2015
B.E. (Electronics and Communication Engineering)
Sixth Semester
EC-601: Microwave and Radar Engineering

Time allowed: 3 Hours   Max. Marks: 50

NOTE: *Attempt five questions in all, including Question No. I which is compulsory
and selecting two questions from each Unit.*

x-x-x

1. Attempt the following:-

   a) Differentiate between transferred electron devices and transistors.   (5×2)

   b) What is avalanche transit time effect?

   c) What is Gunn effect?

   d) Define MTI radars.

   e) Define the term radar range resolution and write the equation.

UNIT - I

2 a) What is the principle of phase shifter? Draw the diagram of dielectric phase   (5)

   shifter and discuss the working mechanism.

   b) Describe how can the power of a microwave generator be measured using   (5)

   (i) Bolometer (ii) Calorimeter techniques

3 a) In a Gunn diode with active length of 20μm, the drift velocity of electrons is   (5)

   2×10^7cm/s. Calculate the rational frequency and critical voltage of the diode.

   b) Why EH plane Tee is called a magic Tee. Explain with help of scattering matrix.   (5)

4 a) Explain the operation, construction and applications of TRAPATT.   (5)

   b) Define transition, twists, bends, and matched load, and discuss what properties   (5)

   they are supposed to possess.

UNIT -II

5 a) What is velocity modulation? How is it different from normal modulation?   (5)

   Explain how velocity modulation is utilized in klystron amplifier.

   b) A reflex klystron operates at peak mode of n = 2 with beam voltage V_0= 300V.   (5)

   Beam current I_0= 20mA, signal voltage V_1= 40V. Determine (i) the input power

   in watts (ii) output power in watts (iii) efficiency.

P.T.O.

6 a) What is strapping in magnetron? How is the same effect obtained without (5) strapping?

b) Explain how a helical TWT achieves amplification. (5)

7 a) What is the significance of slow wave structures used in microwave circuits? (5)

b) Define Doppler effect. Establish a relation between Doppler frequency shift and (5) radial velocity of a moving target.

x-x-x