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Code No: EC1523

GEC-R14

II B. Tech II Semester Supplementary Examinations, January 2017

TRANSMISSION LINES AND WAVE GUIDES

(Electronics and Communication Engineering)

Time: 3 Hours

Max. Marks: 60

Note: All Questions from **PART-A** are to be answered at one place.

Answer any **FOUR** questions from **PART-B**. All Questions carry equal Marks.

PART-A

6 × 2 = 12M

1. Draw the equivalent circuit of a unit length Transmission line and define line parameters.
2. Define Reflection Coefficient.
3. What is stub matching?
4. List the characteristics of waves between parallel plates.
5. Why TEM mode does not exist in hollow wave guides.
6. Define wave impedance for TE and TM modes in circular wave guides.

PART-B

4 × 12 = 48M

1. a) Derive the fundamental transmission line equation and from them find expression for voltage and current along an infinite line. (8M)
b) The primary constants of a cable are:
 $R = 80 \Omega/\text{km}$
 $L = 2 \text{ mH}/\text{km}$
 $G = 0.3 \mu\text{S}/\text{km}$
 $C = 0.07 \text{ mF}/\text{km}.$
Calculate secondary constants at 1kHz. (4M)
2. a) Show that for transmission lines, $Z_o^2 = Z_{SC} \cdot Z_{OC}$. (6M)
b) Write short notes on Standing Wave Ratio of a transmission line. (6M)
3. a) Describe the characteristics of transmission lines at high frequencies. (7M)
b) Explain the applications of Smith chart. (5M)
4. a) Derive the expression for the field components in parallel plane wave guide. (8M)
b) Derive the relationship between η_{TE} , η_{TM} and η . (4M)

5. a) A rectangular waveguide have cross - section dimensions $a=7\text{cm}$, $b=4\text{cm}$. Determine all the possible modes which will propagate at a frequency of 3 GHz. (8M)
- b) Distinguish between Transverse Electric and Transverse magnetic wave Impedances in rectangular wave guides. (4M)
6. a) What are TE_{mn} and TM_{mn} modes with respect to a circular wave guide. Sketch the dominant modes. (6M)
- b) Write and explain characteristics of TE and TM waves in Circular wave guides. (6M)
