PHYSICS XII

m.m. = 20
Time = 45 min

Electric Potential and Capacitance

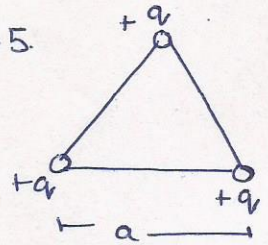
Q.1 Define electric potential at a point. (1)

Q.2 What is equipotential surface. What is dir of $\vec{E}$ at any point on equipotential surface. (2)

Q.3 A metallic shell is given a charge of $5\mu C$. If radius of shell is 10 c.m. find $\vec{E}$ & 'V' at a distance r from centre if (i) $r = 8$ c.m. (ii) $r = 20$ c.m. (2)

Q.4 What is S.I. unit of capacitance. If we double the Q on plates of a capacitor what happens to it's capacitance. (1)

Q.5



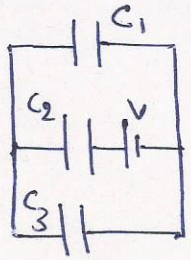
3 identical charges of $+q$ are placed on vertices of equilateral Δ of side a. Find (3)
(i) $\vec{E}$ & V at centroid of Δ
(ii) Potential energy of this system.
(iii) Amount of work required to bring a charge $+Q$ from ∞ to centroid of Δ

Q.6 Derive the expression for capacitance of a || plate capacitor having plate area 'A', distance 'd' b/w plates when a dielectric slab of thickness $t < d$ is inserted b/w the plates. (3)

Q.7 Derive the expression for electric potential energy stored b/w plates of a capacitor. (2)

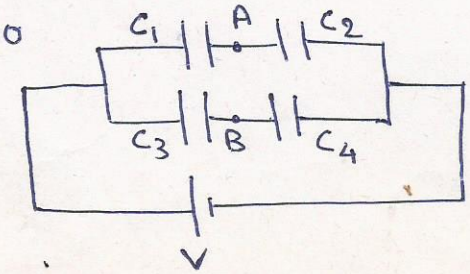
Q.8 A capacitor 'C' is charged to a P.D. 'V' using a battery. Now the battery is removed and distance b/w plates is reduced to half it's original value. What is (i) Final P.D. on capacitor (ii) P.E. (energy) on capacitor (2)

Q.9



$C_1 = 4\mu F$ $C_2 = 6\mu F$ $C_3 = 4\mu F$
$V = 10$ V
Find
(i) effective capacitance across battery. (3)
(ii) P.E. stored in C_3

Q.10



$C_1 = C_4 = 3\mu F$
$C_2 = C_3 = 6\mu F$ (2)
$V = 10$ V

Find P.D. b/w A & B.