Q.P. Code: 16EC415 **R16**

Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech III Year I Semester Supplementary Examinations Feb-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	Derive an expression for the power content and transmission efficiency of single tone amplitude modulated signal.	6M
	b	Explain generation of DSB-SC signal with the help of balanced modulator using diodes.	6M

OR

2	a	Draw the neat circuits and equivalent circuits (for different modes) of ring modulator using diodes for generating DSB-SC signal.	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.	6M

UNIT-II

3	a	Explain the generation of Narrowband Frequency Modulation and Narrowband Phase Modulation with suitable block diagrams.	6M
	b	A single-tone FM is represented by the voltage equation as: v (t) = 12cos (6×106t + 5sin 1250t) Determine the following: (i) Carrier frequency (ii) Modulating frequency (iii) Modulation index	6M

OR

4	a	Draw the block diagram of indirect FM method and define modulation index, carrier swing and percentage modulation of FM.	6M
	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.	6M

UNIT-III

5	a	Obtain the expression for figure of merit of AM(DSB-FC) system.	6M
	b	Calculate thermal noise power available from any resistor at room temperature 290K for a bandwidth of 2MHz and also calculate noise voltage at 100 ohm resistor.	6M

OR

6	a	Compare the noise performance in frequency modulated system and amplitude modulated system.	6M
	b	The noise figure of a receiver is 20dB and it is fed by a low noise amplifier which has gain of 40dB and noise temperature of 800K.Calculate the overall noise temperature of the receiving system and the noise temperature of the receiver.	6M

UNIT-IV

7	a	With a neat sketch, explain the detection/ demodulation of Pulse Duration Modulation	6M
	b	Explain the sampling reconstruction for low-pass signals.	6M

OR

8	a	What are the differences between PAM, PWM, and PPM?		6M
	b	For a pulse-amplitude modulated transmission of voice signal having maximum frequency equal to 3kHz, calculate the transmission bandwidth. It is given that the sampling frequency 8kHz and pulse duration 0.1Ts.		6M

UNIT-V

9	a	Draw block diagram of Super-heterodyne AM receiver and explain function of each block.		6M
	b	What is Conditional entropy and find the entropy the source that emits one of the three symbols A, B, C in a statistically independent sequence with probabilities 1/2, 1/4 and 1/4?		6M

OR

10	a	Explain Entropy, Information rate, Channel capacity theorem, Mutual information.		6M
	b	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.		6M

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