

Total No. of Questions : 6] [Total No. of Printed Pages : 4]

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EG-181

B.E. V Semester (CGPA) Elect. & Commun. Engg. Examination 2018

DIGITAL COMMUNICATION

Paper - EL-502

Time Allowed : Three Hours] [Maximum Marks : 60

Note : All questions are compulsory.

Q.1. Write short answers. $4 \times 2\frac{1}{2} = 10$

- What is the function of equalizer in sampling.
- What is the utility of eye pattern.
- Give applications of spread spectrum.
- What are parity codes?

Q.2. a) State and prove sampling theorem for low pass and band pass signals. 5

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(2)

- b) Discuss Generation and detection of PAM signals. Derive BW and S/N ratio for PAM. 5
OR

- c) Define the following terms related to probability distribution functions. 5
- Mean
 - Variance
 - Standard deviation
 - p.d.f
 - c.d.f

- d) Discuss Generation and detection methods for PPM and PWM. 5

Q.3. a) Describe the need of quantization and compounding in PCM system. 7

b) Compare the performance of DM and ADM systems. 3

OR

c) Draw and explain differential PCM system. What is the need of predictor explain. 5

d) A PCM system uses uniform Quantizer followed by an 8 bit binary encoder. The bit rate of the system is equal to 50×10^6 bits/sec. What is the maximum message band width for which the system operates satisfactorily. 3

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Contd...

(3)

- e) What is M'ary system. Give its merits and demerits.

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- Q.4. a) Describe the working of DPSK system taking the data input $d(t) = 001010011010$. Show how $b(t) b(t-T_b)$ yields. The original data at the receiver, where $b(t)$ is the transmitted pattern.
- b) Give Geometrical representation of 16-QAM system and derive the distance formula, between adjacent symbols, in terms of bit energy. Also draw QASK (QAM) Transmitter circuit.

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OR

- c) Draw and explain the transmitter receiver circuit of BFSK system. Compare it with BPSK system.
- d) What is spread spectrum? Give principle of operation of CDMA.

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- Q.5. a) Define symmetric channel. Derive the channel capacity for a symmetric channel. Find channel capacity for a BSC for $p=0.9$.
- b) State Shannon-Hartley theorem. What is Shannon's limit.

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OR

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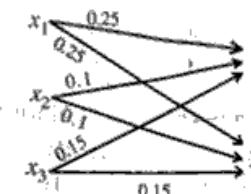
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- c) Define entropy and mutual information. Show that entropy is maximum, when all symbols equi-probable.

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- d) Find the mutual information for the channel. Shown in figure.

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- Q.6. a) Write down Generator matrix for a (6,3) block code. Find all code vectors and discuss how error is detected and corrected with suitable example.

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- b) What are cyclic codes. Give an example.

OR

- c) Apply Shannon Fano coding procedure for $M=2$ for the following.

$$[X] = [X_1 \ X_2 \ X_3 \ X_4 \ X_5 \ X_6]$$

$$[P] = [0.4 \ 0.15 \ 0.15 \ 0.05 \ 0.2 \ 0.05]$$

- d) What are convolution codes? Explain the exhaustive search and sequential decoding method.

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