Program: B. Tech, Course: Computer Science and Engineering
(Artificial Intelligence & Machine Learning)
Subject: Applied Physics/ Engineering Physics, Code: ETPH-101

Semester: I

Time: 03 Hours **Max Marks: 70**

Instructions to the Students:

1. This Question paper consists of two Sections. All sections are compulsory.
2. Section A comprises 10 questions of short answer type. All questions are compulsory. Each question carries 02 marks.
3. Section B comprises 8 long answer type questions out of which students must attempt any 5. Each question carries 10 marks.
4. Do not write anything on the question paper.

Q. No.	SECTION –A(SHORT ANSWER TYPE QUESTIONS)	Marks
1. a.	Describe Gauss Law in integral and differential form.	(2)
b.	Differentiate among diamagnetic, paramagnetic and ferromagnetic materials in terms of their susceptibility.	(2)
c.	Derive the value for differential volume in a spherical coordinate system	(2)
d.	What is the use of the divergence theorem?	(2)
e.	Illustrate the electromagnetic braking system?	(2)
f.	State Gauss law for electric fields.	(2)
g.	A coil wire has 500 turns and a self-inductance of 50 mH. What will be the self-inductance of second similar coil with 600 turns.	(2)
h.	Define magnetic intensity and magnetization.	(2)
i.	If electric displacement is in X-direction, magnetic field is in Y-direction and propagation vector is in Z-direction then show then draw the direction of Poynting vector for anisotropic dielectric medium?	(2)
j.	A magnetic field of 20 Oersted produces a flux of 2400 maxwells in a bar of iron and cross-section 0.2 sq cm. Calculate the relative permeability.	(2)

SECTION –B (LONG ANSWER TYPE QUESTIONS)

2. Derive an expression for Laplace's and Poisson's equations for electrostatic potential. Also, discuss the Stoke's and Gauss's theorems. (10)

3. State and prove the uniqueness theorem. Also, differentiate the Dirichlet and Neumann boundary conditions. (10)

4. Derive the electric field and potential due to a dipole. (10)

5. Calculate the magnetic field for a long straight current-carrying wire. (10)

6. Derive Maxwell's equations from the fundamental laws of electromagnetism. (10)

7. Evaluate the Poynting vector for an electromagnetic wave traveling in the linear isotropic dielectric medium. In what condition- the solution of an electromagnetic wave can be damped oscillatory? (10)

8. If the superposition of waves occurs in different polarization states, then illustrate the conditions to obtain a) plane, b) circularly and c) elliptically polarized waves. (10)

9. If electromagnetic waves travel from a non-conducting medium to a vacuum interface, calculate the reflection and transmission coefficient for normal incidence. (10)

===END OF PAPER===