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**PRESIDENCY UNIVERSITY
BENGALURU
SCHOOL OF ENGINEERING**

MAKE UP EXAMINATION- JAN 2023

Course Code: ECE 211

Course Name: TRANSMISSION LINES AND WAVEGUIDES

Program : B.TECH

Date: 25-JAN-2023

Time: 01.00 PM to 04.00 PM

Max Marks: 100

Weightage: 50 %

Instructions:

- (i) Read the all questions carefully and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and Non-programmable calculators are permitted.

Part A [Memory Recall Questions]

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

1. Write the equation for phase velocity for lossless transmission line? (C.O.No.1) [Knowledge]
2. How do you normalize an impedance in Smith chart? (C.O.No.2) [Knowledge]
3. Define TEM wave? (C.O.No.3) [Knowledge]
4. What is group velocity in waveguide? (C.O.No.4) [Knowledge]
5. What is the relationship between reflection coefficient, load impedance and characteristics impedance of the transmission line? (C.O.No.2) [Knowledge]

Part B [Thought Provoking Questions]

Answer all the Questions. Each Question carries FIFTEEN 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? (C.O.No.1) [Comprehension]
7. A wave is propagated in a parallel plane waveguide separated by a distance 5cm at a frequency pof 5GHz, then what is the dominant mode, cut-off frequency, cut-off wavelength, guide wall wavelength, phase constant? (C.O.No.3) [Comprehension]

Part C [Problem Solving Questions]

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

8. A load impedance of $Z_L=30+j50 \Omega$ is required to be matched to a 20Ω 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?

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

9. TE₂ mode is propagated through the air between two perfectly conducting planes at a frequency of 1.5GHz. The phase constant at this frequency is measured to be 21 rad/m. Find (i) Cut-off frequency (ii) Separation between the planes (iii) angle of incidence on the plane (iv) Cut-off wavelength?

(C.O.No.3) [Application]

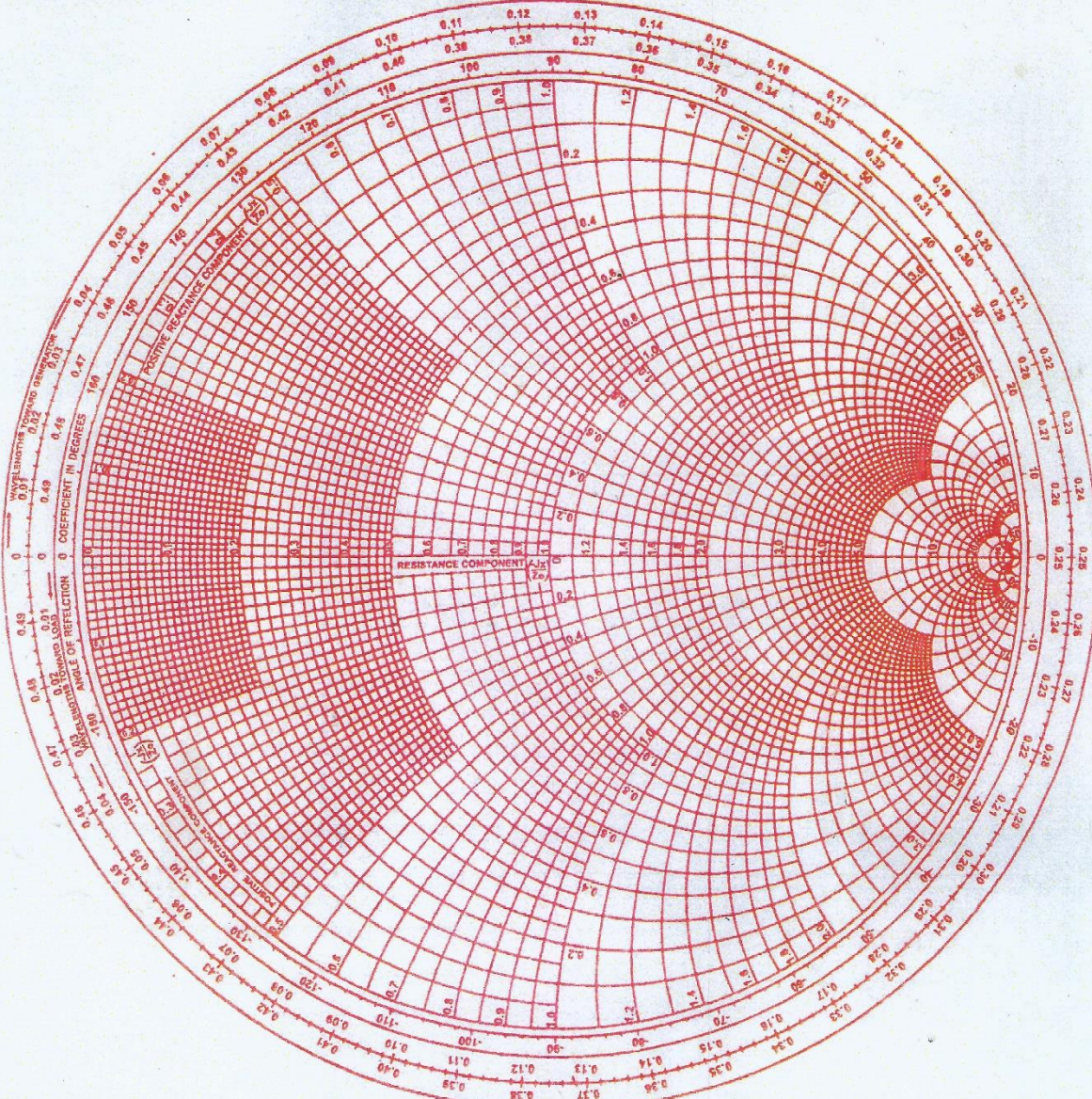
10. If a generator of 0.5V, 2000Hz supplies power to a 10KM transmission line that has the parameters $R=1.5 \Omega/\text{KM}$, $L=0.00335 \text{ H}/\text{KM}$, $G=0.08 \times 10^{-6} \text{ mho}/\text{KM}$, $C=0.0075 \mu\text{F}/\text{KM}$. Then what should be the values of γ , λ and Z_0 of a transmission line?

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

SMITH CHART

NAME	TITLE	DWG. No.
		DATE

IMPEDANCE OR ADMITTANCE COORDINATES



RADIALLY SCALED PARAMETERS

