

Time: 3 Hours

Max. Marks :80

- Note: 1. Each question carries 20 marks
2: Question no 1 is compulsory
3: Solve any 3 out of remaining
4: Assume suitable data wherever required

Q1: Attempt any four

- a) Explain the significance of RWH Theory. (5)
- b) Explain amplification process occurring in Helix TWT (5)
- c) Discuss the various frequency bands of microwaves. State the applications of any two bands. (5)
- d) Explain schematic structure and doping profile of PIN diode. (5)
- e) Explain the properties of ferrite materials. (5)

Q2: A) A rectangular waveguide is filled by dielectric material of $\epsilon_r = 9$ and has inside dimensions of 7×3.5 cm. It operates in the dominant TE_{10} mode. 10

- i) Determine the cut off frequency.
- ii) Find the phase velocity in the guide at a frequency of 2 GHz.
- iii) Find the guided wavelength at the same frequency.

B) Derive the field equations for TE modes in rectangular waveguide. 10

Q3: A) A series RC combination, having an impedance $Z_L = (450 - j600)\Omega$ at 3 GHz, is connected to a 300Ω line. Calculate the position and length of a short-circuited stub designed to match this load to the line. 10

B) Explain E-plane Tee and H-plane Tee with their properties. 10

Q4: A) With the help of Applegate diagram with gap voltage, explain process of velocity modulation in Reflex Klystron. 10

B) Explain working principal of phase shifter. 10

Q5: A) Explain principal of operation of Magnetron with the help of cylindrical model of a magnetron 10

B) Explain physical structure and principal of operation of IMPATT diode. 10

Q6: A) Explain in detail techniques used for VSWR measurement. 10

B) Explain various oscillation modes of Gunn Diode in detail 10
