Roll No											

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
MID TERM EXAMINATION - OCT 2023

Semester : Semester III - 2022
Course Code : EEE2003
Course Name : Sem III - EEE2003 - Electromagnetic Fields
Program : B. TECH

Date : 31-OCT-2023
Time : 11:30AM - 1:00PM
Max Marks : 50
Weightage : 25%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.
(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS **(5 X 2 = 10M)**

1. The collection of partial derivative operators. is commonly called the *del operator*. Mention the possible ways of using the del operator in electromagnetic fields.
(CO1) [Knowledge]
2. *Scalar products* and *vector products* are two ways of multiplying two different *vectors* which see the most application in electromagnetic fields. Write the difference between dot product and cross product.
(CO1) [Knowledge]
3. Depending upon the nature of the quantity under consideration, the field may be a vector or a scalar field. Define a scalar and vector with some examples.
(CO1) [Knowledge]
4. Write the properties of conductors and dielectrics in static electric fields.
(CO2) [Knowledge]
5. State and express the force between one charge point to an array of a charge points with neat diagram.
(CO2) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS **(2 X 10 = 20M)**

6. The temperature in an auditorium is given by,
$T = x^2 + y^2 - z$
A mosquito located at (1, 1, 2) in the auditorium desires to fly in such a direction that it will get warm as soon as possible. In what direction must it fly?
(CO1) [Comprehension]

7. The flux due to the electric field E can be calculated using the general definition of flux in electric field. For practical reasons, however, this quantity is not usually considered as the most useful flux in electrostatics. The vector field D is called the electric flux density and is measured in coulombs per square meter. Given that D = z r cos^2 (Ø) **az** C/m2, calculate the charge density at (1, Π/4, 3) in C/m

(CO2) [Comprehension]

PART C

ANSWER THE FOLLOWING QUESTION **(1 X 20 = 20M)**

8. a. Coulombs law states that the force (F) between any two point charges (Q1 and Q2) is directly proportional to the product of their magnitudes and inversely proportional to the square of the distance R between them. It is directed along the line joining the two charges. Point charges Q1 = 5 μC and Q2 = **-** 4 μC are placed at (3, 2, 1) m and (6, 0, 7) m, respectively. i. Identify the unknown quantities. ii. Find the values of identified quantities.

b. A point charge of 50 nC is located at the origin while plane z = 3 carries charge 20 nC/m^2. Find the Electric flux density at P(0,4,3)m.

(CO2) [Application]