

TEC-601

10

Printed Pages : 4

Paper ID & Roll No. to be filled in your Answer Book

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B.Tech. (ECE) (VI Semester)

End Semester Examination 2015

MICROWAVE TECHNIQUE

*Time: 3.00 Hours**[Total Marks: 100***Note:** Attempt all the questions

Q1. Attempt any FOUR parts: (5×4 = 20)

(a) A 600 ohm lossless transmission line is fed by a 50 ohm generator. If the line is 200m long and terminated by load of 500 ohm, determine in dB:

(i) Reflection loss

(ii) Transmission loss

(iii) Return loss

(b) Write short notes on strip line and micro-strip lines.

(c) A 50 Ohm lossless line connect a signal of 300 kHz to a load of 100 Ohm. If the load power is 50mW determine:

(i) VSWR

(ii) V_{\min} and V_{\max}

(d) Explain why TEM mode does not exist in waveguide

(e) Why microwave is called microwave? Enlist the advantages of Microwave frequencies over lower Frequency wave.

(f) Write the properties of S-matrix.

Q2. Attempt any FOUR parts: (5×4 = 20)

(a) The dimension of a guide is 2.5 X 1 cms .The frequency is 8.6 GHz find the following:

(i) Possible mode

(ii) Cutoff frequencies

(iii) Guide wavelength

(b) Calculate the resonant frequency of a circular resonator of dimension $a=3$ cms, $b=2$ cms $l=4$ cms, when the mode of operator is TE_{101}

(c) What is S-parameter? Obtain the S- matrix for magic Tee.

(d) Write short notes on:

(i) Isolator

(ii) Circulator

(e) Explain the working of two hole directional coupler also calculate the S-matrix for two holes Directional coupler.

(f) Explain the excitation method of waveguide.

Q3. Attempt any TWO parts: (10×2 = 20)

(a) What is VSWR? Discuss the measurement of low, medium & high VSWR.

(b) Discuss methods for measurement of low and high microwave power.

(c) Explain the method for wavelength measurement. Also discuss attenuation measurement.

Q4. Attempt any TWO parts: (10×2 = 20)

(a) Discuss the working of two cavity klystron amplifier and derive the expression for efficiency for two cavity klystron.

(b) Explain the working and characteristic of travelling wave tube (TWT) with neat diagram.

(c) What is velocity modulation. Describe the construction and working of reflex klystron.

Q5. Attempt any TWO parts: (10×2 = 20)

(a) Explain the construction, working of a magnetron.
Also calculate its efficiency.

(b) What are the problems with conventional tubes at
microwave frequencies?

(c) A reflex klystron operates at 8GHz at the peak
of $n=2$ mode with $V_o = 300V$, $R_{sh} = 20k\Omega$ and
 $L=1$ mm. If the gap transit time and beam loading
are neglected. Find the:

(i) Repeller voltage

(ii) Beam current necessary to obtain an RF gap
voltage of 200V.

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