

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**ME - SEMESTER– I (New course)• REMEDIAL EXAMINATION – SUMMER 2015**

**Subject Code: 2710504****Date:13/05/2015**Subject Name: **RF AND MICROWAVES****Time: 10:30 am to 1:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Derive impedance matrix and admittance matrix for  $\delta$  Network 07  
 (b) Explain significance of microwave and its applications in detail. 07
- Q.2** (a) Why we need to design matching network? Explain Single Stub and Double Stub matching Network 07  
 (b) An RF amplifier has the following parameters:  $S_{11}=0.3\angle-70^\circ$ ,  $S_{21}=3.5\angle85^\circ$ ,  $S_{12}=0.2\angle-10^\circ$  and  $S_{22}=0.4\angle-45^\circ$ . The input side of the amplifier is connected to a voltage source with  $V_S=5V$  and source impedance  $Z_S=40\Omega$ . The output is utilize to drive an antenna, which has a impedance  $Z_L=73\Omega$ . Assuming that the S-parameters of the amplifier are measured with reference to a  $Z_0=50\Omega$ . Find the transducer gain, unilateral transducer gain, available gain and operating power gain. 07
- OR**
- (b) Derive Equation of Transducer Power gain  $G_T$  07
- Q.3** (a) Why is a hybrid E-H phase Tee referred to as magic Tee? Explain operation of E-H plane Tee junctions with scattering matrix. 07  
 (b) Derive scattering matrix of Directional Coupler. 07
- OR**
- Q.3** (a) Explain Construction and application of circulator. 07  
 (b) A 90W Power source is connected to the input of a directional coupler with coupling factor of 20 dB, Directivity of 35 dB and an insertion loss of 0.5 db. Find the output powers at the through, coupled and isolated ports. Assume all ports to be matched. 07
- Q.4** (a) Explain Gunn effect using the two valley theory 07  
 (b) What is a parametric amplifier? Write the amplification mechanism of a parametric amplifier. 07
- OR**
- Q.4** (a) What do you understand by avalanche transit time effect? Explain working, construction, and applications of TRAPATT device. 07  
 (b) Explain MMIC fabrication techniques with figure. 07
- Q.5** (a) How is tuning achieved in reflex klystron oscillator? Give major characteristic and application of reflex klystron 07  
 (b) Define VSWR and explain double minimum method of measuring VSWR 07
- OR**
- Q.5** (a) Differentiate between Klystron and TWT 07  
 (b) Explain two methods of measuring impedance of a terminating load in a microwave system. 07

\*\*\*\*\*