

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

## GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VI • EXAMINATION – SUMMER • 2014

Subject Code: 160802

Date: 21-05-2014

Subject Name: Electronic Communication

Time: 10:30 am - 01:00 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) Give classification of Electronic Communication System. Also classify based on direction of communication Write a short note on: Historical review of telecommunication. **07**
- (b) Explain: “Skin effect” **04**
- (c) A coil has a series resistance of  $5\ \Omega$ , a self capacitance of  $7\text{pF}$ , and an inductance of  $1\mu\text{H}$ . Determine the effective inductance and effective Q-factor when the coil forms part of a series tuned resonant at  $25\text{MHz}$ . **03**
- Q.2** (a) Explain (with neat diagram) equivalent input noise generators and comparison of BJTs and FETs. **07**
- (b) Explain the following: **07**  
Shot noise, Partition noise, Flicker noise, Burst noise, Avalanche noise, Bipolar transistor Noise, Field effect transistor noise
- OR**
- (b) In the measurement of noise temperature, an avalanche diode source is used; the ENR Being  $14\text{ dB}$ . The measured Y factor is  $9\text{ dB}$ . Calculate the equivalent noise temperature of the amplifier under test. **07**
- Q.3** (a) State and prove following properties of Fourier Transform **07**  
1. Duality 2. Frequency Shifting 3. Convolution in time domain.
- (b) Find the Fourier transform of the periodic signal:  $x(t) = \cos(2\pi f_0 t) \cdot u(t)$  **07**
- OR**
- Q.3** (a) Explain with block diagram frequency multiplier using PLL and Frequency Synthesizer using PLL. **07**
- (b) List the methods used for SSB generation, and explain “Phase Shift method” for generation of L.S.B. with mathematical proof. **07**
- Q.4** (a) Define frequency modulation. What are the advantages and disadvantages of FM as compared to AM? **07**
- (b) Find the tuning range necessity for the oscillator capacitor in a MW superheterodyne Receiver which tunes over the range of signals from  $530\text{ kHz}$  to  $1650\text{ kHz}$  and uses an IF of  $455\text{ kHz}$ , if the oscillator frequency is:  
1. higher than signal frequency 2. lower than signal frequency **07**
- OR**
- Q.4** (a) Explain the significance of the terms ‘sensitivity’ and ‘selectivity’ as applied to a receiver. Which of the receiver stages control these characteristics? **07**
- (b) What do you mean by ‘tracking’ in a super heterodyne receiver? What is “tracking error”? Explain the “three point tracking” in MW band receiver. **07**
- Q.5** (a) Explain block diagram of double conversion used in communication receivers. **07**
- (b) Explain capacitive tap with circuit diagram and find transfer impedance. Explain what is meant by polar mount antenna. **07**
- OR**
- Q.5** (a) Write a short note on : “Geostationary orbit” **07**
- (b) Explain Power System with reference to satellite communications. **07**

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