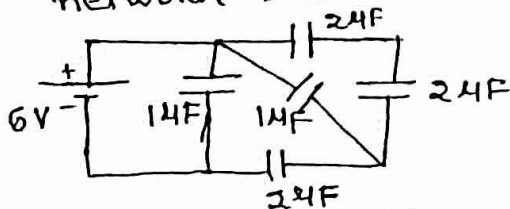


Test No-5

F.M - 30
TIME - 1 H 20 min.

Date

1. Answer all the questions. [1x5=5]
- Write down the relation between electric field and electric potential at a point.
 - Write the unit and dimensions of capacitance.
 - Write down the relation between dielectric constant and electric susceptibility.
 - Can we place a parallel plate capacitor of 1F capacity in our house? Justify your answer.
 - In which orientation, a dipole placed in a uniform electric field is in (i) stable (ii) unstable equilibrium.
2. Answer all the questions. [2x5=10]
- Sketch equipotential surfaces for (i) for a negative point charge. (ii) two equal and opposite charges separated by a small distance.
 - Show that excess charge on a conductor resides only on its surface.
 - What is electrostatic shielding? Mention its two applications.
 - Distinguish between polar and non-polar dielectric. Give one example of each.
 - Explain why polarization of a dielectric reduces the electric field inside the dielectric. Hence define dielectric constant.
3. Answer all the questions. [3x5=15]
- Derive an expression for the potential at a point along the axial line of a short dipole.
 - Two charges $3 \times 10^{-8} \text{C}$ and $-2 \times 10^{-8} \text{C}$ are located 15 cm apart. At what point on the line joining the two charges is the electric potential zero? Take the potential at infinity to be zero.
 - Derive an expression for capacitance of a parallel plate capacitor. On what factor does the capacitance of a parallel plate capacitor depend?
 - Find the total energy stored in the capacitors in the network shown below.



- A 800pF capacitor is charged by 100V battery. After some time battery is disconnected. The capacitor is then connected to another 800pF capacitor. What is the electrostatic energy stored?