

Roll No.

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B.TECH. IV SEM MAIN EXAM

AUGUST-2023

**ELECTRONICS AND COMMUNICATION
ENGINEERING**

(4EC4-03) - ANALOG COMMUNICATION

Time : 3 Hours]

[Max. Marks : 70

[Min Passing Marks :

Instructions to Candidates : Part – A : Short answer type questions (up to 25 words)

10 × 2 marks = 20 marks. All ten questions are compulsory.

Part – B: Analytical/Problem Solving questions 5 × 4 marks = 20 marks. Candidates have to answer 5 questions out of 7.

Part – C: Descriptive/Analytical/Problem Solving questions 3 × 10 marks = 30 marks. Candidates have to answer 3 questions out of 5.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting materials is permitted during examination. (Mentioned in form No. 205)

1 NIL

2 NIL

PART A

Q. 1. Write the expression for AM wave ? [2]

Q. 2. What is Demodulation ? [2]

Q. 3. Why FM is more immune to the effect of noise ? [2]

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- Q. 4. What is Pre-emphasis ? [2]
- Q. 5. What is cascode Amplifier ? [2]
- Q. 6. What is Noise ? Give different type of noise. [2]
- Q. 7. Define the term selectivity and image frequency. [2]
- Q. 8. What is blocking in a receiver ? [2]
- Q. 9. What is pulse-width-modulation ? [2]
- Q. 10. What is the main disadvantages of PCM ? [2]

PART B

- Q. 1. Calculate the percent power saving for the SSB signal if the AM wave is modulated to a depth of (a) 100% and (b) 50%. [4]
- Q. 2. What are the drawbacks of direct method for FM generation ? [4]
- Q. 3. What are the advantages of FM over AM ? [4]
- Q. 4. How SNR is improved using pre-emphasis ? [4]
- Q. 5. With the help of circuit diagram, explain how a balance modulator can be used to demodulate SSB signals. <https://www.btubikaner.com> [4]
- Q. 6. How noise figure is measured experimentally ? Explain the procedure with suitable figure. [4]
- Q. 7. What do you understand by time division multiplexing ? [4]

PART C

- Q. 1. Discuss diode ring modulator for DSB-SC generation using suitable circuit diagram. Also discuss different mode of operations. [10]
- Q. 2. A carrier voltage $10 \cos 8\pi \cdot 10^6 t$ is angle modulated by a modulating signal $5 \cos 3\pi 10^3 t$: [10]
- (i) Determine the bandwidth for frequency modulation assuming $K_f = 15$ kHz per volt.

- (ii) Assuming the same bandwidth, find k_p per phase modulation.
- (iii) Determine the change in the bandwidth for frequency and phase modulation if the modulating signal becomes $5 \cos 10\pi \cdot 10^3 t$.

- Q. 3. (a) Discuss noise in angle modulation system. [4+6=10]
- (b) Two resistors $10 \text{ k}\Omega$ and $25 \text{ k}\Omega$ at room temperature (290°K) for a bandwidth of 120 kHz . Calculate thermal noise for each resistor, if two resistors are in series and if two resistors are in parallel.
- Q. 4. (a) Explain the function and working of each of the blocks in the superheterodyne receiver. [6+4=10]
- (b) What is simple automatic gain control ? What are its functions ?
- Q. 5. (a) A bandlimited signal $x(t)$ is sampled by a train of rectangular pulses of width τ and period T . [6+4=10]
- (i) Find an expression for the sampled signal.
- (ii) Determine the spectrum of the sampled signal and sketch it.
- (b) Define PAM and explain its generation and detection.

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