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**BTECH**  
**(SEM V) THEORY EXAMINATION 2024-25**  
**ANALOG & DIGITAL COMMUNICATION****TIME: 3 HRS****M.MARKS: 70****Note:** Attempt all Sections. In case of any missing data; choose suitably.**SECTION A****1. Attempt all questions in brief. 2 x 07 = 14**

Q no.	Question	CO	Level
a.	Define modulation, Amplitude modulation and angle modulation.	1	K1
b.	Draw the basic block diagram of analog communication system.	1	K1
c.	Explain frequency deviation of FM signal?	2	K2
d.	Explain Nyquist criteria for sampling.	3	K2
e.	Why FSK is preferred over ASK?	4	K3
f.	What do you understand by Shannon Hartley Theorem?	5	K3
g.	What is Electronic Commutator in TDM System?	5	K3

**SECTION B****2. Attempt any three of the following: 07 x 3 = 07**

Q no.	Question	CO	Level
a.	Differentiate between Narrowband FM and wideband FM with their frequency spectrum and suitable mathematical expressions.	1	K1
b.	Explain coherent method of generation and detection of PAM signal with suitable mathematical expressions.	2	K2
c.	What is quantization? How is quantization and coding done? Explain with suitable diagram.	3	K3
d.	Give brief introduction about time division multiplexing? Explain synchronous and asynchronous TDM.	4	K4
e.	Draw the block diagram of BPSK transmitter. Explain balanced ring modulator of BPSK.	5	K5

**SECTION C****3. Attempt any one part of the following: 07 x 1 = 07**

Q no.	Question	CO	Level
a.	Why Super heterodyne receiver is better than the TRF receiver? What are the functions of receivers?	1	K1
b.	With the help of diagram explain generation and detection of SSB-SC wave.	1	K1

**4. Attempt any one part of the following: 07 x 1 = 07**

Q no.	Question	CO	Level
a.	What is noise? Noise is difficult to eliminate but its effect can be minimizing justify.	2	K2
b.	An FM modulator operates at carrier-signal frequency of 500 KHz having peak amplitude of 10V. A modulating frequency ( $f_m$ ) of 10 KHz modulates it with a peak frequency deviation ( $\delta$ ) of 10 KHz. From the Bessel function table, it is observed that a frequency modulation index of one yield three sets of significant of sidebands. Compare actual minimum bandwidth as obtained using Bessel function and the approximate minimum bandwidth using Carson's rule.	2	K2



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**5. Attempt any one part of the following: 07 x 1 = 07**

Q no.	Question	CO	Level
a.	Explain the working of delta modulation. How adaptive Delta modulation improves the performance of Delta modulation.	3	K3
b.	Explain the generation and demodulation of pulse width modulation (PWM)?	3	K3

**6. Attempt any one part of the following: 07 x 1 = 07**

Q no.	Question	CO	Level
a.	A Discrete Memory less Source X has five symbols ( $s_0, s_1, s_2, s_3, s_4$ ) and their probabilities of occurrence are given as 0.40, 0.20, 0.20, 0.10, 0.10, respectively. Construct Huffman Code and calculate efficiency.	4	K4
b.	Giving modulated waveforms, single space diagrams and probability of errors draw the optimum receiver structures for DPSK and coherent FSK modulation schemes.	4	K4

**7. Attempt any one part of the following: 07 x 1 = 07**

Q no.	Question	CO	Level
a.	Define information and entropy. Find an expression for the channel capacity of a continuous channel.	5	K5
b.	What should be the desirable feature of a T1 carrier system? Explain PCM-TDM system.	5	K5