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**Presidency University**

**Bengaluru**

**SCHOOL OF ENGINEERING**

**MAKE UP EXAMINATION JULY 2024**

**Date**: 19/07/2024

**Time**: 9.30 AM to 12.30 PM

**Max Marks**: 100

**Weightage**: 50 %

**Course Code**: ECE 3009

**Course Name**: TRANSMISSION LINES AND WAVEGUIDES

**Program** : B.TECH

**Instructions:**

1. *Read the all questions carefully and answer accordingly.*
2. *Question paper consists of 3 parts.*
3. Scientific and Non-programmable calculators are permitted.

**Part A [Memory Recall Questions]**

**Answer all the Questions. Each Question carries 02 marks. (5Qx 2M= 10M)**

1. Give the classification of transmission line? [2M] (C.O.No.1) [Knowledge]
2. How do you normalize load impedance in Smith chart? [2M] (C.O.No.2) [Knowledge]
3. Define TE wave? [2M] (C.O.No.3) [Knowledge]
4. What is phase velocity in waveguide? [2M] (C.O.No.4) [Knowledge]
5. What is the relationship between reflection coefficient and VSWR of the transmission line?

[2M] (C.O.No.2) [Knowledge]

**Part B [Thought Provoking Questions]**

**Answer all the Questions. Each Question carries 15 marks. (2Qx15M=30M)**

6. How rectangular waveguide produce an oscillation when it is operating as cavity resonator? Comment on dominant modes in TE and TM modes? Justify your answer with examples for dominant modes? [15M] (C.O.No.1) [Comprehension]

7. A wave is propagated in a parallel plane waveguide separated by a distance 4cm at a frequency of 4GHz, then what is the dominant mode, cut-off frequency, cut-off wavelength, guide wall wavelength, phase constant? [15M] (C.O.No.3) [Comprehension]

**Part C [Problem Solving Questions]**

**Answer all the Questions. Each Question carries 20 marks. (3Qx20M=60M)**

8. A load impedance of ZL=10+j20 Ω is required to be matched to a 30 Ω characteristics impedance of the transmission line using a short circuited stub of length ‘l’ connected at a distance d from the load. If the wavelength is 0.5m determine d and l using Smith chart?

[20M] (C.O.No.2) [Application]

9. TE3 mode is propagated through the air between two perfectly conducting planes at a frequency of 2.5GHz. The phase constant at this frequency is measured to be 20 rad/m. Find (i) Cut-off frequency (ii) Separation between the planes (iii) angle of incidence on the plane (iv) Cut-off wavelength? [20M] (C.O.No.3) [Application]

10. If a generator of 0.25V, 2500Hz supplies power to a 5KM transmission line that has the parameters R=1.5 Ω/KM, L=0.00335 H/KM, G=0.08X10-6 mho/KM, C=0.0075 µF/KM. Then what should be the values of ᵞ, λ and Zo of a transmission line?

[20M] (C.O.No.1) [Application

