Code: 15A04402 **R15**

B.Tech II Year II Semester (R15) Regular Examinations May/June 2017

ANALOG COMMUNICATION SYSTEMS

(Electronics and Communication Engineering)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) State the necessity of modulation.
(b) Plot the spectrum of AM.
(c) State the bandwidth requirement of FM with the help of appropriate diagram.
(d) Why local oscillator frequency in super heterodyne radio receiver is chosen to be the incoming signal frequency?
(e) Define noise temperature and give the significance of the same.
(f) Discuss the necessity of pre-emphasis and de-emphasis in FM.
(g) Give the bandwidth requirements of pulse code modulation.
(h) Discuss briefly aperture affect with respect to sampling.
(i) State Shannon Hartley theorem.
(j) Plot the variation of channel capacity of a binary symmetric channel against the transition probability and explain the same.

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 (a) Sketch the spectrum of DSB-SC wave given by: $S(t) = A_c sin(2\pi\ 10^2 t) cos(2\pi\ 10^5 t)$.
(b) Discuss SSB transmitter and receiver with the help of appropriate quantitative analysis and diagrams.

OR

3 (a) Draw the block diagram for generation of DSB-SC wave using two AM modulators. A DSB-SC wave is demodulated using coherent detector. Evaluate the effect of frequency error in local carrier frequency of detector.
(b) Discuss in detail QAM.

UNIT – II

4 (a) Give the bandwidth relationship using Carson's rule in FM.
(b) Explain FM generation using indirect method.

OR

5 (a) Draw the phasor diagrams of NBFM & AM and compare them. A carrier is frequency modulated with a sinusoidal of 2 kHz resulting in a maximum frequency deviation of 5 kHz.
(i) Find the bandwidth of the modulated signal.
(ii) The amplitude of the modulating sinusoid is increased by a factor of 3, and its frequency is lowered to 1 kHz. Find the maximum frequency deviation and the bandwidth of the new modulated signal.
(b) Discuss the choice of selection of IF in super heterodyne radio receiver.

UNIT – III

6 (a) Give the quadrature representation of narrowband noise.
(b) Deduce the SNR of DSBSC.

OR

7 (a) Discuss FM threshold.
(b) Derive an expression of SNR of AM.

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UNIT – IV

8 (a) Deduce the requirements posed by PAM signal on magnitude and phase responses of the channel and show that noise performance of PAM system can never be better than the base band signal transmission.

(b) With the help of experimental setup, explain how will you determine Sensitivity, Selectivity and Fidelity of radio receiver.

OR

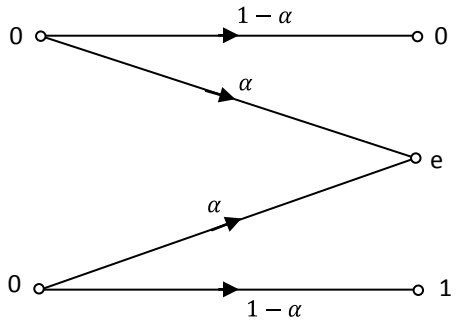
9 (a) Explain the generation of PPM.

(b) Discuss natural and flat topped PAM analytically and compare the same.

UNIT – V

10 (a) State and prove information capacity theorem.

(b) The binary erasure channel has two inputs and three outputs. The inputs are labeled 0 and 1 and the outputs are labeled 0, 1, e. A fraction of incoming bits are erased by the channel. Find the capacity of channel.



OR

11 (a) Give the implication of information capacity theorem in the context of Gaussian channel that is limited in both power and bandwidth through appropriate plot for bandwidth efficiency

(b) A voice grade channel of the telephone network has a bandwidth of 3.4 kHz. Calculate the information capacity of the telephone channel for a signal to noise ratio of 30 dB. Calculate the minimum signal to noise ratio required to support information transmission through the telephone channel at the rate of 9,600 b/s.

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