Printed Pages—3 **TIC501**

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

PAPER ID : 3095 **Roll No.** | | | | | | | | | | |

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 Ω input resistor, a 1600 Ω equivalent noise resistance and a 27 kΩ output resistance. For the second stage these values are 25, 81kΩ, 10 kΩ and 1 MΩ respectively. Calculate the equivalent input noise resistance of this two stage amplifier.
   (f) A receiver connected to an antenna whose resistance is 50 Ω has an equivalent noise resistance of 30 Ω. 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^{n} 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.