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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- Oct 2017

B.Tech/ M.Tech 7th / 1st Semester

COURSE CODE: 10M11EC111 MAX. MARKS:25

COURSE NAME: Advanced Communication System

COURSE CREDITS: 03 MAX. TIME: One Hour Thirty Minutes

Note: *All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

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1. A sinusoidal message signal having peak amplitude of 10V with freq. of 20 KHz is transmitted through 256 levels PCM system. When sampling rate=25% higher than Nyquist Rate, find all parameters of PCM. (4)
2. Consider the (7, 4) Hamming code defined by the generator polynomial $g(x)=1+x+x^2$. The code word 0111001 is sent over a noisy channel, producing the received word 0101001 that has a single error. Determine the syndrome polynomial S(x) for this received word, and show that it is identical to the error polynomial e(x). (5)
3. A compact disc records audio signals digitally by using PCM. Assume the audio signal bandwidth to be 15 KHz. What is the Nyquist rate? If the Nyquist samples are quantized into L=65636 level & then binary coded determine the number of bits required to encode a sample. Determine the number of output data rate. (5)
4. The amplitude of random signal is uniformly distributed between -5V to 5V. if SQNR required in uniformly quantizing the signal is 43.5dB, find out the step size of quantization. If the positive values of signal are quantized with a step size of 0.05V and the negative values with a step size of 0.1V, find the resulting SQNR of this scheme. (5)
5. A packet containing n bits to be transmitted through a channel having probability of error in each bit is p_e. An error detection code has been used that can detect up to 5 errors, in addition, an error correction code is used which can correct up to 3 consecutive (burst) errors in a cyclic manner. Assuming that the receivers can identify errors only through the mentioned error detection coding scheme. In case of an error is detected and cannot be corrected at the receiver, the packet is dropped and retransmitted (Let say N times) until it is correctly received. Hence, N which is essentially a random variable, find the pdf of N. (6)

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