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School of Engineering**B.TECH Electronics and Communication Engineering
Mid Term Examination - Nov 2023****Duration : 90 Minutes
Max Marks : 50****Sem V - G2UC501B - Microwave Engineering**General Instructions*Answer to the specific question asked**Draw neat, labelled diagrams wherever necessary**Approved data hand books are allowed subject to verification by the Invigilator*

- 1) Compare the two wire transmission line and waveguide. K2 (2)
- 2) Define dominant mode in rectangular waveguide. K1 (3)
- 3) Explain degenerate modes in waveguide. K2 (4)
- 4) Illustrate an electrical model diagram of the E-plane Tee and its electrical equivalent. K2 (6)
- 5) Identify a reason why the TEM mode is not exist in rectangular waveguide. K3 (6)
- 6) An air filled waveguide with a cross section 2 x 1 cm transports energy in the TE₁₀ mode at the rate of 0.5 hp. The impressed frequency is 30 GHz. What is the peak value of the electric field occurring in the guide? K3 (9)
- 7) Simplify the expression of phase velocity. K4 (8)
- 8) An air-filled rectangular waveguide has dimensions of a = 6 cm and b = 4 cm. The signal frequency is 3 GHz. Compute the following for the TE₁₀ and TM₁₁ modes: (a)Cut-off frequency (b)Wavelength in the waveguide (c)Phase constant and phase velocity (d)Group velocity in the waveguide. K4 (12)

OR

Analyze the excitation modes in rectangular waveguide. K4 (12)