

R13

Code No: 126AN

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year II Semester Examinations, December - 2017

DIGITAL COMMUNICATIONS

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

- 1.a) Define Nyquist sampling theorem. [2]
- b) Compare DM and PCM. [3]
- c) What is the difference between coherence detection and non coherent detection? [2]
- d) Write an expression for bandwidth of binary PCM with N messages each with a maximum frequency of f_m Hz. [3]
- e) Define the principle of adaptive equalization. [2]
- f) Construct NRZ and RZ format for 011010. [3]
- g) What is hamming distance? [2]
- h) What is difference between block codes and convolutional codes? [3]
- i) Define frequency hopping. [2]
- j) What are the types of FH spread spectrum technique? [3]

PART - B

(50 Marks)

2. The signal $g(t) = 10 \cos(20\pi t) \cos(200\pi t)$ is sampled at the rate of 250 samples per second.
 - a) Determine the spectrum of the resulting sampled signal.
 - b) Specify the cut-off frequency of the ideal reconstruction filter so as to recover $g(t)$ from its sampled version.
 - c) What is the Nyquist rate for $g(t)$.
 - d) Explain the reconstruction process of a message from its samples. [10]

OR

3. Explain the noises in delta modulation systems. How to overcome this effect in Delta modulation? [10]
4. Explain the generation and detection of binary PSK. Also derive the probability of error for PSK. [10]

OR

5. Draw the block diagram of FSK receiver and explain the operation. Determine the
 - a) Peak frequency deviation
 - b) Minimum bandwidth
 - c) Baud for FSK signal with a mark frequency of 49 kHz, space frequency of 51 kHz and input bit rate of 2kbps. [10]

6. The generator polynomial of a (7, 4) Hamming code is defined by $g(D) = 1 + D^2 + D^3$. Develop the encoder and syndrome calculator for this code. [10]

OR

7. Explain correlation receiver with block diagram. Also explain why the correlation receiver is also called an integrated and dump filter. [10]

8. Explain Viterbi algorithm to decode a convolutionally coded message. [10]

OR

9. Describe the steps involved in the generation of linear block codes. Define and explain properties of syndrome. [10]

10. Write about the Aloha and slotted aloha methods in multiple access methods. [10]

OR

11. Describe the operation of a CDMA multiplexing system. [10]

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