

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. - SEMESTER – II • EXAMINATION – SUMMER • 2014****Subject code: 1710411****Date: 24-06-2014****Subject Name: RF and Microwave Engineering****Time: 02:30 pm - 05:00 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) With neat sketch explain 'Aperture Coupling' with equivalent electric and magnetic polarization for various Transmission Line and Waveguide Configurations. **07**
- (b) How Signal Flow Graph can be reduced to a single branch between two nodes to obtain any desired wave amplitude ratio using 'Decomposition Rules'. **07**
- Q.2** (a) Define the Terms: Reflection Coefficient, Return Loss, VSWR and Characteristic Impedance. **07**
- (b) Prove that TE mode of Rectangular Waveguide, Cut-off Frequency **07**
- $$f_{c_{m,n}} = \frac{K_C}{2\pi\sqrt{\mu\epsilon}}.$$
- OR**
- (b) Discuss: TE mode of Circular Waveguide. **07**
- Q.3** (a) Compare: Series Resonator and Parallel Resonator **07**
- (b) What are the problems with Lossless T-Junction Power Divider? Explain WILKINSON Power Divider with necessary equations. **07**
- OR**
- Q.3** (a) Define: 'Resonance Isolator'. Explain Resonance Isolator with E-Plane and S-Plane Slab. **07**
- (b) Write Short Note on : 180° HYBRID **07**
- Q.4** (a) With neat Sketch explain 'Balanced Amplifier' using 90° Hybrid Coupler. **07**
- (b) Discuss: Time Varying Maxwell's Equations. **07**
- OR**
- Q.4** (a) What do you understand by 'Conversion Loss of Mixer'? Explain 'Single Ended Mixer Circuit' **07**
- (b) What is 'Microwave Integrated Circuit'? Explain Monolithic Microwave Integrated Circuit in brief with advantage and disadvantage. **07**
- Q.5** (a) A lossless T-Junction power divider has a source impedance of 100'. Find the output characteristics impedance so that the input power is divided in a 2:1 ratio. Compute the reflection coefficients seen looking into the output ports **07**
- (b) Explain Gain and Stability of two port amplifier circuit in terms of S parameter of Transistor. **07**
- OR**
- Q.5** (a) Draw 'Lumped-element equivalent circuit' of two wire Transmission Line. Prove that Characteristic Impedance: $Z_0 = \sqrt{L/C}$ with necessary equations. **07**
- (b) Write Short Note on: Smith Chart **07**
