

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. Sem. - V - Examination – June- 2011

Subject code: 151004

Subject Name: Electronic communication

Date: 27/06/2011

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)** Draw block diagram of superheterodyne receiver and explain function of each block. **07**
(b) Explain Armstrong method of FM generation with neat diagram. **07**

- Q-2 (a)** State and prove any three properties of Fourier transform. **07**
(b) Explain different types of noise related to communication. **07**

OR

- (b)** Discuss Noise factor. Derive expression for noise factor of amplifier connected in cascade. **07**

- Q-3 (a)** Explain Tracking and Adjacent channel selectivity. **07**
(b) Explain double conversion superheterodyne receiver with neat diagram. **07**

OR

- Q-3 (a)** What do you understand by image frequency and its rejection? **07**
 For a receiver with IF and RF frequency of 455 KHz & 950 KHz respectively determine:

- (i) local oscillator frequency
- (ii) image frequency
- (iii) image frequency rejection ratio. take $Q=70$.

- (b)** Explain AGC and discuss difference between simple AGC and Delayed AGC. **07**

- Q-4 (a)** Draw and discuss schematic diagram for FDM system to combine 4 voice channels each occupies a bandwidth of 6KHz. The common voice channel has a bandwidth of 24 KHz. (Band- 200 to 224 KHz). **07**

- (b)** Explain phase locked loop and vestigial sideband transmission. **07**

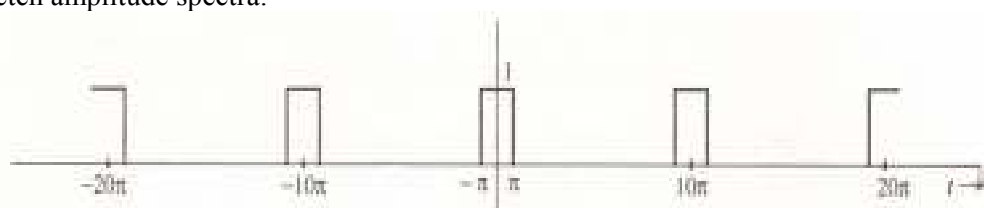
OR

- Q-4 (a)** Derive the expression for AM wave. 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**

- (b)** Discuss the following: **07**
 (i) Energy spectral density
 (ii) Power spectral density
 (iii) Essential bandwidth of a signal

- Q-5 (a)** Discuss basic principle of FM detection and Explain foster seeley discriminator with neat diagram. **07**

- (b)** For the periodic signal shown in fig. 1. Find compact trigonometric fourier series and sketch amplitude spectra. **07**



OR

- Q-5 (a)** Give comparison of FM and PM systems. **07**
In FM system, the modulating frequency is 500Hz & modulating voltage is 3.6V with modulating index 65. Calculate maximum frequency deviation. What will be the modulation index when modulating frequency is 235Hz and modulation voltage is 5V?
- b)** Find Fourier transform of following: **07**
- (i) $\text{rect}(t/\tau)$
 - (ii) $e^{-7|t|}$
