# GUJARAT TECHNOLOGICAL UNIVERSITY
### P.D.D.C.  Sem - IV  Examination June- 2011
## Subject code: X41101
## Subject Name: ELECTRONIC COMMUNICATION

Date: 02/06/2011                                              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.**

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|---|---|---|---|
| **Q.1** | **(a)** | What is Noise Figure? Explain the measures used to improve the Noise Figure of a receiver. | **07** |
| | **(b)** | A channel has a bandwidth of 5 kHz and a signal to noise power ratio 63. Determine the bandwidth needed if the S/N power ratio is reduced to 31. What will be the signal power required if the channel bandwidth is reduced to 3 kHz? | **07** |
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| **Q.2** | **(a)** | Explain frequency selective Properties of Series Resonance circuit? Derive equation for resonance. | **07** |
| | **(b)** | Draw a block diagram of high quality Super heterodyne communication receiver and describe function of each block. | **07** |

<div align="center"><b>OR</b></div>

| | | | |
|---|---|---|---|
| | **(b)** | Explain the following terms in brief.<br>(i) Thermal Noise                    (ii) Noise Temperature | **07** |
| | | | |
| **Q.3** | **(a)** | Fourier Transform is a limiting case of Fourier Series by letting the Period of Periodic function infinite. Justify the statement with an example of Periodic gate function. | **07** |
| | **(b)** | The frequency span to be received by a receiver is from 525 kHz to 1650 kHz. If $C_{min}$ of tuning circuit is limited to 50 pF by a trimmer of 25 pF, calculate the value of padder capacitor, if the maximum value of variable capacitor is 450 pF. The IF used is 465 kHz. | **07** |

<div align="center"><b>OR</b></div>

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|---|---|---|---|
| **Q.3** | **(a)** | What is skin effect? Why it is undesirable? How will you reduce it? | **07** |
| | **(b)** | Write a short note on: Self Capacitance of a Coil. | **07** |
| | | | |
| **Q.4** | **(a)** | (i) Explain the Shannon's capacity for a Noisy Channel. | **04** |
| | | (ii) If each stage has a gain of 10 dB and Noise figure of 10 dB determine the overall Noise figure of a two stage cascaded amplifier. | **03** |
| | **(b)** | Explain Balanced Modulator using FET with the derivation for DSB-SC. | **07** |

<div align="center"><b>OR</b></div>

| | | | |
|---|---|---|---|
| **Q.4** | **(a)** | Write short note on: Electronically Tuned radio receiver. | **07** |
| | **(b)** | What do you mean by Fourier Transform? Prove that the compression in the time domain results in expansion of frequency spectrum whereas expansion in the time domain results in compression of the frequency spectrum. | **07** |
| | | | |
| **Q.5** | **(a)** | Explain the Armstrong method of generating FM with a neat block diagram and phasor diagram. | **07** |

**(b)** A complex modulating waveform consisting of a sine wave of amplitude **07** 3V and frequency 1000 Hz plus a cosine wave of amplitude 5V and frequency 3000 Hz, amplitude modulates a carrier of 500 kHz and 10V peak. Plot the spectrum of modulated wave and determine the average power when the modulated wave is fed into a 50Ω load.

**OR**

**Q.5** **(a)** (i) What do you mean by Image Frequency and its rejection? **04**

(ii) List the merits and limitations of Fourier Transform. **03**

**(b)** Obtain the Fourier transform of a cosine wave having frequency $f_0$ and **07** peak amplitude of unity and plot its spectrum.

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