

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE- VI<sup>th</sup> SEMESTER–EXAMINATION – MAY- 2012****Subject code: 160802****Date: 11/05/2012****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) Define analog and digital messages. What is the difference between them? Write a short note on: Historical review of telecommunication. **07**
- (b) Explain briefly (with neat diagram) low frequency transformer. **07**  
An ac series circuit having  $R=10\text{ ohm}$ ,  $L=0.1\text{H}$  and  $C=100\text{ micro F}$  is connected to a  $230\text{ V}$ ,  $50\text{ Hz}$  supply find:  
1. power factor 2. voltage across coil 3. Frequency when  $Z=10\text{ ohm}$ .

- Q.2** (a) Explain the following: **07**  
1. Thermal noise 2. Flicker noise 3. Burst noise 4. Avalanche noise  
Explain signal to noise ratio briefly.  
(b) Explain briefly the measurement of Noise Temperature.. An amplifier has a bandwidth of  $4\text{ MHz}$  with  $10\text{k ohm}$  as the input resistor. Calculate the rms noise voltage at the input to this amplifier if the room temperature is  $27^\circ\text{C}$ . **07**

**OR**

- (b) Explain briefly double spotting. For a receiver with IF and RF frequencies of  $455\text{ kHz}$  and  $900\text{kHz}$  respectively, determine: **07**  
1. The local oscillator frequency 2. Image frequency  
3. Image frequency rejection ratio for a pre-selector Q of 80.

- Q.3** (a) Define and explain energy spectral density (ESD). Obtain the Fourier transform of a unit step function. **07**  
(b) What is the difference between time domain representation and frequency domain representation of signals? Write a short note on: Practical filters. **07**

**OR**

- Q.3** (a) State and prove the following properties of Fourier Transform: **07**  
1. Scaling 2. Duality 3. Integration in time domain  
State relation between auto correlation and PSD (power spectral density).  
(b) Explain electronically tuned radio receivers. The carrier amplitude after AM varies between 4 volts and 1 volt. Calculate depth of modulation. **07**

- Q.4** (a) Explain frequency division multiplexing (FDM). The antenna current of an AM transmitter is  $10\text{ A}$  when it is modulated to a depth of 30% by an audio signal. It increases to  $11\text{ A}$  when another signal modulates the carrier. What is the modulation index due to second wave? **07**  
(b) Explain block diagram with waveforms of FM receiver. Discuss applications of Angle modulation. **07**

**OR**

- Q.4** (a) Compare frequency modulation (FM) and angle modulation (AM) signals **07**  
(b) Explain briefly baseband and carrier communications. Prove that in AM (amplitude modulation) maximum average power transmitted by an antenna is 1.5 times the carrier power.. **07**

- Q.5 (a)**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**
- (b)**Compare between DSB-FC.,DSB-SC.,SSB and VSB in terms of carrier suppression, sideband suppression,bandwidth,transmission efficiency,application,complexity etc. **07**
- OR**
- Q.5 (a)**What do you mean by altitude control? Explain Multiple-access methods with diagram. **07**
- (b)**State and explain Kepler’s laws in relation to artificial satellites orbiting the earth. **07**

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