

- N. B. :** (1) Question no.1 is compulsory.
 (2) Answer any four questions from remaining.
 (3) Assume suitable data wherever necessary.

1. (a) Microstrip ~~Microstrip~~ line is also called an open strip line. Comment on this. 18
 (b) What do you understand by the terms cutoff wavelength, dominant mode, guide wavelengths, phase velocity and wave impedance. 20
 (c) Explain the action of a rat-race junction.
 (d) Discuss the power frequency, current frequency and power gain frequency limitations with reference to a microwave transistor.

2. (a) What is the importance of beam-coupling coefficient. Derive the equation of velocity modulation in klystron. 18
 (b) A refler klystron operster at 8GHz at the peak of $n=2$ mode with $V_0 = 300V$
 $R_{sn} = 20k \Omega$ and $L=1mm$. If the gap transit time and beam loading are neglected, find the (a) Repeller voltage (b) Beam current necessary to obtain an RF gap voltage of 200V. 20
Rsh

3. (a) Discuss design procedure for filter using insertion loss method. Compare this with image-parameter method. 10
 (b) Explain the procedure of measurement of dielectric constant at microwave frequency. 10

4. (a) Describe different modes of oscillation of gun-diode. Differentiate between transferred electron devices and transistors. 10
 (b) How is buchning actived in a cavity magnetron. Explain phase focussing effect. What is strapping in magnatron. 10

5. (a) Describe in detail the operation of a 2-hole directional coupler. Calculate the coupling factor if the power in the primary waveguide is 72mw and the power delivered to the dirational coupler is 8 mw. 10
 (b) A single stubtuner is to match a lossless line of 400Ω to a local of $800-j300 \Omega$. The frequency is 3GHz. 10
load
 (i) Find the distance in meters from load to a tuning stub.
 (ii) Determine the length in meters of the short circuited stub.

6. (a) Explain the working of a negative resistance Parametric amplifier and explain its application. 10
 (b) Derive plane wave equation and explain the significance. 10

7. (a) Explain Travelling wave to be as an amplifier. 4
 (b) Explain Hybride junction 4
 (c) Explain Brillouinflow and derivian expression for Brillouin magnetic field Br. 8
 (d) Design a circulator using Magic-T 4