

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025

Third Semester

Computer Science and Engineering

(Common to Information Technology)

20ESEC301 - COMMUNICATION ENGINEERING

Regulations - 2020

Duration: 3 Hours

Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

	<i>Marks</i>	<i>K- Level</i>	<i>CO</i>
1. In amplitude modulation (AM), the modulation index is given by (a) The ratio of the carrier amplitude to the signal amplitude (b) The sum of the carrier and modulating frequency (c) The ratio of the signal amplitude to the carrier amplitude (d) The difference between carrier frequency and signal frequency	1	K1	CO1
2. Which of the following are the applications of PLL? (a) Frequency multiplier (b) AM detector (c) Frequency translation (d) FM detector(e) All of the mentioned	1	K1	CO1
3. Which of the following is a type of angle modulation? (a) Amplitude Modulation (AM) (b) Pulse Modulation (PM) (c) Frequency Modulation (FM)(d) Both b and c	1	K1	CO2
4. In phase modulation (PM), the phase of the carrier signal is varied in accordance with the (a) Amplitude of the carrier signal(b) Frequency of the carrier signal (c) Amplitude of the modulating signal (d) Phase of the modulating signal	1	K1	CO2
5. BPSK is also called _____. (a) phase reversal keying (b) On-off keying (c) Biphase modulation(d) phase reversal keying and biphase modulation	1	K1	CO3
6. Which of the following is an element of Non-coherent detection of ASK signal. (a) Band pass filter (b) Envelope detector (c) Sampler (d) Decision making device (e) All of the mentioned	1	K1	CO3
7. According to the Sampling Theorem, the minimum sampling rate required to avoid aliasing is (a) Equal to the bandwidth of the signal (b) Twice the highest frequency of the signal (c) Half the bandwidth of the signal (d) Three times the highest frequency of the signal	1	K1	CO4
8. Quantization is the process of: (a) Converting a continuous signal into a discrete-time signal (b) Approximating the continuous amplitude of a signal with a set of discrete levels (c) Encoding the digital signal for transmission (d) Sampling the analog signal at uniform intervals	1	K1	CO4
9. Cyclic codes are well suited for _____. (a) Error correction (b) Error detection (c) Both error correction and error reduction(d) None of the mention	1	K1	CO5
10. A satellite or radio channel communication represents _____. (a) Multiple access(b) Multiplexing (c) Both multiple access and multiplexing(d) None of the mentioned	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

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|--|---|----|-----|
| 11. Define modulation. | 2 | K1 | CO1 |
| 12. Draw the AM modulated wave for modulation index= 0.5. | 2 | K1 | CO1 |
| 13. List the common methods used in FM modulation. Briefly describe one of them. | 2 | K1 | CO2 |
| 14. A carrier frequency is modulated with a sinusoidal signal of 2KHz resulting in a maximum frequency deviation of 5KHz. Find bandwidth of the modulating signal. | 2 | K2 | CO2 |
| 15. State sampling theorem. | 2 | K1 | CO3 |
| 16. Define quantization. | 2 | K1 | CO3 |
| 17. Why FSK and PSK signals are preferred over ASK signals. | 2 | K1 | CO4 |
| 18. Define inter symbol interference (ISI). | 2 | K1 | CO4 |
| 19. State Shannon's channel capacity theorem. | 2 | K1 | CO5 |
| 20. Define systematic code. | 2 | K1 | CO5 |
| 21. Define spread spectrum and list its types. | 2 | K1 | CO6 |
| 22. List the advantages of Bluetooth. | 2 | K1 | CO6 |

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

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|--|----|----|-----|
| 23. a) (i) Derive an expression for AM and the power distribution of AM. | 6 | K2 | CO1 |
| (ii) Derive the modulation index in terms of envelope of AM. | 5 | K2 | CO1 |
| OR | | | |
| b) With the help of neat diagram, Explain the generation of VSB transmission? Draw VSB spectrum and explain its significance. | 11 | K2 | CO1 |
| 24. a) Explain in detail about FM generation using indirect method. | 11 | K2 | CO2 |
| OR | | | |
| b) Explain the concept of Phase Modulation (PM). Derive the expression for the instantaneous phase and frequency of a PM wave. List its advantages and disadvantages. | 11 | K2 | CO2 |
| 25. a) (i) Explain the generation of PCM with its expression. | 6 | K2 | CO3 |
| (ii) With suitable block diagram and equation, Explain the generation of DPCM. | 5 | K2 | CO3 |
| OR | | | |
| b) Explain the process of quantization, types of quantization (uniform and non-uniform), and the concept of quantization error. | 11 | K2 | CO3 |
| 26. a) What is known as Binary phase shift keying? Discuss in detail about BPSK transmitter and Receiver. | 11 | K3 | CO4 |
| OR | | | |
| b) Construct a 8 QAM transmitter and explain the concept with truth table. | 11 | K3 | CO4 |
| 27. a) A discrete memoryless source has five symbols x_1, x_2, x_3, x_4, x_5 with probabilities 0.4, 0.19, 0.16, 0.15, 0.15 respectively attached to every symbol. Construct Shannon-Fano and Huffman coding for the source and calculate code efficiency η . | 11 | K2 | CO5 |

OR

b) Derive the expression for channel capacity of a continuous channel. Comment on the tradeoff between SNR and capacity. 11 K2 CO5

28. a) Describe in detail about the launching procedure of a satellite. 11 K2 CO6

OR

b) Summarize the features of various multiple access techniques used in wireless mobile communication. State the advantages and disadvantages of each techniques. 11 K2 CO6