

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year I Semester Regular & Supplementary Examinations December-2023
ANALOG COMMUNICATIONS
(Electronics and Communication Engineering)

Time: 3 Hours**Max. Marks: 60**

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

- 1 a Explain the elements of communication system with a neat block diagram. CO1 L2 6M
b Define Amplitude Modulation. Derive expression for AM wave and sketch its frequency spectrum. CO1 L1 6M

OR

- 2 a With a neat diagram and relevant equations, explain the generation of AM wave using Switching modulator. CO2 L2 6M
b A given AM broadcast station transmits a total power of 5kW when the carrier is modulated by sinusoidal signal with a modulation index of 0.7071. Find the Carrier power and Transmission Efficiency. CO2 L3 6M

UNIT-II

- 3 a Prove that the Balanced Modulator produces an output consisting of sidebands only with carrier removed. CO2 L5 6M
b Illustrate the effect of phase error on the output of coherent detector and calculate the percentage of power saving for a DSB-SC signal for the percent modulation of 100% and 50%. CO2 L4 6M

OR

- 4 a Explain the principle of coherent detection of SSB-SC modulated wave with a neat block diagram. CO2 L2 6M
b The power of an SSB transmission is 10kW. This transmission is to be replaced by a standard AM signal with the same power content. Calculate the power content of the carrier and each of the sidebands when the percentage modulation is 80%. CO2 L4 6M

UNIT-III

- 5 a Explain the generation of NBFM and WBFM. CO3 L2 8M
b A 20 MHz carrier is frequency modulated by a sinusoidal signal such that the peak frequency deviation is 100 kHz. Determine the modulation index and the approximate bandwidth of the FM signal if the frequency of the modulating signal is: (i) 1 kHz (ii) 15 kHz CO3 L3 4M

OR

- 6 a Explain clearly about Pre-Emphasis and De-Emphasis circuits in FM. CO4 L2 8M
b A single-tone FM is represented by the voltage equation as: $(t) = 12 \cos(6 \times 10^6 t + 5 \sin 1250 t)$. Determine the following: (i) Carrier frequency (ii) Modulating frequency (iii) Modulation index (iv) What power will this FM wave dissipate in 10Ω resistors? CO4 L3 4M

UNIT-IV

- 7 a Construct the block diagram of Super-heterodyne AM receiver and explain the function of each block. CO6 L6 9M
- b Define sensitivity, selectivity & fidelity. CO6 L1 3M

OR

- 8 a Define figure of merit. CO5 L1 2M
- b Derive the expression for figure of merit of AM (DSB-FC) system. CO5 L3 10M

UNIT-V

- 9 a Define Analog pulse modulation and its classification. CO3 L4 4M
- b List the comparisons among PAM, PWM and PPM. CO3 L1 8M

OR

- 10 a Discuss on information content of message and information rate. CO6 L2 4M
- b Given four messages with probabilities 0.1, 0.2, 0.3, 0.4. Construct a binary code by using Shannon-Fano algorithm. Find entropy, efficiency ' λ ' and redundancy ' Υ ' CO6 L4 8M

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