

Please check whether you have got the right question paper.

- N.B:
1. **Q 1 is compulsory**
  2. **Solve any 3 from remaining**
  3. **Assume suitable data if required**

- Q.1 Solve any four 20
- a) What is mode jumping and how is it avoided in magnetron
  - b) List microwave frequency bands with frequency range
  - c) Calculate coupling factor of directional coupler when the incident power is 600 mW and power in auxiliary waveguide is 350 mW.
  - d) Explain working of Tunnel diode and its application in microwave engineering.
  - e) Explain microstrip line working with geometry
- Q.2 a) Explain schematic of Reflex klystron & working with applegate diagram. 10
- b) Explain physical structure and principle of working of TRAPATT diode. 10
- Q.3 a) An air filled 5 x 2 cm waveguide has  $E_2 = 20 \sin(40\pi x) \sin(50\pi y) e^{-j\beta z}$  10  
z v/m 15GHz
1. What is mode of propagation. Justify
  2. Determine wave impedance  $E_y/H_x$
- b) A magnetron has following parameters 10  
Gnner radius : 0.15 m  
Outer radius : 0.45m  
Flux density of magnetic field  $B_0 : 1.2 \text{ Wb/m}^2$
1. Determine Hull cut off voltage
  2. Cut off magnetic field density when beano voltage  $V_0 = 6000\text{V}$
  3. Cyclotron frequency in GHz if  $B = 0.3 \text{ Wb/ m}^2$
- Q.4 a) A  $50\Omega$  transmission line is terminated on a load of  $73 - j80\Omega$  . Design 10  
single stub matching impedance matching using short circuited shunt stub
- b) Explain any two methods of power measurement. 10
- Q.5 a) Construct a four port circulator using two magic Tees & a gyrator. Explain 10  
working of same at all four parts.
- b) Discuss working of Faraday Rotation isolator from port 1 to port 2 & port 2 10  
to port 1 with relevant diagrams.
- Q.6 a) List various modes of oscillation of Gunn diode. Give criteria of 10  
classification of these modes and explain working of any one mode.
- b) Derive field equations for TE modes in rectangular waveguides. What are 10  
degenerate modes?