

R16

Code No: EC405ES

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, 2019
ANALOG COMMUNICATIONS
Time: 3 Hours
Max. Marks: 75
Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

PART A (25 Marks)		
Q.No	Question	Bloom's Level
1.a)	Define amplitude modulation and give its time domain representation.	L1
b)	Compare AM, DSBSC and SSBSC modulation techniques	L2
c)	Give mathematical equation of SSB-SC signal and draw the spectrum.	L1
d)	A SSB transmitter radiates 0.5 kW when the modulation percentage is 60. How much of carrier power (in kW) is required if we want to transmit the same message by an AM wave?	L2
e)	Write the expression for instantaneous value of FM wave and define modulation index.	L1
f)	Compare AM and FM techniques.	L2
g)	Define Noise Figure and highlight its significance.	L1
h)	Discuss how Average Noise Figure of cascaded networks can be obtained.	L2
i)	What is AGC? Mention its function.	L1 / L2
j)	Define selectivity and sensitivity of a Radio receiver.	L2
PART B (50 Marks)		
2.	Explain square law modulation of AM with neat circuit diagram, time domain expression, frequency domain expression and spectrum.	L2 / L3
OR		
3.	Show that synchronous and Costas demodulators can be used to obtain the message signal from DSB- SC wave.	L3 / L4

4.	Show that, SSB signal can be demodulated by only synchronous detection. Write the time domain expression, frequency domain expression and spectrum of the recovered signal.	L3 / L4
OR		
5.	It is required to transmit a TV signal for long distance. Identify a suitable analog modulation technique and explain the generation of the identified technique.	L3 / L4
6.a)	A 20 MHz sinusoidal carrier frequency is frequency modulated by $m(t) = A_m \cos(2\pi f_m t)$, such that peak frequency deviation is 100KHz. Determine modulation index and transmission bandwidth if $f_m = 50\text{KHz}$ and 500KHz .	L3 / L4
b)	With a neat diagram and characteristics explain, Balanced discriminator used to recover the message signal from FM wave.	L3 / L4
OR		
7.a)	Explain the direct method of generating FM waves	L3 / L4
b)	A sinusoidal signal of 5 volts and 1 kHz is applied to an FM generator that has a frequency sensitivity constant of 40Hz/volt. Find the frequency deviation and modulation index of FM wave.	L3 / L4
8.a)	Explain the representation and analysis of narrowband noise effect in analog communication system.	L3 / L4
b)	What is the need for pre-emphasis and de-emphasis.	L3 / L4
OR		
9.a)	Discuss the effect of noise in AM system.	L3 / L4
b)	Define noise. Explain thermal noise and white Gaussian noise.	L3 / L4
10.a)	Discuss the principle of TDM.	L2
b)	Discuss the operation of amplitude limiter used in FM demodulators.	L3 / L4
OR		
11.a)	Draw the waveforms for PAM, PWM and PPM	L2
b)	Explain the generation of PAM with neat waveform and relevant equations.	L3 / L4