

Roll No. ....

Printed Pages : 3

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BT-3 / D-17

## ANALOG COMMUNICATION

Paper-ECE-209 N

Time allowed : 3 hours]

[Maximum marks : 75

**Note :-** There are total **eight** questions. Each question carries equal marks. The candidate is required to attempt **five** questions selecting **one** question from each unit.

### Unit-I

1. (a) Explain the following terms: 9
  - (i) Signal to Noise Ratio
  - (ii) Noise Figure
  - (iii) Noise Temperature
- (b) A receiver connected to an antenna whose resistance is 50 ohm has an equivalent noise resistance of 30 ohm. Calculate the receiver's noise figure in decibels and its equivalent noise temperature. 6
2. (a) With the help of suitable waveforms, derive an expression for instantaneous voltage of amplitude modulated signal. Also describe the power relation involved in AM. 7
- (b) Differentiate between
  - (i) NBFM and WBFM
  - (ii) FM and PM 8

33090

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### Unit-II

3. (a) With the help of suitable diagram and waveforms, describe the operation of square law diode modulator. 7
- (b) What are the constituent stages of amplitude modulation radio transmitter and briefly describe the function of each stage? 8
4. (a) Explain superheterodyne receiver in detail with the help of diagram using concept of frequency mixing. 7
- (b) With the help of diagram explain the principle of envelop detection used for the demodulation of AM signal. Also derive the expression for time constant of envelop detector. 8

### Unit-III

5. (a) Using a block diagram and frequency spectrum diagram, explain the operation of stereo multiplex FM transmission system. Why is the difference subcarrier originally generated at 19 KHz? 7
- (b) Draw the complete block diagram of the Armstrong frequency modulation system and explain the function of the mixer and multipliers in it. 8
6. (a) What is the principle of operation of FM detection? Explain in detail the working of Ratio Detector with its merits and demerits. 8

33090

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- (b) What is Pre-emphasis and De-emphasis? Why it is required? 7

**Unit-IV**

7. (a) Compare the three main subsystems of SSB generation by drawing up a table of outstanding characteristics of each system. 7
- (b) With the help of circuit diagram, explain how balanced modulator is able to demodulate the SSB signal. 8
8. (a) Explain vestigial side band modulation. What are the advantages and disadvantages of vestigial side band modulation? 7
- (b) What is pulse width modulation? Describe the process of generation and demodulation of PWM. 8