

MICROWAVE ENGINEERING (EEC-603)

Important Question

1. Why TEM mode does not exist in rectangular waveguide? Also explain TE mode in rectangular waveguide.
2. Define Excitation mode in rectangular waveguide.
3. Give the expression for Power transmission and Power losses in circular waveguide.
4. Explain Two-hole directional coupler with S matrix.
5. Explain Microwave circulator and also explain the working of Attenuator.
6. Define Microwave strip lines with its characteristic impedances.
7. A rectangular waveguide measure $4.5 \times 3 \text{ cm}^2$ internally and have 9 GHz signal propagated in it. Calculate:
 - (i) Cut-off wavelength.
 - (ii) Guide wavelength.
 - (iii) Group velocity.
 - (iv) Phase velocity.
 - (v) Characteristic impedance of TE_{10} mode.
8. Write short note on Micro strip Transmission Line.
9. A TE_{11} mode is propagating through a circular waveguide. The radius of the guide is 5cm and the guide contains an air dielectric ($X'_{np} = 1.841$), find f_c , λ_g and z_g for an operating frequency of 3.0 GHz.
10. An air filled waveguide with cross section $2 \times 1 \text{ cm}$ transports energy in the TE_{10} mode at a rate of 0.5 hp. The impressed frequency is 30 GHz. What is the peak value of electric field occurring in the guide?
11. Explain the Hybrid rings tee with its matrix.

12. Define the working of attenuator.

13. Show that the diagonal elements of the s matrix of a Tee junction are not all zero.

14. Derive the s matrix for a two hole directional coupler.

15. Explain, how isolator is used to isolate one component from reflection of other components in the transmission line?

16. Describe the property of multiport microwave circulator.

17. What are the limitations of conventional active devices at microwave frequency?

18. Explain principle of operation of backward wave oscillator.

19. What is bunching process? And also explain velocity modulation in two cavity klystron.

20. Discuss the Gunn Effect and two valley model in detail.

21. With the help of suitable diagram, explain principle of operation of TRAPATT diodes.

22. Discuss the microwave characteristics of tunnel diode.

23. Write short note on measurement of insertion loss and attenuation loss.

24. Explain how antenna characteristics are measured?

25. Explain the basic experimental set up of VSWR measurement. How will you measure the high VSWR value?