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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech II Year II Semester Regular Examinations July-2021

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 Amplitude modulation for single tone information. L2 6M
b Define Modulation index and percentage of modulation index. Obtain the expression for total transmitted power of AM wave. L2 6M

OR

- 2 a With a neat diagram and relevant equations explain the generation of AM wave using Switching modulator. 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. Determine Carrier power and Transmission Efficiency. L2 6M

UNIT-II

- 3 a Show that the output of coherent detector of SSB modulated wave is given by $VO(t) = 1/4 AC m(t)\cos\phi + 1/4 AC m(t)\sin\phi$. L2 6M
b Consider a resultant wave obtained by adding a non-coherent wave $AC \cos(2\pi fct + \phi)$ to a DSB-SC wave $\cos(2\pi fct) m(t)$. This composite wave is applied to an ideal envelope detector. Find the resulting detector output. Evaluate this output $\phi=0$. L4 6M

OR

- 4 a Explain single tone modulation for transmitting only lower side band (LSB) frequency of SSB modulation. L2 6M
b What is DSB-SC Modulation? Explain the time and frequency domain expressions of DSB-SC wave. L2 6M

UNIT-III

- 5 a Derive the expression for single - tone frequency modulation with necessary waveforms. L5 6M
b A 107.76MHz carrier signal is frequency modulated by a 7kHz sine wave. The resultant FM signal has a frequency deviation of 50kHz. Determine carrier swing, highest & lowest frequencies of frequency modulated signal, and modulation index of FM wave. L1 6M

OR

- 6 a Explain the functionality of each block of phase shift discriminator. L2 6M
b A single-tone FM is represented by the voltage equation as: $v(t) = 12\cos(6 \times 10^6 t + 5\sin 1250t)$ Determine the following: (i) Carrier frequency (ii) Modulating frequency (iii) Modulation index (iv) What power will this FM wave dissipate in 10Ω resistors. L4 6M

UNIT-IV

- 7 a For a broadcast Super-heterodyne AM receiver having no RF amplifier, the loaded Quality factor of the antenna coupling circuit is 100. Now, if the intermediate frequency is 455kHz, determine the image frequency and its rejection ratio at an incoming frequency of 1000kHz. L4 6M
- b Calculate the noise figure for an SSB-SC system L3 6M
- OR**
- 8 a Write short notes on receiver parameters. 6M
- b A radio receiver with 10KHz bandwidth has a noise figure of 30dB. Determine the signal power required at the input of receiver to achieve input SNR at 30dB. L4 6M

UNIT-V

- 9 a State the definitions of different types of analog pulse modulation schemes. L1 6M
- b Write a short note on channel capacity theorem. L2 6M
- OR**
- 10 a Explain how PPM can be generated from PWM signals. L2 6M
- b Explain Shannon's encoding algorithm. L1 6M

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