2301

B. E. B. Tech. 6th Semester (ECE)
· Examination – May, 2014

MICROWAVE AND RADAR ENGG.

Paper : EE-302-E

Time : Three Hours]   *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt any *five* questions out of eight questions. All questions carry equal marks.

1. (a) How are waveguides different from normal two wire transmission lines ? Discuss the similarities and dissimilarities.   10

   (b) Show that TEM wave can not propagate in a wave-guide by making use of Maxwells equations.   10

2. Derive the wave equation for a TM wave and obtain all the field components in a rectangular waveguide. **20**

3. Mention how a TWT can be converted to an oscillator. Explain the operation of such a device. How is large turning range, possible with such a derive ? **20**

4. Define a Microwave Junction. How can it be described by scattering matrix ? Derive the scattering matrix for H-plane Tee Junction. **20**

5. (a) Explain how a tunnel diode can be used as an amplifier and as an oscillator with the necessary circuit diagrams. **10**

(b) Explain GUNN effect using the two valley theory. **10**

6. Describe how can the power of a microwave generator be measured using : **20**

(a) Bolometer,

(b) Calorimeter ?

7. (a) Define unambiguous range of a radar system and derive an expression for the same. **10**

(b) What limits the sensitivity of a radar receiver, discuss in detail. 10

8. Write short note on : $10 + 10 = 20$

   (i) Ferrite devices.

   (ii) Varactor diode.