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BTECH
(SEM IV) THEORY EXAMINATION 2023-24
COMMUNICATION ENGINEERING

TIME: 3 HRS**M.MARKS: 100****Note:** 1. Attempt all Sections. If require any missing data; then choose suitably.**SECTION A****1. Attempt all questions in brief.****2 x 10 = 20**

Q no.	Question	Marks	CO
a.	Differentiate between continuous-time and discrete-time signal.	02	1
b.	Discuss the principles of VSB modulation.	02	1
c.	How does angle modulation differ from amplitude modulation?	02	2
d.	Explain the difference between wideband and narrowband FM.	02	2
e.	Differentiate between discrete and continuous random variables.	02	3
f.	Draw characteristic curve of Additive white Gaussian noise (AWGN)	02	3
g.	Discuss the advantages and limitations of pulse modulation.	02	4
h.	Describe the process of quantization in PCM.	02	4
i.	Analyze the advantages of PSK in digital communication systems.	02	5
j.	Explain the applications of MSK in communication systems.	02	5

SECTION B**2. Attempt any three of the following:****3 x 10 = 30**

a.	Explain the basic principles of amplitude modulation. Discuss the need for modulation in communication systems and the advantages of using amplitude modulation.	10	1
b.	Explain the spectral characteristics of PM signals. A phase modulation system has a modulation sensitivity of 0.1 rad/V. If the modulating signal is a 2 V peak sinusoid at 500 Hz, calculate the peak phase deviation of the PM signal.	10	2
c.	Explain the impact of noise on amplitude modulation systems. How does noise affect the quality and reliability of AM signals?	10	3
d.	Describe the sampling process in digital signal processing. Explain the Nyquist-Shannon sampling theorem and its importance in signal reconstruction.	10	4
e.	Write down the difference between BPSK and QPSK. Explain QPSK generation and detection with its signal constellation diagram.	10	5

SECTION C**3. Attempt any one part of the following:****1 x 10 = 10**

a.	Explain the concept of SSB modulation and its advantages over DSB-SC modulation. Discuss the generation of SSB signals using the Hilbert transform.	10	1
b.	Discuss the principles of DSB-SC modulation. Given a message signal $m(t) = e^{-t}u(t)$ and a carrier signal $c(t) = \cos(2\pi f_c t)$. Compute the DSB-SC modulated signal and its Fourier transform.	10	1

4. Attempt any one part of the following:**1 x 10 = 10**

a.	Explain the process of generating an FM signal using a voltage-controlled oscillator (VCO).	10	2
b.	Derive the mathematical representation of a PM signal. Discuss the applications of PM in modern communication systems.	10	2



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5. Attempt any *one* part of the following: 1 x 10 = 10

a.	Explain the concepts of pre-emphasis and de-emphasis in communication systems. Why are these techniques used, and how do they improve signal transmission?	10	3
b.	Define the threshold effect in angle modulation systems. How does this effect impact the demodulation process?	10	3

6. Attempt any *one* part of the following: 1 x 10 = 10

a.	Explain Differential Pulse Code Modulation and its advantages over PCM.	10	4
b.	Explain the principles of Pulse Amplitude Modulation and how it differs from Pulse Code Modulation.	10	4

7. Attempt any *one* part of the following: 1 x 10 = 10

a.	Construct and explain the block diagram of Transmitter and receiver for a QAM.	10	5
b.	Derive the expression for probability of Error for binary phase shift keying.	10	5