ELECTRIC CHARGES AND FIELDS

Q.1. Calculate how many electrons would have to be removed from a copper penny to leave it with positive charge of 10^{-15} C?

Q.2. Is a charge of 5.8 X 10^{-19} C possible?

Q.3. A polythene piece rubbed with wool is found to have a negative charge of 3×10^{-7} C.
(a) Estimate the number of electrons transferred (from which to which?)
(b) Is there a transfer of mass from wool to polythene?

Q.4. If 10^9 electrons move out of a body to another body every second, how much time is required to get a total charge of 1 C on the other body?

Q.5. A charge Q is to be divided on two objects. What should be the value of charges on the object so that force between the objects can be maximum?

Q.6. Two particles each having a mass 5g and charge 1×10^{-7} C, stay in limiting equilibrium on a horizontal table with a separation of 10 cm between them. The coefficient of friction between each particle and the table is same. Find μ.

Q.7. A particle of mass m carrying charge $(-q_1)$ is moving around a charge $(+q_2)$ along a circular path of radius r. Prove that period of revolution of the charge $(-q_1)$ about $(+q_2)$ is given by $16\pi^3\varepsilon_o mr^3/q_1q_2$.

Q.8. Two particles A and B having charges 8 X 10^{-6} C and 2×10^{-6} C respectively are held fixed at a separation of 20 cm, where a third charged particle should be placed so that it does not experience an electric force?

Q.9. A particle 'A' having a charge of 2μC and mass 100 g is fixed at the bottom of a smooth inclined plane of inclination 30^o. Where should another particle B having same charge and mass be placed on incline, so that it may remain in equilibrium?

Q.10. Three equal charges each having a magnitude of 2×10^{-6} C, are placed at the three corners of a right angled triangle of sides 3 cm, 4 cm and 5 cm. Find force on a charge at the right angle corner.