



United International University

School of Science and Engineering

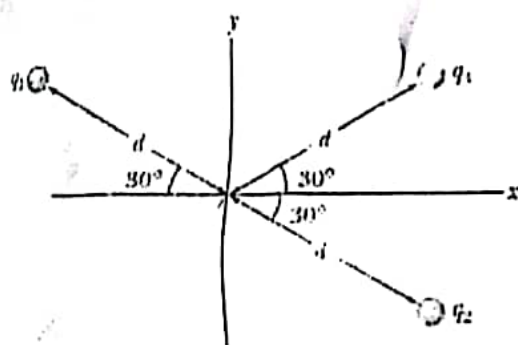
Mid-Term Examination; Year 2022; Semester: Spring

Course: PHY 1205; Title: Physics

Full Marks: 40; Section: A/D/E; Time: 2 hours

There are Five Questions. Answer 4 of them as following; Answer to the question no 1, 2 & 3 are mandatory and answer any one from question no 4 & 5.

1. a) Write at least three differences between electric potential energy? [2] CO1
 b) Draw electric field lines from a dipole. Show directions of electric fields at three points in this field lines. [2] CO1
 c) Direction of electric field along +Y axis. An electron is moving along +X axis. Does it does work done positive/ negative; potential energy of electron increase/decrease? [2] CO1
2. a) What is the force between two 3gm copper coins one meter apart if we remove all the electrons from the copper atoms? (atomic mass of copper = 29, atomic weight of Cu 63.5gm and $k=10^{10} \text{ Nm}^2/\text{C}^2$) [4] CO3
 b) Three charges lie on the x axis: $q_1=+25 \text{ nC}$ at the origin, $q_2=-12 \text{ nC}$ at $x=2\text{m}$, $q_3=+18 \text{ nC}$ at $x=3\text{m}$. What is the net force and it's direction on q_1 ? [3] CO3
 c) Figure below shows three particles with charges $q_1=2\mu\text{C}$, $q_2=2\mu\text{C}$, and $q_3=4\mu\text{C}$, each at a distance $d=30\text{cm}$ from the origin. What net electric field and it's direction at the origin? [5] CO3



- a) Two charges $q_1=$ (last two digits of your ID)C is placed at coordinates (1,0) and $q_2=2 \times$ (last two digits of your ID)C is placed at coordinates (0,2) respectively. Draw the charge arrangement. Find the produced electric field and it's direction at origin [5] CO3
- b) Two particles are placed at x axis: particle 1 of charge $-2.0\mu\text{C}$ at $x=6.0 \text{ cm}$, particle 2 of charge $+4.0\mu\text{C}$ at $x=21.0 \text{ cm}$. Midpoint between the particles, what is the net electric field and direction? [4]
- c) What is the electric potential at point P, located at the centre of the square of point charges? The side of the square is 1.5 m , and the charges are $q_1=12\text{nC}$, $q_2=-24\text{nC}$, $q_3=3\text{nC}$, and $q_4=17\text{nC}$. What is work done to bring a unit charge from infinite distance to point P. [3] CO3