Term Test. PHY-205B, Full Marks-20 ,Answer any two

1.(a)   Define coulomb. What do you mean by the quantization of charge?   4
  (b)   Show that the electrical force is about 10^{39} times stronger than the gravitational force.   6

2(a)   Define lines of force. Sketch the lines of force for the (i) Positive point charge, (ii)   4
        negative point charge, (iii) dipole and (iv) for the two point charges.
  (b)   Define electric dipole. Show that when an electric dipole is placed in a uniform   6
        electric field, then the stored potential energy inside the system can be expressed
        as $U = - \vec{P} \cdot \vec{E}$. What do you mean by the negative sign of this potential energy?

3.(a)   State the Gauss's law for the electrostatic. When a hypothetical cylinder of radius R   6
        immerse in a uniform electric fields $\vec{E}$, then calculate the ϕ_E for this closed surface.
  (b)   Define Electric potential, show that the electric potential can be expressed as   4
        $$V_A - V_B = \int_{A}^{B} \vec{E} \cdot d\vec{s}$$