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| **Hall Ticket Number:**  **20EC403**   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  | | **II/IV B. Tech (Regular) DEGREE EXAMINATION** | | | | | | | | | | | **August 2022** | | | | | | | **Electronics and Communication Engineering** | | | | **Fourth Semester** | | | | | | | **EM Waves and Transmission Lines** | | | | **Time: Three Hours** | | | | | | | | **Maximum:70 Marks** | | |  |
| |  |  | | --- | --- | | ***Answer question 1 compulsory.*** | **(14X1 = 14 Marks)** | | ***Answer one question from each unit.*** | **(4X14=56 Marks)** | |  |

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| 1. | a) | What is perpendicular polarization? | CO1,L1 |  |
|  | b) | Explain about surface wave. | CO1,L2 |  |
|  | c) | What is total internal reflection? | CO1,L1 |  |
|  | d) | What surface impedance? | CO1,L1 |  |
|  | e) | Define Reflection Coefficient. | CO2,L1 |  |
|  | f) | Define VSWR | CO2,L1 |  |
|  | g) | Explain how transmission line can be used as a circuit element. | CO2,L2 |  |
|  | h) | State the applications of Smith Chart. | CO2,L1 |  |
|  | i) | Discuss various types of coupling mechanisms used in rectangular waveguides. | CO3,L2 |  |
|  | j) | What is Dominant Mode of a Wave Guide? | CO3,L1 |  |
|  | k) | Write the expression for power transmission in rectangular waveguide for TE Mode | CO3,L2 |  |
|  | l) | Write the expression for guide wavelength. | CO4,L2 |  |
|  | m) | Write the applications of circular waveguides. | CO4,L2 |  |
|  | n) | What are the characteristics of standard circular waveguides | CO4,L1 |  |
| **Unit –I** | | | | |
| 2. | a) | Derive the expression for reflection coefficient for oblique incidence on a perfect dielectric in parallel polarization. | CO1,L6 | 8M |
|  | b) | Explain about the wave incident normally on perfect conductor | CO1,L2 | 6M |
| **(OR)** | | | | |
| 3. | a) | Explain about the wave incident obliquely to the surface of perfect conductor | CO1,L2 | 6M |
|  | b) | Derive the expression for Transmission and reflection coefficients for E and H fields under normal incidence on a perfect dielectric. | CO1,L6 | 8M |
| **Unit –II** | | | | |
| 4. | a) | Derive Voltage & Current equation of a Transmission line. | CO2,L3 | 8M |
|  | b) | Discuss the need for loading and types | CO2,L2 | 6M |
| **(OR)** | | | | |
| 5. | a) | Explain about the transmission line parameters | CO2,L2 | 7M |
|  | b) | What is the need for stub matching in transmission lines? Design a single stub match for a load of 150+j225 ohms for a 75 ohms line at 500 MHz using smith chart. | CO2,L6 | 7M |
| **Unit –III** | | | | |
| 6. | a) | Derive electric and magnetic field components for TE modes in rectangular waveguide. | CO3,L6 | 8M |
|  | b) | Explain power transmission in rectangular Wave guide. | CO3,L3 | 6M |
| **(OR)** | | | | |
| 7. | a) | Derive electric and magnetic field components for TM modes in rectangular waveguide. | CO3,L6 | 8M |
|  | b) | Derive the expressions for guide wavelength and guide impedance in rectangular waveguide | CO3,L6 | 6M |
| **Unit –IV** | | | | |
| 8. | a) | Derive the solutions of wave equations in cylindrical coordinates | CO4,L3 | 7M |
|  | b) | Derive electric and magnetic field components for TM modes in circular waveguide. | CO4,L6 | 7M |
| **(OR)** | | | | |
| 9. | a) | Explain TEM waves in circular waveguides does not exist in hallow waveguides. | CO4,L2 | 7M |
|  | b) | Write short notes on Excitation of modes in circular waveguides. | CO4,L2 | 7M |

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