Exam.Code:0930
Sub. Code: 33686

2055

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 Section.

x-x-x

Q.1a) Define the terms: bends, twists, and matched load. (2×5)

b) Why EH plane tee is called a magic tee?

c) What are slow wave structures?

d) What is strapping in magnetron?

e) Define the principle of RADAR.

Section A

Q.2a) Name and define the principle of operation of an isolator. Explain the action of a circulator with help of a ray diagram. (6)

b) Calculate the resonant frequency of a circular resonator of dimensions a= 3cms, b=2cms and l= 4cms, when the mode of operator is TE_{101}. (4)

Q.3a) Explain the construction and operation of a two hole directional coupler with the help of scattering matrix. Define different parameters associated with it. (6)

b) Describe how can the power of a microwave generator be measured using (i) Bolometer (ii) Calorimeter techniques (4)

Q.4a) Define negative differential resistivity. Explain Gunn effect using two valley theory. (5)

b) In a Gunn diode with active length of 20μm, the drift velocity of electrons is $2x10^7$cm/s.Calculate the rational frequency and critical voltage of the diode. (5)

Section B

Q.5a) Derive an expression for the efficiency of a two cavity klystron amplifier, starting from basic principles. (6)

b) A reflex klystron is operated at 56Hz with an anode voltage of 1000V and cavity gap 2mm. Calculate the gap transit angle. Find optimum length of the drift region. Assume N=1, V_R= -500 V. (4)

P.T.O.

Q.6a) Derive Radar range equation. (5)

b) Explain the terms frequency pulling and frequency pushing with reference to a magnetron. (5)

Q.7a) A simple MTI delay line canceller is an example of time domain filter. Explain why? (5)

b) A helical TWT has diameter of 2mm with 50 turns per cm. Calculate axial phase velocity and the anode voltage at which the TWT can be operated for useful gain. (5)

x-x-x