Code No. : **6190/O/S**

FACULTY OF ENGINEERING
B.E. 4/4 (ECE) I Semester (Old) Examination, June 2014
MICROWAVE ENGINEERING

Time : 3 Hours] [Max. Marks : 75

***Note** : Answer **all** questions from Part – **A**, and **any five** questions from Part **B**.*

PART – A **(25 Marks)**

1. In a rectangular waveguide for which a = 2b (a is length, b is breadth). The cut off frequency for TE_{02} mode is 12 GHz. Calculate cut off frequency for TM_{11} mode. **3**
2. Define cut off frequency for a given mode. **2**
3. State properties of scattering matrix. **2**
4. Give applications of cavity Resonator. **2**
5. Give the principle of velocity modulation. **2**
6. What is the range of X band in microwaves ? **2**
7. What is the mode jumping in cavity magnetron ? **3**
8. In a directional coupler is the power in the primary wave guide is 64 mW and power delivered at the secondary waveguide is 4 mW. Calculate coupling factor. **3**
9. A coplanar strip line carries an average power of 250 mW and a peak current of 100 mA. What is the characteristic impedance ? **3**
10. Write the principle of O type travelling wave tube. **3**

PART – B **(50 Marks)**

11. Discuss the properties of TE waves between plane parallel conducting plates. Derive expressions for electric and magnetic field components.
12. a) Discuss TE modes in circular wave guide.

    b) A TE_{11} mode in propagating through a circular waveguide. The radius of the guide in 5 cm and the guide contains air as dielectric determine.

    i) The cut off frequency

    ii) Guide wavelength λ_g at the operating frequency of 3GHz.

    iii) Wave impedance in the guide.

13. Discuss the propagation of TE waves in rectangular waveguides. Obtain expressions for the electric and magnetic field components.
14. What is scattering matrix ? Derive the scattering matrix of a magic tee.
15. Explain with neat diagram the function of magnetron. What is it mode ? How it is separated from other modes ?
16. Describe construction of TMPATT diode. Explain how negative resistance is achieved in it.
17. Write short notes on **(any two)** :
    a) Microstrip lines.
    b) Veractor.
    c) Gunn diode.