**H.T No**

**Regulations:**

**A18**



**Sreenidhi Institute of Science and Technology**

(An Autonomous Institution)

**Code No: 7A302**  **Date: 23-July-2021(AN)**

**B.Tech II-Year I- Semester Covid-19 Special External Examination, July-2021 (Regular)**

**ELECTRO MAGNETIC FIELDS (EEE)**

**Time: 3 Hours Max.Marks:70**

***Note: a****) No additional answer sheets will be provided.*

*b) All sub-parts of a question must be answered at one place only, otherwise it will not be valued.*

*c) Missing data can be assumed suitably.*

**ANSWER ANY 5 OUT OF 8 QUESTIONS. EACH QUESTION CARRIES 14 MARKS.**

**Bloom's Cognitive Levels of Learning (BCLL)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Remember | L1 | Apply | L3 | Evaluate | L5 |
| Understand | L2 | Analyze | L4 | Create | L6 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  | **BCLL** | **CO(s)** | **Marks** |
| 1. | a) | A chare Q1= -20µC is located at P (-6, 4, 6) and a charge Q2=50µC is located at R (5, 8,-2) in a free space. Find the force exerted on Q2 by Q1 in vector form. The distances given are in meters. | L4 | CO1 | [7M] |
|  | b) | Derive Maxwell's first equation. | L3 | CO1 | [7M] |
|  |  |  |  |  |  |
| 2. | a) | show that torque on a physical dipole p C-m in a uniform electric field E is given by T = PxE | L3 | CO2 | [7M] |
|  | b) | Derive the integral form of continuity equation and also write its meaning. | L3 | CO2 | [7M] |
|  |  |  |  |  |  |
| 3. | a) | Define polarization and explain how dielectric acquires polarization. | L2 | CO3 | [7M] |
|  | b) | What is the capacitance of a capacitor consisting of two parallel plates 30cm by 30cm, separated by 5mm of air? What is the energy stored in it, if it is charged to potential of 500V? | L4 | CO3 | [7M] |
|  |  |  |  |  |  |
| 4. | a) | Derive an expression for H due to an infinite long current carrying conductor. | L3 | CO4 | [7M] |
|  | b) | State and explain a Lorentz force equation. | L1 | CO4 | [7M] |
|  |  |  |  |  |  |
| 5. | a) | Derive an expression for torque on a current loop. | L3 | CO5 | [7M] |
|  | b) | Define magnetic torque. | L1 | CO5 | [7M] |
|  |  |  |  |  |  |
| 6. | a) | Derive the coefficient of coupling between two circuits. | L4 | CO6 | [7M] |
|  | b) | A conductor of length 100cm moves at right angles to uniform field of strength 10000 line/cm2 with a velocity of 50 m/s . Calculate emf induced if when the conductor moves at an angle of 300 to the direction of field. | L4 | CO6 | [7M] |
|  |  |  |  |  |  |
| 7. | a) | A point charge of 20nC is located at the origin. Determine the magnitude and direction of Ē at the point (1, 3, -4). | L5 | CO1 | [5M] |
|  | b) | Derive the relation between current and current density. | L4 | CO2 | [5M] |
|  | c) | Derive the relation between magnetic field intensity and magnetic flux density. | L3 | CO3 | [4M] |
|  |  |  |  |  |  |
| 8. |  | Write short notes on following: |  |  |  |
|  | a) | Maxwell’s equations for static fields | L1 | CO4 | [7M] |
|  | b) | Scalar and vector magnetic potential. | L1 | CO5 | [7M] |

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