

Total No. of Questions – [8]

1 Paper code - U229-133(BE-F&F)

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G.R. No.

DEC 2019/ENDSEM - Backlog Exam.

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

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 noise figure in cascaded stage. 6 Marks
OR

Q 1b The radio receiver with 10kHz bandwidth has a noise figure of 30dB. Determine the signal power required at the input of the receiver to achieve input SNR of 30 dB. 6 Marks

Q 2a Draw AM waveform for undermodulation, critical modulation and over modulation. 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 0.8 6 Marks

Q 3a Explain product demodulator for DSB-SC signal. 6 Marks
OR

Q 3b Draw and Explain Superhetrodyne Receiver for AM reception. 6 Marks

Q 4a Explain single slope FM detection. 4 Marks
OR

- Q 4b With the block diagram explain FM Superheterodyne Receiver. 4 Marks
- Q 5a Derive the expression for modulation index of frequency modulated wave. 6 Marks
- Q 5b Draw the block diagram of narrowband FM 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 $\Delta f = 20\text{KHz}$. A NBFM generator with $f_c = 200\text{kHz}$ 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, $\omega_c = 4\pi \times 10^6$ 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 Explain with the help of block diagram that how to generate FM from PM modulator and vice versa. 4 Marks
- Q 7a Explain different types of sampling with waveforms 6 Marks
- Q 7b What is antialiasing filters? Explain. 4 Marks
- Q 7c Specify the Nyquist rate and Nyquist interval for each of the following signal
 $x(t) = \text{sinc}(200t) + \text{sinc}(400t)$, 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 receiver. 4 Marks
- Q 8c Give the examples of time limited and band limited signals 4 Marks