

Hall Ticket Number:

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Code No. : 15445 S O

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

Accredited by NAAC with A++ Grade

B.E. (E.C.E.) V-Semester Supplementary Examinations, June-2023

Analog and Digital Communication

Time: 3 hours

Max. Marks: 60

Note: Answer all questions from Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

| Q. No. | Stem of the question | M | L | CO | PO |
|----------------------------------|--|---|---|----|-----|
| 1. | Sketch the waveforms of Amplitude Modulation (AM) for an arbitrary baseband signal $x(t)$. | 2 | 1 | 1 | 1 |
| 2. | The total power content of AM signal is 1kW. Determine the power being transmitted at the carrier frequency when the %modulation is 100. | 2 | 2 | 1 | 1,2 |
| 3. | Draw the block diagram for the generation of PPM signals. | 2 | 1 | 2 | 1 |
| 4. | Calculate the transmission rate (Kbps) of TDM if the link transmits 2000 frames per second and each slot has 16 bits. | 2 | 2 | 2 | 1,2 |
| 5. | How many bits of quantization are needed to achieve a SNR ratio of at least 40dB? | 2 | 2 | 3 | 1,2 |
| 6. | Sketch the granular noise in delta modulation. | 2 | 1 | 3 | 1 |
| 7. | Sketch the waveform of amplitude shift keying and frequency shift keying for the binary pattern "10110" | 2 | 1 | 4 | 1 |
| 8. | What is inter symbol interference? | 2 | 1 | 4 | 1 |
| 9. | What is the need for spread of a code? | 2 | 2 | 5 | 1,2 |
| 10. | Define processing gain in spread spectrum modulation. | 2 | 1 | 5 | 1 |
| Part-B (5 × 8 = 40 Marks) | | | | | |
| 11. a) | An AM transmitter radiates 9kW of power when the carrier is unmodulated and 10.125kW of power when the carrier is sinusoidal modulated. Find the modulation index & Percentage modulation. Now if another sine wave corresponding to 40% modulation is transmitted Simultaneously. Calculate total radiated power. | 4 | 2 | 1 | 1,2 |
| b) | Explain the generation of Frequency Modulation with Phase modulator and generation of Phase Modulation with frequency modulator with suitable block diagrams. | 4 | 3 | 1 | 1,2 |
| 12. a) | Explain generation of PAM with neat circuit diagram. | 4 | 2 | 2 | 1,2 |
| b) | Brief on the process of sampling and quantization in converting an analog signal is converted into digital signal. | 4 | 3 | 2 | 1,2 |
| 13. a) | Write short note on Pre-Emphasis and De-Emphasis circuits. | 4 | 1 | 3 | 1 |
| b) | Obtain the expression for figure of merit of AM (DSB-FC) system | 4 | 3 | 3 | 1,2 |

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|--------|--|---|---|---|-----|
| 14. a) | With a neat block diagram and waveforms, explain the generation of BPSK signal. | 4 | 2 | 4 | 1,2 |
| b) | Compare binary PSK and M ary PSK | 4 | 3 | 4 | 1,2 |
| 15. a) | Write the differences between frequency hopping spread spectrum and direct sequency spread spectrum. | 4 | 3 | 5 | 1,2 |
| b) | List the applications of spread spectrum. | 4 | 2 | 5 | 1,2 |
| 16. a) | Explain the working of superheterodyne receiver with a neat block diagram. | 4 | 2 | 1 | 1,2 |
| b) | What is slope overload noise? How it is avoided in delta modulation. Explain with a neat sketch. | 4 | 3 | 2 | 1,2 |
| 17. | Answer any <i>two</i> of the following: | | | | |
| a) | Discuss about different sources of noise. | 4 | 2 | 3 | 1,2 |
| b) | Differentiate coherent ASK and non-coherent ASK. | 4 | 3 | 4 | 1,2 |
| c) | Explain the properties of PN sequence with an example. | 4 | 3 | 5 | 1,2 |

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

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|------|-------------------------------|-----|
| i) | Blooms Taxonomy Level – 1 | 20% |
| ii) | Blooms Taxonomy Level – 2 | 40% |
| iii) | Blooms Taxonomy Level – 3 & 4 | 40% |
