



United International University

School of Science and Engineering

Quiz#04; Year 2021; Semester: Summer

Course: PHY 105; Title: Physics

Full Marks: 20 ; Section: A; Time: 30 minutes

Name:	ID:	Date:
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1. What is Electric Flux? Draw the electric flux of a surface. **1**
2. Calculate the Electric Field due to a proton at the location of the electron in the H atom. The radius of the electron orbit is 0.5×10^{-15} m. [Given, $e = +1.6 \times 10^{-19}$ C, $e^- = -1.6 \times 10^{-19}$ C, $m_e = 9.1 \times 10^{-31}$ kg, $m_p = 1.67 \times 10^{-27}$ kg and $k = 9 \times 10^9$ F/m] **2.5**
3. An electric dipole consists of charges $+2e$ and $-2e$ separated by 0.78 nm. It is in an electric field of strength 3.4×10^6 N/C. Calculate the magnitude of the torque on the dipole when the dipole moment is (i) parallel to, (ii) perpendicular to, and (iii) antiparallel to the electric field and also calculate (iv) the maximum value, (v) the minimum value of the potential energy induced due to electric dipole. **2.5**
4. Two litmus paper, blue and red that initially have +4 C and +8 C of charge. After an interaction, i.e., they touch with each other, and the blue litmus has +10 C of charge, and the red litmus has an unknown quantity of charge. Use the law of conservation of charge to find (i) the final charge on the red litmus and (ii) the final charge of red litmus if blue litmus has opposite charge of +10 C after interaction. **2**
5. A butterfly net is in a uniform electric field of magnitude $E = 3.0$ mN/C. The rim, a circle of radius $a = 11$ cm, is aligned perpendicular to the field. The net contains no net charge. (i) Find the electric flux through the netting, and (ii) If the net contains of charge $1.8 \mu\text{C}$, what is the net electric flux through the surface? **2**