

Sem TU C-scheme KT (EXTC) Winter 2025

12/12/25

Duration: 3hrs

[Max Marks:80]

- N.B. : (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

- 1 Attempt any FOUR [20]
- a Draw the block diagram of analog communication system and explain its working in brief.
 - b Compare amplitude modulation and frequency modulation.
 - c Explain the concept of pre-emphasis and de-emphasis in FM.
 - d Compare PAM, PWM, PPM
 - e What are the various factors considered in selection of IF in super heterodyne receivers?
- 2 a An AM signal produced by modulating a carrier signal of 10 MHz frequency and with a modulating signal of 10 KHz. Compute sideband frequencies, bandwidth and plot the frequency domain representation by assuming the 50% modulation and peak amplitudes of message and carrier signal as 3V and 15V respectively. [10]
- b Explain the generation and detection of PPM signal? [10]
- 3 a Explain the working of Ratio detector with the relevant diagrams. How is it better than balanced slope detector? [10]
- b What is the need of multiplexing? Explain the Time division multiplexing in detail along with its applications. [10]
- 4 a Explain the working of indirect FM transmitter. State its advantages [10]
- b Define Friis formula. Calculate the overall noise figure of the system using Friis formula for the three amplifier cascade stages with following specifications. [10]
- Amplifier 1: $G_1 = 10$, $F_1 = 12$
Amplifier 2: $G_2 = 20$, $F_2 = 15$
Amplifier 3: $G_3 = 30$, $F_3 = 100$
- 5 a Explain the working of diode detector as AM demodulator. How is practical diode detector different from diode detector? [10]
- b What are the various methods of generating FM? Explain the working of varactor diode modulator with required diagrams. [10]
- 6 a Explain the working of superheterodyne receiver in detail. [10]
- b State and prove sampling theorem. State the consequences of not satisfying Nyquist criteria in sampling [10]
