International Islamic University Chittagong (IIUC)

Department of Electronic and Telecommunication Engineering

Mid-Term Examination

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

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

CLOs	Course Learning Outcomes (CLOs): Upon the successful completion of the course, students will be able to	Bloom's Taxonomy Domain/Level
CLO: 1	**Demonstrate** an understanding of Electricity & Magnetism, Alternating Current, Solid state physics, Modern Physics & Relativity.	Cognitive
CLO: 2	**Apply** basic physics laws and formulae to complex cases like; Gauss's law for dialectic 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.	Cognitive

1. a)	Illustrate Gauss's law in both the integral and differential form.	2	U	CO1
b)	Derive the expressions for electric field at a point due to an electric dipole.	6	An	CO1
c)	Estimate the electric potential at the surface of a gold nucleus. The radius of the nucleus is 6.6×10^{-15}m and Z=79.	2	Ap	CO2
2. a)	Illustrate your idea on "magnetic field".	2	U	CO1
b)	Derive an expression for magnetic field at the center due to a square shaped current carrying wire.	6	An	CO1
c)	Find the value of magnetic field at a point 12 cm away from an infinitely long straight wire carrying 3 ampere current.	2	Ap	CO2

Or

2. a)	Discuss "Ampere's circuital law" with proper figure.	2	U	CO1
b)	Derive the expression $B = \frac{\mu_0 N i a^2}{2x^3}$, where the symbols have their usual meanings.	6	An	CO1
c)	Find the magnetic induction at the center of a square current loop of side 60 cm carrying current 2 amp.	2	Ap	CO2
3.a)	Illustrate your idea on mutual inductance, with proper figure.	2	U	CO1
b)	Derive an expression for mutual-inductance of a long solenoid having different cores.	6	An	CO1
c)	Two coils, a primary of 500 turns and a secondary of 60 turns are wound on an iron ring of radius 0.1 m and cross-section 4×10^{-4} m diameter. Find their mutual inductance. Consider μ_r for Iron is 800.	2	Ap	CO2