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Total No. of Questions – [8] Total No. of Printed Pages: 2

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Paper Code: U359-193(ESE)

DECEMBER 2019/ENDSEM

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

COURSE NAME: Communication Engineering-II

COURSE CODE: ETUA31173

(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.1) a) Compute Fourier transform of the following signals and plot magnitude spectra.

1) $x(t) = e^{-at}u(t)$

2) $x(t) = te^{-at}u(t)$

[6 marks]

OR

b) Explain the terms power spectral density and energy spectral density. What is importance in communication? [6 marks]

Q.2) a) State sampling Theorem. The signal $g(t) = 10\cos(40\pi t)\cos(400\pi t)$ is sampled at 500 samples/sec. Find

i) Nyquist rate

ii) Cut-off frequency of ideal reconstruction filter [6 marks]

OR

b) Explain companding with the help of input-output characteristics. What is the importance? [6 marks]

Q.3) a) Explain desirable characteristics/properties of line codes. [6 marks]

OR

b) Plot the PDS's and compare of Unipolar, Polar and bipolar line codes. [6 marks]

Q.4) a) Derive the expression for the peak signal to rms noise power ratio of integrate and dump type receiver. [4 marks]

OR

b) What is matched filter? Write the expression for impulse response of matched filter and interpretation. [4 marks]

Q.5) a) Explain QPSK generation and reception with the help of block diagram. [6 marks]

b) Explain signal space representation of QPSK. What is the maximum phase change? [4 marks]

c) With the help of above signal space representation find out QPSK phase changes for a sequence [1 0 0 1 1 1 0 0 1 1 0 1 1 0 0 1]. Consider first bit as even bit. [4 marks]

OR

Q.6) a) Draw block diagram of BPSK receiver. Explain the importance of carrier recovery circuit. [6 marks]

b) Write the formula of distance between the symbols of BPSK, QPSK and M-ary PSK. Comment on probability of error. [4 marks]

c) Compare bandwidth requirements of BPSK, QPSK and M-ary PSK. Comment on bandwidth requirement. How we can reduce the bandwidth? [4 marks]

Q.7) a) Draw block diagram of DS-SS transmitter and receiver. List out advantages of DSSS system [6 marks]

b) Explain the properties of PN sequence in detail. [4 marks]

c) Explain concept of slow frequency hopping and fast frequency hopping. [4 marks]

OR

Q.8) a) Explain the concept of CDMA with respect to bit duration and chip duration? [6 marks]

b) Draw block diagram of FH-SS modulation and explain its working. [4 marks]

c) Explain the terms [4 marks]

i)Jamming Margin.

ii)Processing Gain