Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – Nov/Dec – 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **14EC2007** | **Duration :** | **3hrs** |
| **Sub. Name :** | **TRANSMISSION LINES AND WAVEGUIDES** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | | **Questions** | **Course**  **Outcome** | Marks |
| 1. | a. | | Discuss about different types of transmission lines. | CO1 | 8 |
| b. | | A 300 m long line has the following primary constants: R= 4.5 KΩ, L = 0.5mH, G=60mmho and C=12nF, operated at 6MHz frequency. Find the secondary constants and velocity of propagation. | CO1 | 12 |
| (OR) | | | | | |
| 2. | a. | | Define waveform distortion and explain about its types. Also derive the condition for a distortionless transmission line. | CO1 | 10 |
| b. | | Mathemathically, observe frequency and delay distortion in an ordinary telephone cable. How could it be overcomed? | CO1 | 10 |
| 3. | a. | | Discuss the voltages and currents on a dissipation less transmission line and sketch the phasors for the following resistive loads:  (a) Short Circuited Load  (b) Open Circuited Load  (c) Matched Load | CO1 | 14 |
|  | b. | | A certain transmission line, operating at radio frequency has following constants L =10µH/m, C=16pF/m. The line is terminated in a resistive load of 1000Ω. Find the reflection co-efficient and Standing wave ratio. | CO1 | 6 |
| (OR) | | | | | |
| 4. |  | A lossless transmission line with characteristic impedance Z0 = 50 Ω is terminated in a load of ZR = (50 +j50) Ω. Using Smith chart, find the following:  i) VSWR  ii)Magnitude and angle of reflection coefficient at the load  iii)load admittance  iv)Source impedance at a distance of λ/4 from the load  v) Position of first voltage minimum from the load. | | CO2 | 20 |
| 5. | a. | | From the general expressions of Transverse Electric waves(TE), sketch the field distribution of the dominant mode in a parallel plate waveguide. | CO2 | 10 |
|  | b. | | Derive the attenuation factor of a TEM mode in a parallel plate waveguide, whose field components are:  Hy = Ce-jβz  Ex = βC/ωε[e-jβz] | CO2 | 10 |
| (OR) | | | | | |
| 6. |  | The separation between the parallel plates of a waveguide is 3 cm. It is filled with a dielectric with relative permittivity of 4. The signal frequency is 6GHz. Find all propagating modes. For each of the propagating modes calculate the following:  a) Cut off frequency b) Cut off wavelength  c)Guide wavelength | | CO2 | 20 |
| 7. |  | Discuss about rectangular wave guide and derive its general field equations. | | CO2 | 20 |
| (OR) | | | | | |
| 8. | a. | | Derive the characteristics of TE and TM waves in a rectangular waveguide. | CO2 | 15 |
|  | b. | | Discuss about excitation of modes in a rectangular waveguide. | CO2 | 5 |
|  | | | **Compulsory:** |  |  |
| 9. |  | Write short notes on:   * 1. Microstrip Lines   2. Slot Lines   3. Circular waveguides   4. Fin Lines | | CO2 | 20 |

ALL THE BEST