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B.TECH
(SEM VII) THEORY EXAMINATION 2020-21
ANALOG & DIGITAL COMMUNICATION

Time: 3 Hours**Total Marks: 100****Note:** Attempt all Sections. If require any missing data; then choose suitably.**SECTION A****1. Attempt all questions in brief.****2 x 10 = 20**

a.	Define amplitude modulation.
b.	What is image frequency? How can its rejection ratio be improved.
c.	What do you mean by angle modulation
d.	What do you mean pre-emphasis?
e.	What are the drawbacks of delta modulation?
f.	What do you mean by quantization process?
g.	Draw the Signal space Diagram of ASK.
h.	Sketch the wave form of the FSK signal for the input binary sequence 1100100010.
i.	Write the advantages of digital communication
j.	Define the terms entropy and information rate.

SECTION B**2. Attempt any three of the following:****10x3=30**

a.	Explain the generation of SSB using balanced modulator.
b.	What are the different types of noises associated with the communication system, explain. Discuss the noise calculation of AM system.
c.	Draw the block diagram and describe the operation of a delta modulator. What do you mean by slope overload distortion and Granular noise in delta modulation?
d.	With neat diagrams and equations, explain about PSK system. Draw the space representation of BPSK. And also draw its waveforms?
e.	Explain in detail Huffman coding algorithm with the help of one example. Compare this with the other types of coding.

SECTION C**3. Attempt any one part of the following:****10x1=10**

a.	What do you mean by modulation index? A 400W, 1MHz carrier is amplitude-modulated with a sinusoidal signal of 2500Hz. The depth of modulation is 75%. Calculate: i. The sideband frequencies ii. Bandwidth iii. Power in sidebands iv. The total power in modulated wave
b.	Explain the detection of AM signals using envelope detector.

4. Attempt any one part of the following:**10x1=10**

a.	Derive the expression for the frequency modulated signal. Explain what is meant by narrow band FM and wide band FM?
b.	Explain the Armstrong method for the generation of Wideband FM system.



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5. Attempt any one part of the following:

10x1=10

a.	Explain Pulse width modulation with the diagram. Also sketch the necessary waveforms.
b.	A signal whose amplitude is varies from 0V to 10V is band limited to 4 kHz and transmit through a channel using 5 bit PCM, the sampling rate 50% higher than the nyquist rate. Calculate following parameter of PCM: (i) Bandwidth (ii) Bit rate (iii) Step Size (iv) Maximum quantization error

6. Attempt any one part of the following:

10x1=10

a.	Explain ASK system with the help of transmitter and state its advantages and disadvantages over other system. Derive the bit error probability of a coherent ASK signaling scheme.
b.	A voice signal is transmitted using standard PCM with its respective nyquist rate. This PCM signal is modulated and transmitted into a channel using following modulation technique: ASK PSK FSK(with $f_H = 16$ MHz $f_L = 10$ MHz) Determine the bandwidth of the signal for each scheme.

7. Attempt any one part of the following:

10x1=10

a.	State Shannan Hartley theorem for channel capacity. Derive its expression: (i) When S/N is very high ($S/N \gg 1$) (ii) When bandwidth is very high ($BW \approx \infty$)
b.	Explain the frame structure of T1 system in detail.