

Time: 3 Hours

Max. Marks :80

Note: 1. Each question carries 20 marks.

2. Question no 1 is compulsory.

3. Attempt any 3 from the remaining questions.

4. Assume suitable data wherever required.

Q.1 Attempt any 4 questions.

[20]

- Discuss the various Microwave Frequency bands with Frequency range and applications.
- (Compare Strip-line and Microstrip line.
- State properties of Magic Tee and list its applications.
- What is mode jumping in Magnetron and how it can be avoided.
- Explain characteristics and working principle of Tunnel diode.

Q.2 (A) Explain characteristics of E plane and H plane Tee.

[10]

(B) With the help of Two-Valley Model Theory explain the characteristics of Gunn diode. List the various modes of oscillation of Gunn diode.

[10]

Q.3 (A) Explain the methods used to measure low and high VSWR at microwave frequency.

[10]

(B) What are ferrite devices. Explain the working of Circulator and its applications.

[10]

Q.4 (A) Derive the field equations for TE modes in rectangular waveguide.

[10]

(B) Explain working of Reflex Klystron with schematic diagram. Explain the process of velocity modulation with the help of Applegate diagram.

[10]

Q.5 (A) An air-filled rectangular waveguide propagates a frequency of 10 GHz and has width $a=2\text{cm}$ and height $b=1\text{cm}$. For a dominant TE mode find (i) cut-off frequency (ii) guide wavelength (iii) phase velocity (iv) group velocity (v) Wave Impedance.

[10]

(B) Design a single stub matching network using short-circuited shunt stub to match the terminating load $Z_L = (200 + j300) \Omega$ to the characteristic impedance $Z_0 = 300 \Omega$.

[10]

Q.6 Write Short Note on: (Attempt any FOUR)

[20]

- Trapatt Diode
- Measurement of Microwave frequency
- Applications of Smith Chart
- Isolator
- Helix Travelling wave Tube
