

International Islamic University Chittagong (IIUC)
Department of Electronic and Telecommunication Engineering
Mid-Term Examination

Program: B.Sc. (Engg.) in ETE
 Course Code: PHY-1201
 Total Marks: 30

Semester: Autumn 2023
 Course Title: Physics - II
 Time-1.5 Hours

(i) Answer all the questions. The figures in the right-hand margin indicate full marks. (ii) Course Outcomes (COs) and Bloom's Levels are mentioned in additional Columns.						
Course Outcomes (COs) of the Questions						
CLO1	Demonstrate an understanding of Electricity; Magnetism, Alternating Current, Solid state physics, Modern Physics; Relativity.					
CLO2	Apply basic physics laws and formulae to complex cases like; Gauss's law for dielectric material, Biot-Savart law for solenoid, toroid, Ampere's law, Faraday's laws, Crystal lattice formation for solid state electronic materials, Photo-electric and Compton effect etc.					
Bloom's Levels of the Questions						
Letter Symbols	R	U	Ap	An	E	C
Meaning	Remember	Understand	Apply	Analyze	Evaluate	Create

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|--|---|----|-----|
| 1. a) Illustrate your idea on electric dipole moment. | 2 | U | CO1 |
| b) Derive the expressions for electric potential at a point due to a point charge. | 6 | An | CO1 |
| c) Two equal and opposite charges of magnitude 4×10^5 C are at a distance 'd' apart such that their force of attraction is 1.5 lb. Estimate the value of 'd'. | 2 | Ap | CO2 |

Or

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|---|---|----|-----|
| 1. a) Illustrate your idea on Gauss's law for point charge. | 2 | U | CO1 |
| b) Derive the expression of Gauss's law for dielectric medium in differential form. | 6 | An | CO1 |
| c) Estimate the potential at the surface of an Aluminium nucleus. Consider $r = 4.5 \times 10^{-13}$ cm and $q = 13e$. | 2 | Ap | CO2 |
| | | | |
| 2. a) Discuss "magnetic flux" with proper figure. | 2 | U | CO1 |
| b) Derive the expression $B = \frac{2\sqrt{2}\mu_0 i}{\pi d}$, where the symbols have their usual meanings. | 7 | An | CO1 |
| c) Find the magnetic induction at any point inside the core of a solenoid of 12 turns per cm with 1.3 ampere current flowing through the solenoid. | 1 | Ap | CO2 |
| | | | |
| 3. a) Illustrate your idea on self-inductance, with proper figure. | 2 | U | CO1 |
| b) Derive an expression for self-inductance of a long solenoid having different cores. | 6 | An | CO1 |
| c) Estimate the self-inductance of a solenoid having 1200 turns and length 1.1 meter. The area of cross-section is 6 cm^2 and the relative permeability of the core is 800. | 2 | Ap | CO2 |