  C and  $-2 \times 10^{-8}$  C are located 15 cm apart in air. Find at what point on the line joining these charges the electric potential is zero? (2 marks)
  - 6). Show that the electric field is always perpendicular to an equipotential surface? (2 marks)
  - 7). (i) Can two equipotential surfaces intersect each other?  
(ii) Two charges  $-q$  and  $+q$  are located at points A (0, 0, -1) and B (0, 0, +1) respectively. How much work is done in moving a test charge from p (7, 0, 0) to Q (-3, 0, 0)? (2 marks)

8).The graph shows the variation of voltages  $V$  across the plates of two capacitors A & B versus increases of charge, 'Q' stored on them. Which of the two capacitors has HIGHER CAPACITANCE? (2 marks)



9).Two rectangular metal plates, each of area  $A$  are kept parallel to each other at a distance 'd' apart to form a parallel plate capacitor. If the area of each of the plates is doubled and their distance of separation decreases to  $1/2$  of its initial value. Calculate the ratio of their capacitance in the two cases? (2 marks)

10). Derive an expression for the energy stored in a parallel plate capacitor. (3 marks) ratio of their capacitance in the two cases? (2 marks)

11).A charge  $Q$  is placed on a large spherical conducting shell of radius  $R$  another small conducting sphere of radius  $r$  carrying charge  $q$  is introduced inside the large shell and is placed at its centre. Show that Charge will flow from inner sphere to shell . when connected together Name the device which works on this fact mention its application? (5 marks)

12).(a) Derive an expression for energy stored per unit volume in parallel plate Capacitor.

(b) A  $10 \mu\text{F}$  Capacitor is charged by a  $30 \text{ v}$  d.c. Supply and then connected across an uncharged  $50 \mu\text{F}$  Capacitor. Calculate the final potential difference across the combination and loss of energy in the process? (5 marks)

13).An electric dipole is placed in uniform electric field  $\vec{E}$  translatory motion (5 marks)

- (i) Show that dipole does not has translator motion.
- (ii) Also find out an expression for torque on dipole.
- (iii) State conditions for stable and unstable equilibrium.