Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 70381

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

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. Sketch the QPSK signal for the binary sequence 11001100.

4. Compare QPSK and 16 PSK signal in terms of bandwidth.

5. What are the standards organizations for data communications?

6. Define pulse time modulation.

7. State Shannon's fundamental theorem of information theory.

8. Define Hamming distance (HD).

9. What are the steps involved in Handoff process?

10. Mention the three most commonly used multiple accessing schemes.

PART B — ($5 \times 13 = 65$ marks)

11. (a) (i) The first stage of a two stage amplifier has a voltage gain of 10, a 600 Ω input resistor, a 1600 Ω equivalent noise resistance and a 27 k Ω output resistor. For the second stage, these values are 25, 81 k Ω, 10 k Ω and 1 M Ω respectively. Calculate equivalent input noise resistance of this two stage amplifier and also calculate the noise figure of the amplifier if it is driven by a generator whose output impedance is 50 Ω. (8)

(ii) Derive the expression for instantaneous voltage of AM wave. (5)

Or

(b) (i) Explain the nature of SSB spectrum if the modulating signal is $m(t) = \cos 2\pi . 100t + \cos 2\pi . 2000t$ and carrier is given by $c(t) = \cos 2\pi . 10000\ t$. (8)

(ii) Describe the relationship between the instantaneous carrier frequency and the modulating signal for FM. (5)

12. (a) Describe the generation and detection of binary FSK signal with necessary diagram and equation. (13)

Or

(b) (i) If a digital message input data rate is 8 Kbps and average energy per bit is 0.01 unit. Find the bandwidth required for transmission of the message through BPSK, QPSK, BFSK, MSK and 16PSK. (8)

(ii) Compare the various digital modulation schemes. (5)

13. (a) Discuss about serial and parallel interfaces.

Or

(b) Discuss about the generation of PAM and its demodulation.

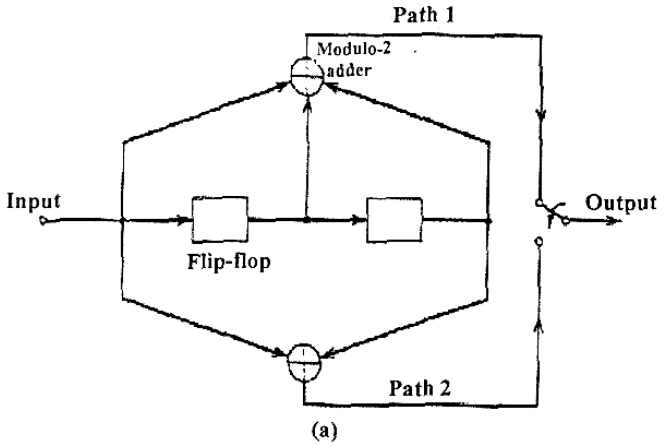
14. (a) Draw and explain the generalized

(i) (n, k) cyclic encoder to implement an encoding procedure for an (n, k) cyclic code in systematic form (6)

(ii) syndrome calculator and properties of syndrome polynomial. (7)

Or

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



(a)

15. (a) Draw and explain the architecture of GSM.

Or

(b) Explain in detail the principle and operation of a CDMA system.

PART C — ($1 \times 15 = 15$ marks)

16. (a) The generator polynomial of a $(15, 11)$ Hamming code is given by $g(x)=1+x+x^2$. Design encoder and syndrome calculator for this code using systematic form. (15)

Or

(b) (i) A data bit sequence consists of the following string of bits 10 11 10 10. Analyze and draw the nature of waveform transmitted by BPSK transmitter. (8)

(ii) A 400 W carrier is amplitude modulated to a depth of 100%. Calculate the total power in case of the AM and DSBSC techniques. How much power saving in watts is achieved for DSBSC? If the depth of modulation is changed to 75%, then how much power in W is required for transmitting the DSBSC wave? Compare the power required for DSBSC in both cases and comment on the reason for change in the power levels. (7)

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