

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST-2 EXAMINATIONS - DECEMBER 2022

PhD First Semester

COURSE CODE: 13M1WEC334(3)

MAX. MARKS: 25

COURSE NAME: Antenna Theory & Techniques

COURSE INSTRUCTOR: Dr. Naveen Jaglan

MAX. TIME: 1 Hour 30 Min

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

- Q1. Calculate the ratio of circular waveguide cross sectional area to rectangular waveguide cross section. Assume that both the waveguides have equal cut-off frequencies for TE modes.
[CO-4: 3 Marks]
- Q2. When a dominant mode is propagated in an air-filled rectangular waveguide, the guide wavelength for a frequency of 9000 MHz is 4 cm. Calculate breadth of the waveguide?
[CO-3: 4 Marks]
- Q3. An air-filled parallel plane waveguide carries the TM_2 mode. The height of the waveguide is 20 cm. If the phase velocity of the wave is $1.5c$, find the frequency and guide wavelength of the mode.
[CO-3,4: 3 Marks]
- Q4. In a parallel plane waveguide, the phase velocity of TE_3 mode is $1.4c$. Find the guide wavelength of TM_2 mode inside the waveguide. The waveguide has been filled with a material having dielectric constant of 9 and frequency of the wave is 1 GHz.
[CO-4: 3 Marks]
- Q5. The cross section of a rectangular waveguide is $20\text{cm} \times 5\text{cm}$. Find six lowest order modes which will propagate on the waveguide and their cut-off frequencies.
[CO-3: 3 Marks]
- Q6. Can TEM mode exist inside a rectangular waveguide. Explain with justification.
[CO-4: 3 Marks]
- Q7. What are the boundary conditions on the surface of the waveguide?
[CO-1,2: 3 Marks]
- Q8. What is the dominant mode of a rectangular waveguide? Write the significance of the dominant mode.
[CO-2,3: 3 Marks]