ROLL NO:----------

COLLEGE OF ENGINEEERING,

(14)

# EC284 TRANSMISSION LINES AND WAVEGUIDES

III SEMESTER ELECTRONICS AND COMMUNICATION ENGINEERING R 2005

(SMITH CHART MUST BE PROVIDED)

**DURATION: 3 HOURS** **MAX MARKS: 100**

## ANSWER ALL QUESTIONS

## PART A (10x2=20 Marks)

1. Can a finite line terminated in characteristic impedance be treated as infinite line?justify your answer
2. A transmission line is terminated with i) Short Circuit ii) Open Circuit. Sketch the admittance variation along the line
3. State the principle of loading of transmission lines?
4. Define return loss in transmission lines.
5. What are the advantages of using m-derived filters over prototype filters
6. Specify the applications of equalizers.
7. Bring out the Significance of dominant mode of operation
8. TEM wave cannot Exist in a hollow rectangular waveguide? Why?.
9. Define Q of a resonator
10. Why is $TM_{01}$ mode is preferred in circular waveguides?Give its special features

## PART B (5x16 =Marks)

11. i)Describe the reflection phenomena in transmission lines and sketch the standing wave patterns **(6)**

ii)A Transmission line has terminating impedance $Z_L$=(200-j350)ohms at 10MHZ.It is connected to a 100 ohms line. Design a single stub matching network and verify your answer with smith chart **(10)**

12.a)Derive the transmission line equations and obtain the solution .Also describe the physical significance of these equations

**(OR)**

12.b) i)Derive the condition for minimum attenuation. **(8)**
ii)Bring out the special characteristics of quarter wave and half wave lines **(8)**

13a)Discuss the role of a quarter wave transformer in impedance matching **(6)**
ii)Design a single stub (Short circuited shunt stub)matching network for a transmission line terminated with $Z_R$=350-j400 ohms to obtain matching for maximum length of the transmission line.The characteristic impedance of the line is $Z_0$=100 ohms.Derive appropriate expressions and verify your answer using Smith chart **(10)**

**(or)**

13b) i)Design a symmetrical lattice attenuator to have attenuation of 20 dB and characteristic impedance of 500 ohms .Draw its equivalent T-configuration also. (8)
ii) Obtain the design equations of Lattice equalizer (8)

14a) Derive the expression to predict the filter performance. Discuss on it.

**(or)**

14b) Design a constant K high pass filter (both T and Pi sections) having cut off frequency of 10 KHz and design impedance $R_0$=600 ohms. Find its characteristic impedance and phase constant at 25 KHz.

15a)i)What are the methods of excitation of waveguides. (6)
ii)Obtain the expression for the field components (TE mode) of a rectangular waveguide (10)

**(or)**

15b) i)Obtain the expression for the field components of a circular waveguide and explain. (16)