

GUJARAT TECHNOLOGICAL UNIVERSITY
PDDC - SEMESTER – IV • EXAMINATION – WINTER 2012

Subject code: X 41101**Date: 03/01/2013****Subject Name: Electronic Communication****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) Derive Friss' formula for amplifiers connected in cascade. A mixer stage has a noise figure of 20 dB, and it is preceded by an amplifier that has noise figure of 8 dB and an available power gain of 16 dB. Calculate the overall Noise figure referred to the input. **07**

(b) Define frequency deviation. What is the maximum deviation allowed in FM broadcast? Derive expression for frequency modulated wave. **07**

Q.2 (a) Define modulation. Explain the need of modulation? **07**

(b) Explain Armstrong method of FM generation with necessary Block diagram and vector diagram. **07**

OR

(b) Explain Ratio detector for FM detection with circuit and vector diagram. How amplitude limiting is achieved in ratio detector? **07**

Q.3 (a) Enlist characteristics of Superhetrodyne receiver and explain image frequency rejection. **07**

In a broadcast Superhetrodyne receiver having no RF amplifier, the loaded Q of the antenna coupling circuit is 100. If the IF is 455 KHz, calculate

a) The image frequency and its rejection ratio for tuning at 1100 KHz

b) The image frequency and its rejection ratio for tuning at 25 MHz.

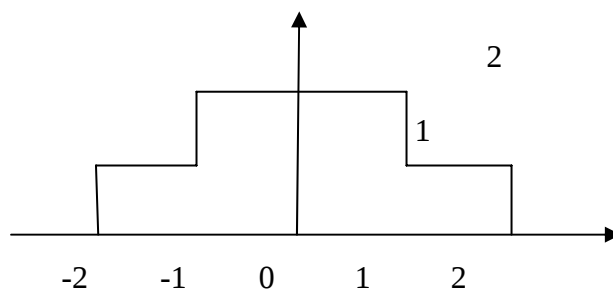
(b) Explain FET Balanced modulator for AM generation with necessary diagram and equations. **07**

OR

Q.3 (a) Differentiate TRF and Superhetrodyne receiver. Draw the block diagram of Superhetrodyne receiver and explain the function of each block. **07**

(b) The antenna current of AM broadcast transmitter modulated to the depth of 40% by an audio sine wave is 11A. It increases to 12A as a result of simultaneous modulation by another audio sine wave. What is the modulation index due to this second wave? **07**

Q.4 (a) Determine the Fourier transform of the signal shown in fig. **07**



- (b) List all the properties of Fourier transform. Explain time-shifting and frequency-shifting properties.

OR

- Q.4 (a) Find the Fourier transform of the signal: 07

$$x(t) = \cos \omega_0 t$$

- Q.4 (b) Differentiate Energy signal and Power signal. Explain Power spectral density and state all of its properties. 07

- Q.5 (a) Enlist different methods of SSB generation. Explain phase shift method with necessary block diagram and equations. 07

- (b) Write short note on tapped inductor and capacitive tap. 07

OR

- Q.5 (a) Draw parallel tuned circuit and derive equation for resonant frequency and Q-factor. 07

- (b) What is noise? Explain shot noise, thermal noise and partition noise 07
