

Code: 22ECMC2T1

I M.Tech - II Semester – Regular Examinations - JULY - 2023**ADVANCED ELECTROMAGNETIC FIELDS
(MICROWAVE & COMMUNICATION ENGINEERING)**

Duration: 3 hours

Max. Marks: 60

Note: 1. This paper contains 4 questions from 4 units of Syllabus. Each unit carries 15 marks and have an internal choice of Questions.

2. All parts of Question must be answered in one place.

BL – Blooms Level

CO – Course Outcome

| | | | BL | CO | Max. Marks |
|----------------|----|--|----|-----|------------|
| UNIT-I | | | | | |
| 1 | a) | In detail, explain the A-C Characteristics of matter. | L4 | CO1 | 7 M |
| | b) | Describe the relationship of complex terminal current to complex terminal voltage. | L4 | CO1 | 8 M |
| OR | | | | | |
| 2 | a) | What are Maxwell's equations? Write the Maxwell's equations in integral form & point form and describe it. | L3 | CO1 | 8 M |
| | b) | Explain and derive the expression for energy stored in Magnetic field. | L4 | CO1 | 7 M |
| UNIT-II | | | | | |
| 3 | a) | Describe the following terms with relevant illustrations and necessary equations: (i) Standing Wave Ratio | L3 | CO2 | 8 M |

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|-----------------|----|---|----|-----|-----|
| | | (ii) Q-factor (iii) Dominant mode (iv) Radiation resistance. | | | |
| | b) | What is Polarization? With relevant figures, explain the types of polarization. | L3 | CO2 | 7 M |
| OR | | | | | |
| 4 | a) | Derive the wave equations in lossy matter. | L3 | CO2 | 7 M |
| | b) | Derive the field components of TE-Mode in Rectangular Waveguide. | L3 | CO2 | 8 M |
| UNIT-III | | | | | |
| 5 | a) | What do you mean by Green's function? Derive its necessary equations and write down the properties of Green's Function. | L3 | CO3 | 8 M |
| | b) | State and prove reciprocity theorem. | L3 | CO3 | 7 M |
| OR | | | | | |
| 6 | a) | In detail, explain duality theorem with relevant examples. | L4 | CO3 | 7 M |
| | b) | State and explain Uniqueness Theorem. Justify how uniqueness theorem satisfies the criterion of Laplace's equation and potential on the boundaries. | L3 | CO3 | 8 M |
| UNIT-IV | | | | | |
| 7 | a) | What is Uniform Plane Wave? Derive all the necessary relations in an Uniform Plane Wave and prove $E/H=120\pi$ | L3 | CO4 | 8 M |
| | b) | Analyze wave functions using separation of variables method. | L4 | CO4 | 7 M |

| OR | | | | | |
|-----------|----|--|----|-----|-----|
| 8 | a) | In detail, Analyze the Rectangular Cavity. | L4 | CO4 | 7 M |
| | b) | Obtain the Boundary Conditions for TM&TE w.r.t Rectangular waveguide. | L4 | CO4 | 8 M |