T.E. (Etrx) Sem 6 (Rev.)
Microwave & fibre optic Communication 03/12/07

Con/4940–07. **(REVISED COURSE)** **CD–5520**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of remaining **six** questions.
(3) Assume any **suitable** data whenever **required** but justify the **same.**

1. Attempt any **four** from the following : **20**
   (a) The $TE_{1\cdot0}$ mode is described as the dominant made in rectangular waveguides. What property does it have which makes it dominant ?
   (b) Explain the limitations of conventional vacuum tubes at microwave frequencies.
   (c) Show that waveguide is nothing but HP filter.
   (d) What is dispersion in optical fibers ? How does it affect the performance of the fiber optic link ?
   (e) What are crossed field devices ? Explain the working principle in brief of any one crossed field device.

2. (a) Discuss the method of exciting TE_{10} and TE_{20} modes in a rectangular waveguide. **10**
   (b) A rectangular waveguide measures 3 x 4·5 cm internally, with a 9GHz signal propogation in it find – **10**
      (i) The cut-off wavelength
      (ii) The guided wavelength
      (iii) The group and phase velocities.

3. (a) With the aid of a suitable diagram explain the operation of the hybrid T Junction. What are its applications ? **8**
   (b) Explain the microwave circulator with S matrix. **8**
   (c) Define coupling factor and directivity of a directional coupler. **4**

4. Distinguish between :
   (a) IMPATT diode and TRAPATT diode. **5**
   (b) Step index and graded index fiber. **5**
   (c) Rectangular waveguide and circular waveguide. **5**
   (d) LASERs and LEDs. **5**

5. (a) Explain the process of velocity modulation and bunching in a reflex klystron oscillator with the help of applegate diagram. **10**
   (b) Distinguish between spontaneous emission and stimulated emission. How stimulated emission is achieved in LASER ? **10**

6. (a) Explain Attenuation in optical fiber system. **5**
   (b) Write the advantages and applications of optical communication system. **5**
   (c) Explain in brief, different splicing technique in optical fibers. **10**

7. Write short notes on any **four** : **20**
   (a) Cavity resonator
   (b) Gunn oscillator
   (c) Multiplexing techniques in fiber optic system
   (d) Link power budget
   (e) TWT (Travelling wave tube).

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