Q.P. Code : 50777

(3 Hours) **[Total Marks:80]**

N. B.: 1) Question No. **1** is **compulsory.**
2) Attempt **any three** questions out of the remaining five questions.
3) Assume suitable data wherever necessary.

1. **Answer the following (any four):** 20
   a) Explain how quantization helps in noise removal.
   b) Explain why the local oscillator frequency is always chosen as f_s+f_{IF} and not f_s-f_{IF}?
   c) Explain noise triangle in FM.
   d) Determine the overall noise factor and noise figure for three cascade amplifiers with the following parameters:
   A_1=6dB, A_2=15dB A_3=10dB
   NF_1=10dB NF_2=6dB NF_3=10dB
   e) Calculate percentage saving in AM modulated wave to a depth of 100 percent when the carrier and one of the sidebands are suppressed. Compare AM with SSB-SC.

2. a) With the help of a neat bock diagram explain the FM transmitter using Armstrong method of FM generation. 5
   b) In a super-heterodyne receiver having no RF amplifier, the loaded Q of the antenna coupling circuit is 100. If the IF is 455kHz, calculate: 1) The image frequency and its rejection ratio for the tuning at 1044kHz. 2) The image frequency and its rejection ratio for the tuning at 30MHz. 5
   c) With a neat block diagram explain the working of super-heterodyne receiver,with waveforms at the output of each block. Explain the functions of each block. 10

3. a) Explain the terms with reference to Radio Receivers: Selectivity, Sensitivity, Fidelity AGC and Double spotting. 10
   b) Explain the frequency discriminators with the help of neat diagrams. 10

4. a) Explain PAM, PWM and PPM generation with relevant waveforms. 10
   b) Explain natural sampling and flat top sampling . What is aliasing error? How it can be overcome? 10

5. a) Derive the expression for the signal to quantization noise ratio in PCM. 5
   b) In an FM system, when the audio frequency is 400Hz and the AF voltage is 4V, the deviation is 4.8kHz. Calculate the modulation index and the bandwidth required. If the modulating frequency is halved, what is the new bandwidth? 5
   c) Explain the working of Delta Modulation with a neat block diagram and showing proper waveforms. 10

6. a) Explain FDM with a neat block diagram. Give its applications. 10
   b) Draw block diagram of PCM transmitter and receiver and explain the function of each block .. 10

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