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

**Karunya University**

**(Karunya Institute of Technology and Sciences)**

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

**Supplementary Examination - June 2011**

**Subject Title: TRANSMISSION LINES AND WAVE GUIDES Time: 3 hours**

**Subject Code: EC280 Maximum Marks: 100**

#### **Answer ALL questions**

**PART – A (10 x 1 = 10 MARKS)**

1. What is distributed parameters?

2. What is lossless line?

3. Line at radio frequencies is \_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_.

4. What is Smith Chart?

5. What is TE mode?

6. For TEM mode direction of propagation is \_\_\_\_\_\_\_\_\_.

7. What is dominant mode?

8. Draw the cross sectional view of rectangular wave guide.

9. What is circular wave guide?

10. What is the use of cavity resonator?

**PART – B (5 x 3 = 15 MARKS)**

11. Describe wave impedance.

12. What is the characteristic impedance of a line with L = 2.5μH/km and C = 4.45pF/km?

13. Discuss on TM mode of Propagation.

14. Discuss about the impossibility of TEM waves in rectangular waveguides.

15. Explain the resonant frequency in terms of the dimension of the cavity.

**PART – C (5 x 15 = 75 MARKS)**

16. Derive the general solution of a transmission line.

(OR)

17. Zo of a transmission line is 745∠-12° and the line is terminated with 100 Ω. Calculate the reflection loss and return loss in dB.

18. Describe the features of half wave and quarter wave line and mention its applications.

(OR)

19. S value of a line is 2.5 and a voltage minimum exists at 0.15λ from the load. Find the input impedance for a line of 0.35 λ using Smith Chart.

20. Obtain the necessary relations to represent TM waves in between the parallel planes.

(OR)

21. a. Describe velocity of propagation of electromagnetic waves in parallel plane waveguide. (7)

b. What is wave impedance? Derive the wave impedance of TE, TM and TEM modes. (8)

22. Calculate the cut-off frequency, phase velocity, group velocity attenuation at 0.9fc and wave impedance for  mode through a rectangular guide with a = 10 cm and at the frequency 2.5 GHz.

(OR)

[P.T.O]

23. Describe how attenuation occurs in TE mode in rectangular wave guide and derive its attenuation factor.

24. Using Bessel function, represent wave propagation in circular guide in detail.

(OR)

25. Describe the rectangular resonant cavity and its principle of operation.