

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2118

Roll No.

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B.Tech.

(SEM. V) ODD SEMESTER THEORY

EXAMINATION 2013-14

PRINCIPLES OF COMMUNICATIONS

Time : 3 Hours

Total Marks : 100

Note :— Attempt **all** the questions. Each question carries equal marks.

1. Attempt any **four** parts of the following : (5×4=20)
- (a) What is Modulation ? Why modulation is needed ?
 - (b) Derive the relation between the output power of an AM transmitter and the depth of modulation.
 - (c) Prove that the balanced modulator produces an output consisting of sidebands only, with the carrier removed.
 - (d) Draw the block diagram of phase cancellation SSB generation and explain how the carrier and the unwanted sideband are suppressed.
 - (e) When a broadcast AM transmitter is 50 percent modulated, its antenna current is 12 A. What will be the current when the modulation depth is increased to 0.9 ?
 - (f) What is VSB modulation ? What is the application of VSB modulation ?

2. Attempt any **four** parts of the following : **(5×4=20)**
- (a) Derive the expression for the instantaneous value of an FM voltage and define the modulation index.
 - (b) Draw the block diagram of balance frequency discriminator and explain it for demodulation of FM signal.
 - (c) Illustrate the principle of Armstrong system of generating FM and PM signal.
 - (d) With the help of suitable diagram explain the working of stereophonic broadcasting transmitter receiver.
 - (e) What do you understand by instantaneous frequency, frequency deviation and bandwidth of FM wave? A carrier wave of frequency 100 MHz is frequency modulated by a sinusoidal wave of amplitude 20 V and frequency 100 kHz. The frequency sensitivity of the modulator is 25 kHz per volt. Determine approximate band-width of FM Signal.
 - (f) Draw the circuit diagram of a Foster-Seeley discrimination. Explain its principle of operation with the help of relevant phasor diagrams.
3. Attempt any **two** parts of the following : **(10×2=20)**
- (a) What is Quantization? How can you minimize the quantization error? How quantizing and coding is done? Explain with suitable waveform.
 - (b) Explain the Modulation and Demodulation of pulse width modulation system using suitable waveform. Also discuss how is the Pulse Position Modulation (PPM) generated through PWM (Pulse Width Modulation).

- (c) (i) For the given binary sequence 1011001011 construct unipolar NRZ, unipolar RZ, bipolar NRZ, bipolar RZ, Alternate Mark Inversion (AMI) and Manchester format.
- (ii) What is Companding? What is the advantage of Companding?

4. Attempt any **two** parts of the following : **(10×2=20)**
- (a) What is the advantage of Differential Pulse Code Modulation over Pulse Code Modulation? What is the limitation of Delta Modulation?
 - (b) Discuss the classification, working advantages and one application of each type of Vocoders.
 - (c) What is Noise? What are various forms and sources of noise? Discuss the importance of S/N ratio in a radio-receiver.
5. Attempt any **two** parts of the following : **(10×2=20)**
- (a) Analyze Noises present in Amplitude Modulation System and derive its signal to Noise Ratio. Find out the figure of merit in DSB-SC System.
 - (b) What is pre-emphasis and de-emphasis and how SNR improves by using pre-emphasis and de-emphasis? Find out the figure of merit in SSB-SC System.
 - (c) What is Digital Phase Locked Loop? Explain the working of an Ex-OR gate based digital phase comparator.