Code No. : 5150/ S

FACULTY OF ENGINEERING
B.E. 4/4 (ECE) I Sem. (Suppl.) Examination, June 2012
MICROWAVE ENGINEERING

Time: 3 Hours] [Max. Marks: 75

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

PART – A **(25 Marks)**

1. Explain briefly about wave between parallel planes with diagram. **3**
2. Justify the guide wave length in a wave guide is greater than free space wave length. **3**
3. Find cut off frequency of dominant mode in circular wave guide of size 2.2 cm × 1 cm. **2**
4. What is the magic of magic Tee ? **2**
5. What is Gunn Effect ? Plot V-I characteristic. **3**
6. What is π mode in a magnetron ? Explain. **2**
7. Justify the use of helix as slow wave structure in TWT. **3**
8. List out HF limitations of conventional tubes. **2**
9. Differentiate between TE, TM and TEM waves. **3**
10. Write about flap attenuator. **2**

PART – B **(50 Marks)**

11. Derive the field expression for TM_{mn} modes in parallel plate wave guide. Show that TEM mode is special case of TM mode. **10**
12. A hollow rectangular wave guide has dimension 4 cm × 2 cm. Calculate guide wave length, phase velocity and wave impedance if frequency signal is 3 GHz. **10**

13. Prove that scattering matrix of a loss less reciprocal network is unitary. **10**

14. A pair of perfectly conducting planes is separated by 8 cm in air. If the frequency is 5 GHz with TM_{10} mode excited. Find
    a) Cut off frequency
    b) Characteristic wave impedance
    c) Phase and group velocity **10**

15. Using S-parameter explain the operation of directional coupler and also write expression for coupling factor and directivity. **10**

16. a) Find Scattering properties of Magic Tee. **5**
    b) Explain working of B.W.O. **5**

17. Write short notes on **any two** of the following : **10**
    a) Vane and flap Attenuators
    b) Varactor and PIN diode
    c) Magnetron.
