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Question Paper Code : 71676

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Third/Fourth Semester

Computer Science and Engineering

CS 6304 — ANALOG AND DIGITAL COMMUNICATION

(Common to Biomedical Engineering, Information Technology)

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Define amplitude and angle modulation.

2. Illustrate AM and FM signals produced by a single tone signal.

3. Given the input binary sequence 1100100010, sketch the waveforms of the in-phase and quadrature components of a modulated wave obtained by using QPSK.

4. Show the sequences and waveforms involved in the generation of an MSK signal for the binary sequence 1101000.

5. Summarize the important advantages of PCM.

6. Define entropy.

7. Consider a discrete memory less source with source alphabet (s_0, s_1, s_2) and with their respective probabilities $(P_0 = 1/4, P_1 = 1/4, P_2 = 1/2)$. Find the entropy of the source.

8. Define mutual information and mention its properties.

9. What are all the essential components of GSM?

10. Draw the block diagram of CDMA transmitter and receiver.

PART B — (5 × 13 = 65 marks)

11. (a) Discuss about the indirect method of generaring wideband FM signal.

Or

(b) Describe frequency discrimination method of generating SSB modulated wave and a method to demodulate it. What are the design issues involved in this method of generation? What is the cause and effect of phase error in demodulated signal?

12. (a) Explain the working of MSK transmitter and receiver with its block diagram and power spectra of MSK signals.

Or

(b) Define binary FSK and explain about the generation and detection of binary FSK signals using block diagram.

13. (a) Explain quantization process in detail and derive the expression for output signal to noise ratio of uniform quantizer.

Or

(b) Explain about various operations performed in the transmitter and receiver of PCM system.

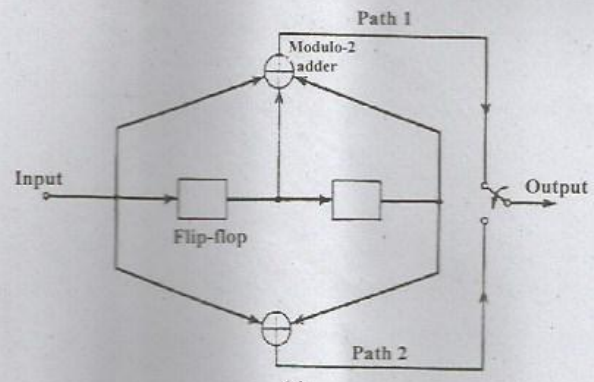
14. (a) Draw and explain the generalized

(i) (n, k) cyclic encoder to implement an encoding procedure for an (n, k) cyclic code in systematic form

(ii) syndrome calculator and properties of syndrome polynomial.

Or

(b) Draw trellis diagram and encode the given bits 10011 using the given convolutional encoder shown below.



(a)

15. (a) Explain in detail about the function of each layer in a Bluetooth system.

Or

(b) Explain about GSM protocol architecture in detail.

PART C — (1 × 15 = 15 marks)

16. (a) The generator polynomial of a (15, 11) Hamming code is defined by $g(X)=1+X+X^4$. Develop the encoder and syndrome calculator for this code, using a systematic form for the code. Generate the code word for the message vector (1111 1111 111) using the developed encoder. Find the output of the designed syndrome calculator for the received code word (1111 1111 1111 111).

Or

(b) The source of information A generates the symbols {A0, Al, A2, A3 and A4} with the corresponding probabilities {0.4, 0.3, 0.15, 0.1 and 0.05}. Encoding the source symbols using binary encoder and Shannon-Fano encoder and compare its efficiency.