# United International University

## School of Science and Engineering

Quiz#04; Year 2020; Semester: Fall
Course: PHY 105; Title: Physics
Full Marks: 20; Section: E; Time: 20 minutes

| **Name:** | **ID:** | **Date:** |
|---|---|---|

**1.** What is electric potential? Write down the equation for electric potential if a positive test charge and a negative charge are placed at a distance R from a specific point. If the positive and negative test charge has value $q=|\pm 12e|$ nC, then also write down the equation for the electric potential and potential energy. **1**

**2.** Draw a graph for electric potential where both positive and negative potentials are present. **1**

**3.** Cosmic rays are coming toward the earth from ionosphere creating electric field $\vec{E}$ with field strength 150 N/C. Electrons making collision in an atmosphere with cosmic rays move upward direction and produce the displacement of electron is 550 m which is supposed to be the magnitude of maximum range of electric field from the center point. Total no of negative charge (electron) is $q=15e^-$. Now (i) calculate the change in electric potential energy and change in electric potential for which the electron moved, (ii) draw the electric field lines for a point negative charge, and (iii) the electric potential. Given, $e^- = -1.6\times10^{-19}$ C. **3**

**4.** Hydrogen sulfide ($H_2S$) is a molecule that has a permanent dipole moment with dipole charge $q=|\pm 18e|$. The dipole distance of $H_2S$ molecule is 1.12 fm. What is the dipole moment? **2.5**

**5.** Calculate the Electric Field due to a proton at the location of the electron in the Ka atom first orbit. The radius of the electron orbit (of the first orbit) is 1.7 times of Bohr radius r $=5.29\times10^{-11}$ m. Given, $k=9\times10^9$ $Nm^2C^{-2}$. **2.5**