GIET MAIN CAMPUS AUTONOMOUS GUNUPUR – 765022

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Registration No:

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AR-18

M.TECH 1ST SEMESTER EXAMINATIONS(BACK), NOV/DEC 2019

ECE-MECPE1042

RF AND MICROWAVE CIRCUIT DESIGN

Time: 3 Hours **Max Marks : 70**

The figures in the right hand margin indicate marks.

PART-A **(10 X 2=20 MARKS)**

1. Answer the following questions.

a) What do you mean by lumped parameter and distributed parameter network?
b) What are the transmission line parameters ?
c) Mention advantages and disadvantages of planar transmission line
d) Define quarter wave transmission line .
e) Draw the E-Plane , H-Plane and Magic Tee junctions.
f) Write the S-Matrix of a circulator?
g) Write the formula for quality factor Q of the TE_{101} Cavity mode
h) Why cannot TEM mode propagate in a single conductor transmission line that is in a waveguide
i) What is oversized waveguide?
j) A coaxial filter is which type of filter and a waveguide in general is which type of filter ?

PART-B **(5 X 10=50 MARKS)**

Answer any five questions from the following.

2.
a) Discuss about phase shifter with proper diagram .
b) What is an attenuator? Discuss about the flap type attenuator.

3.
a) Explain with proper diagram about the gun diode .
b) Explain with proper diagram about the IMPATT diode.

4.
a) a)Explain in detail about directional couplers and power dividers.
b) Discuss about micro strip transmission line .

5.
a) A directional coupler has the coupling factor of 10 dB and a directivity of 30 dB .If the power in the isolated port is 40 μW, find the power in the input port and also in the through port . What is the insertion loss in the coupler ?
b) Find the scattering matrix of a matched isolator with 1.0dB insertion loss and 30 dB isolation .Neglect any reflection .

6.
a) a)Discuss about the signal flow graphs : Decompositions Rules and Meson's Rule.
b) Discuss about the properties of S-Parameter.

7.
a) Consider an air filled cubical cavity (a=b=d) designed to be resonated in the TE_{101} mode at 12 GHz with gold plated surfaces (conductivity is 4.1×10^7 siemens per meter). Find the quality factor .
b) Design a cylindrical cavity with length of the cavity equal to its diameter, with the TE_{011} mode resonating at 10 GHz . The cavity has silver plated walls ($\sigma = 6.1 \times 10^7$ S/m).Determine the Q of the Cavity .

8.
a) Explain about coupling and tuning of microwave resonator .
b) Explain about Strip/Disc Resonator with suitable diagram.

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