

Reg. No. :

--	--	--	--	--	--	--	--	--	--	--	--	--

Question Paper Code:R4B03

B.E./B.Tech. DEGREE EXAMINATION, APRIL / MAY 2025

Fourth Semester

Biomedical Engineering

R21UBM403- COMMUNICATION SYSTEMS

(Regulations R2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. State the Carson's Rule. CO1-U
2. Write down the condition of under Modulation also draw the spectrum of Under modulated wave. CO1-U
3. A television signal with a bandwidth of 4.2MHz is transmitted using binary PCM the number of quantization level is 512 calculate the Transmission bandwidth. CO3-Ana
4. How do you generate the PM using FM? CO2-App
5. Plot the digitally modulated waveforms for the binary data 110110101 using QPSK. CO3-Ana
6. Determine the bandwidth and baud for the FSK signal with a Mark frequency of 49KHz and space frequency of 51KHz and bit rate of 2Kbps. CO2-App
7. Define Entropy. CO1-U
8. Give error correcting capability of a linear block code. CO1-U
9. Compare TDMA and FDMA. CO1-U
10. Write the advantages of FH SS techniques. CO1-U

PART – B (5 x 16= 80 Marks)

11. (a) Discuss and analyze the generation and detection of VSB. CO1 U (16)
Or
(b) Explain with suitable diagrams the generation of FM using indirect Method. CO1- U (16)

12. (a) A signal of bandwidth 3.5kHz is sampled, quantized and coded by a PCM system. The coded signal is then transmitted over a transmission channel of supporting a transmission rate 50 kbits/sec. Calculate the maximum signal to noise ratio that can be obtained by this system. The signal input has peak to peak values of 4volts and rms value of 0.2V. CO3- App (16)

Or

- (b) A television signal with a bandwidth of 4.2MHz is transmitted using binary PCM. the number of Quantization level is 512 Calculate CO3-App (16)

- i) Code word length (4)
- ii) Transmission Bandwidth (4)
- iii) Final bit rate (4)
- iv) What is the Minimum sampling rate.(4)

13. (a) Discuss the operation of QPSK transmitter and receiver with neat diagram draw its waveform and constellation diagram. CO1- U (16)

Or

- (b) Discuss the operation of FSK transmitter and receiver with neat diagram draw its waveform and constellation diagram. CO1- U (16)

14. (a) The generator Matrix for a (6,3) block code is given below . find all code vectors of this code. CO3- An (16)

$$G = \begin{bmatrix} 1 & 0 & 0 & 1 & 1 \\ 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 1 & 1 & 0 \end{bmatrix}$$

- i) Find the parity check matrix.
- ii) Find Minimum weight of this code.

Or

- (b) The Message 1001001010 is to be transmitted in a cyclic code with a generator Polynomial $g(x) = x^2 + 1$. CO3- An (16)

- i) How Many check bits does the encoded message contain.
- ii) Obtain the transmitted code word.
- iii) Draw the encoding arrangement to obtain remainder bits.
- iv) After the received word is clocked into the decoder input, what should be the content of the register stores?

15. (a) Explain the principle of DS Spread spectrum technique. CO1- U (16)
- Or
- (b) Describe the block diagram of DS SS binary PSK spread CO1- U (16)
spectrum system.

