Q.P. Code: 18EC0408 **R18**

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year II Semester Regular Examinations October-2020

ANALOG COMMUNICATIONS

(Electronics & Communication Engineering)

Time: 3 hours Max. Marks: 60

PART-A

(Answer all the Questions **5 x 2 = 10** Marks)

1	**a**	Explain frequency discrimination method of AM SSB – SC generation.	**2M**
	b	Define Pre-Emphasis and De-Emphasis circuits.	**2M**
	c	Define effective noise temperature.	**2M**
	d	Explain about demodulation of PPM signal.	**2M**
	e	Write a short note on channel capacity of a Discrete memory less channel.	**2M**

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

2	**a**	Derive an expression for the power content and transmission efficiency of single tone amplitude modulated signal.	**5M**
	b	Generate DSB-SC signal with the help of ring modulator using diodes, with a neat sketch of waveforms.	**5M**
		OR	
3	**a**	With the help of circuit diagram, explain the operation of square-law diode modulator & demodulator for AM.	**5M**
	b	Derive an expression for SSB-SC wave using the concept of pre-envelope.	**5M**

UNIT-II

4	**a**	Explain the functionality of each block of phase shift discriminator.	**5M**
	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 (iv) What power will this FM wave dissipate in 10Ω resistors?	**5M**
		OR	
5	**a**	Explain the generation of Narrowband Frequency Modulation and Narrowband Phase Modulation with suitable block diagrams.	**5M**
	b	With the necessary circuit and voltage to frequency characteristics, explain the functionality of balanced slope detector for FM.	**5M**

UNIT-III

6	**a**	If each stage has a gain of 10dB and noise figure of 10dB. Calculate the overall noise figure of a two-stage cascaded amplifier.	**5M**
	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.	**5M**
		OR	
7	**a**	Discuss about noise effect in PM and obtain expression for figure of merit.	**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 80K.Calculate the overall noise temperature of the receiving system and the noise temperature of the receiver.	**4M**

UNIT-IV

8	**a**	Explain about advantages and disadvantages for PAM. And about synchronization in PAM.	**6M**
	b	With block diagram, explain the generation of PWM signals.	**4M**
		OR	
9	**a**	Explain the frequency spectrum of Flat Top PAM signal.	**5M**
	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.	**5M**

UNIT-V

10	**a**	Explain Entropy, Information rate, Channel capacity theorem, Mutual information.	**5M**
	b	A voice grade telephone channel has a bandwidth of 3400Hz.If the signal to noise ratio on the channel is 30dB; determine the capacity of the channel. If the above channel is to be used to transmit, 4.8kbps of data determine minimum SNR required on the channel.	**5M**
		OR	
11	**a**	Explain Super-heterodyne FM receiver and mention its disadvantage of Super-heterodyne AM receiver.	**5M**
	b	A Discrete source emits one of 5 symbols once every millisecond. The symbol Probabilities are 1/2, 1/4, 1/8, 1/16 and 1/16. Find entropy and information rate.	**5M**

END