

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE - SEMESTER– V • EXAMINATION – WINTER 2016**

**Subject Code: 151004****Date: 17/11/2016****Subject Name: Electronic Communication****Time: 10:30AM – 01:00PM****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) What is modulation? Why modulation is required? Describe in detail. **07**  
 (b) Draw and explain circuit of envelope detector for AM. **07**
- Q.2** (a) Draw and explain series tuned circuits in detail. Also derived equation for Resonance frequency and Q-factor for the series tuned circuits. **07**  
 (b) Explain briefly what is meant by skin effect and why it is undesirable. What steps may be taken to reduce skin effect in inductors? **07**
- OR**
- (b) Draw block diagram of super heterodyne receiver and explain function of each block. **07**
- Q.3** (a) Explain Amplitude Modulation with required waveforms. Also give mathematical representation of Amplitude modulated Wave. **07**  
 (b) AM modulating signal  $8\sin(2\pi \times 900t)$  is used to modulate a carrier signal  $18\sin(2\pi \times 15000t)$ . Find modulation index, percentage modulation, frequencies of sideband components and their amplitude. Draw the spectrum of AM wave. **07**
- OR**
- Q.3** (a) What are the natural sources of noise? Explain Shot noise, Partition noise and Thermal noise. **07**  
 (b) Define noise factor. Drive the Friis's formula for noise factor when amplifiers are in cascade connection. **07**
- Q.4** (a) Discuss the basic principal of FM detection and explain Foster-seeley Discriminator. **07**  
 (b) A FM voltage is represented by  $v=12\sin(6 \times 10^8t + 5\cos 1250t)$  Find Carrier Frequency, Modulating Frequency, Modulation Index, Maximum Deviation **07**
- OR**
- Q.4** (a) Explain AGC and discuss difference between simple AGC and Delayed AGC. **07**  
 (b) Explain various types of tracking. **07**
- Q.5** (a) Discuss the importance of Pre-emphasis and De-emphasis circuits in FM broadcasting. **07**  
 (b) Two resistors 20 k $\Omega$  and 50 k $\Omega$  are at room temperature (290K) for a bandwidth of 100kHz. Calculate thermal noise for each resistor and if two resistors are in series. **07**
- OR**
- Q.5** (a) State and prove any three properties of Fourier transform. **07**  
 (b) A receiver tunes signals from 550 to 1600 kHz with an IF of 455 kHz. Find the frequency tuning ranges and capacitor tuning ranges for the oscillator section and for the RF section. **07**

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