

Printed Pages—3

TIC501

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 3095

Roll No.

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**B.Tech.**

(SEM. V) ODD SEMESTER THEORY EXAMINATION  
2010-11

**ANALOG AND DIGITAL COMMUNICATION SYSTEM**

Time : 3 Hours

Total Marks : 100

**Note :** Attempt **all** questions. All questions carry equal marks.

1. Attempt any **four** parts of the following : **(5×4=20)**
  - (a) Draw and explain the block diagram of communication system.
  - (b) Define modulation and explain the need for modulation.
  - (c) Define Thermal noise.
  - (d) Define various types of External noise in brief.
  - (e) The first stage of a two stage amplifier has a voltage gain of 10, a  $600\ \Omega$  input resistor, a  $1600\ \Omega$  equivalent noise resistance and a  $27\ \text{k}\Omega$  output resistance. For the second stage these values are 25,  $81\ \text{k}\Omega$ ,  $10\ \text{k}\Omega$  and  $1\ \text{M}\Omega$  respectively. Calculate the equivalent input noise resistance of this two stage amplifier.
  - (f) A receiver connected to an antenna whose resistance is  $50\ \Omega$  has an equivalent noise resistance of  $30\ \Omega$ . Calculate the receiver's noise figure in decibels and its equivalent noise temperature.
2. Attempt any **four** parts of the following : **(5×4=20)**
  - (a) Define amplitude modulation and modulation index.

- (b) A certain transmitter radiates 9kW with the carrier unmodulated, and 10.125 kW when the carrier is sinusoidally modulated. Calculate the modulation index. If another sine wave, corresponding to 40% modulation, is transmitted simultaneously, determine the total radiated power.
- (c) What is single sideband modulation ? What are its advantages with respect to ordinary AM ?
- (d) Describe phase shift method for SSB generation.
- (e) Briefly explain the function of each of the blocks in the superheterodyne receiver.
- (f) Calculate the percentage power saving when the carrier and one of the sidebands are suppressed in an AM wave modulated to a depth of (a) 100% (b) 50%
3. Attempt any **two** parts of the following : **(10×2=20)**
- (a) Define frequency and phase modulation. A 25-MHz carrier is modulated by a 400-Hz audio sine wave. If the carrier voltage is 4V and the maximum deviation is 10 kHz, write the eq<sup>n</sup> of this modulated wave for (a) FM and (b) PM. If the modulating frequency is now changed to 2 kHz, all else remaining constant, write a new equation for (c) FM and (d) PM.
- (b) Define direct FM and Indirect FM. With the help of block diagram explain Indirect method of FM generation in detail.
- (c) Draw the schematic diagram for a Foster Seeley discrimination and describe its operation.

4. Attempt any **two** parts of the following : **(10×2=20)**

- (a) Describe ground-wave propagation. What is the angle of tilt ? How does it affect field strength at a distance from the transmitter ?
- (b) Describe the following terms connected with sky-wave propagation : virtual height, critical frequency, maximum usable frequency skip distance and fading.
- (c) Define PWM and PPM. Explain how PPM can be derived from PWM.

5. Attempt any **two** parts of the following : **(10×2=20)**

- (a) What is multiplexing ? Why is it needed ? What are the two basic forms of multiplexing ? Show, diagrammatically and with an explanation how channels are combined into groups, and groups into supergroups and so on, when FDM is generated in a practical system.
- (b) Draw the block diagram of a microwave link repeater, indicating the function of each block.
- (c) Define optical fibers. Also define the losses in optical fibers and advantages of optical fiber.