SP - 82

Total No. of Pages : 4

Seat No.	

S.Y. B.Tech. (E & TC) (Semester - IV) (CBCS)
Examination, January - 2024
PCC-ETC-404 : DIGITAL COMMUNICATION
Sub. Code : 79184

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Day and Date : Monday, 01 - 01 - 2024 **Total Marks : 70**

Time : 2.30 p.m. to 5.00 p.m.

Instructions :
1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**
3) **Assume Suitable data, if necessary.**

Q1) Attempt following Multiple choice questions. **[14×1=14]**

a) Which gives the measure of randomness of the random variable?

i) Mean ii) Variance

iii) Standard variance iv) PDF

b) Mapping of Outcomes to real No. is called as

i) Random variable ii) Gamma variable

iii) Algeabraic variable iv) None of the above

c) Gaussian PDF is

i) Square Shaped Structure ii) Circular Shaped Structure

iii) Cylindrical Shaped Structure iv) Bell Shaped Structure

d) The sub-processes involved in the PCM modulation in sequential order are:

i) Sampling, quantizing, encoding

ii) Quantizing, encoding, sampling

iii) Quantizing, sampling, encoding

iv) None of the above

P.T.O.

e) Out of the following mentioned techniques, _____ modulation technique requires minimum bandwidth

i) Delta modulation ii) PCM

iii) DPCM iv) PAM

f) _____ is the digital modulation technique in which the step size is varied according to the variation in the slope of the input

i) DM ii) PCM

iii) ADM iv) PAM

g) The relation between entropy and mutual information is

i) I(X; Y) = H(X) – H(X/Y) ii) I(X; Y) = H(X/Y) – H(Y/X)

iii) I(X;Y) = H(X) – H(Y) iv) I(X; Y) = H(Y) – H(X)

h) In On-Off keying, the carrier signal is transmitted with signal value 'l' and '0' indicates

i) No carrier

ii) Half the carrier amplitude

iii) Amplitude of modulating signal

iv) None of the above

i) Spread spectrum signals are used for

i) Ranging

ii) Determination of position

iii) Ranging & Determination of position

iv) None of the mentioned

j) As the eye opens, ISI _____

i) Increase ii) Decreases

iii) Remains the same iv) None of the mentioned

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k) The technique that may be used to reduce the side band power is

i) MSK

ii) BPSK

iii) Gaussian minimum shift keying

iv) BFSK

l) Granular noise occurs when

i) Step size is too small

ii) Step size is too large

iii) There is interference from the adjacent channel

iv) Bandwidth is too large

m) Eye Diagram will be corrupted by

i) Noise ii) Interference

iii) Both (i) and (ii) iv) None of the above

n) ASK is sometimes referred as

i) ON-OFF Keying ii) ON-ON Keying

iii) OFF-OFF Keying iv) None of the above

Q2) Solve any two. **[2×7=14]**

a) In class of 100 students, 40 students had taken maths, 30 students taken biology then what is probability of students who had taken both subjects.

b) Consider source s1, s2, s3 having probability of the messages P1 = 1/4, P2 = 1/4. P3 = 1/2 find entropy of the system.

c) Three coins are tossed then calculate probability-

i) of getting exactly one tail &

ii) of getting at least 2 tails.

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Q3) Solve any two **[2×7=14]**

a) Derive Baye's theorem.

b) Explain any two properties of information with its proof.

c) Apply Shannon-fano coding for following messages S1 to S6. Where probability P=[0.25, 0.30, 0.12, 0.15, 0.08, 0.10]. Find efficiency of the code and also calculate reduntancy.

Q4) Solve any two **[2×7=14]**

a) Explain Unipolar RZ with its advantages and disadvantages.

b) Discuss QPSK in detail.

c) Draw the Eye pattern and indicate how ISI is measured from it.

Q5) Solve any two. **[2×7=14]**

a) Explain Spread Spectrum techniques. DSSS

b) Discuss the principle of operation of ASK transmitter.

c) Explain inter symbol interference (ISI)

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