United International University

School of Science and Engineering

Quiz#04; Year 2020; Semester: Fall

Course: PHY 105; Title: Physics

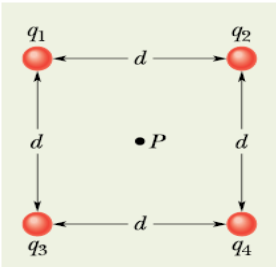
Full Marks: 20; Section: C; Time: 20 minutes

Name:	ID:	Date:

1. What is electric potential gradient? Write down an equation for it. Write down also the equations for components of electric field $\vec{E}$ at any point. **1**

2. Draw a convenient graph for equipotential surfaces. **1**

3. What is the electric potential at point *P*, located at the centre of the square of point charges shown in figure below? The distance *d* is 370 cm, and the charges are q_1=117μC, q_2= -42μC, q_3=51μC, and q_4= -12μC. **3**



4. An ink drop with a mass *m* of 1.3× 10^{-10}kg and a negative charge of magnitude Q= 3.5× 10^{-15} C enters the region between the plates, initially moving along the x axis with speed V_x=18 m/s. The time required to pass the total length L of each plate is 0.86 ms. The plates are charged and thus produce an electric field at all points between them. Assume that field $\vec{E}$ is downward directed, is uniform, and has a magnitude of 6.4 × 10^4 N/C. What is the vertical deflection of the drop at the far edge of the plates? **2.5**

5. Fair weather atmospheric electricity is produced in the ionosphere due to the collision between layers of moving clouds with huge amount of Electric potential 5×10^5 V. Due to this ample potential, the electric field is acting downward 70 km high in the ionosphere level. (i) What is the amount of Electric field strength required in ionosphere? (ii) Draw an electric field lines for a positive charge particle. **2.5**