Total No. of Questions – [8] Total No. of Printed Pages 02

G.R. No.	

Paper code - U228 - 133 (ESE)

MAY 2019/ENDSEM

S. Y. B. TECH. (E&TC) (SEMESTER - I)

COURSE NAME: COMMUNICATION ENGINEERING-I

COURSE CODE: ETUA22173

(PATTERN 2017)

Time: [**2 Hours**] [Max. Marks: **50**]

(*) Instructions to candidates:

1) **Answer Q.1, Q.2, Q.3, Q.4, Q.5 OR Q.6, Q.7 OR Q.8**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed**
4) **Use suitable data where ever required**

Q 1a Derive the expression for SNR of a tandem connection 6 Marks

OR

Q 1b An amplifier operating over frequency range from 450 to 460 kHz What is the r.m.s. noise voltage at the input to this amplifier if the ambient temperature is 17° C? Also calculate noise power and power spectral density. 6 Marks

Q 2a Draw AM waveform for modulation index m=0,0.5,1 and also draw corresponding spectrums. 6 Marks

OR

Q 2b The antenna current of an AM transmitter is 8 A when only carrier is sent , but it increases to 8.93 A when the carrier is modulated by single sine wave. Find the percentage modulation . Determine antenna current when the percentage modulation changes to 80 % 6 Marks

Q 3a With the help of equations and spectrums, explain DSB-SC synchronous detection 6 Marks

OR

Q 3b Explain, with suitable numerical example, need of high side injection in AM receiver. 6 Marks

Q 4a Explain single slope FM detection with circuit diagram and curves . 4 Marks

OR

Q	4b	With the block diagram and equations, explain PLL method of FM detection	4 Marks
Q	5a	Derive the expression for frequency modulated wave.	6 Marks
Q	5b	Draw the block diagram of narrowband FM and PM generator	4 Marks
Q	5c	Explain the direct generation method of FM generation	4 Marks

OR

Q	6a	Design an Armstrong indirect method for FM generation with the carrier frequency of 96 MHz and Δf=20KHz . A NBFM generator with fc=200kHz and adjustable Δf in the range of 9 to 10 Hz is available. The stock room also has an oscillator with adjustable frequency in the range of 9-10MHz. Only frequency doublers are available.	6 Marks
Q	6b	An angle modulated signal with carrier frequency $\omega_c = 4\pi X10^6$ is described by the equation $s(t)=10\cos(\omega_c t+0.1\sin(2000\pi t))$. Find frequency and phase deviation.	4 Marks
Q	6c	Referring to problem no. 6b, show that doubling the signal (m(t)) amplitude roughly doubles frequency deviation of both FM and PM waveform.	4 Marks
Q	7a	For ideal, natural and flat top sampling, draw circuit diagram , waveforms and write expression of each.	6 Marks
Q	7b	What is aliasing and how it is avoided?	4 Marks
Q	7c	Specify the Nyquist rate and Nyquist interval for each of the following signal 1. $x(t)=\text{sinc}(200t)$, 2. $x(t)=\text{sinc}^2(200t)$	4 Marks

OR

Q	8a	Derive the expression for spectrum of flat top signal	6 Marks
Q	8b	Draw neat diagram and waveforms at the output of each block of PCM transmitter.	4 Marks
Q	8c	Define time limited and band limited signals with suitable examples	4 Marks