



## BHARATI VIDYAPEETH'S COLLEGE OF ENGINEERING

(Approved by AICTE, New Delhi & Affiliated to Guru Gobind Singh Indraprastha University, Delhi)

(An ISO 9001:2015 Certified Institution)

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### Department of Electronics and Communication Engineering

Student Name \_\_\_\_\_

Enroll. No \_\_\_\_\_

Semester: V sem

Date: \_\_\_\_\_

Course Code. : ETEC – 303

Course Title: Digital Communication

Quiz/Test No.: Class Test

Marks Obtained \_\_\_\_\_

Max. Marks : 4

Evaluator's Sign \_\_\_\_\_

Q1. Data is being transmitted between two nodes at 10,000 bps. Provided that the roll-off factor of the communication system is 0.4, what is the effective bandwidth needed for transmission? (0.3)

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Q2. Which of the following is the Nyquist criteria for zero ISI in the final shaped pulse  $p(t)$ ? (0.2)

a)  $p(nT_b) = \begin{cases} 1 & \text{when } n = 0,1 \\ 0 & \text{when } n \neq 0 \end{cases}$

c)  $p(nT_b) = \begin{cases} 1 & \text{when } n = 0 \\ 0 & \text{when } n \neq 0 \end{cases}$

b)  $p(nT_b) = \begin{cases} 0 & \text{when } n = 0 \\ 1 & \text{when } n \neq 0 \end{cases}$

d)  $p(nT_b) = \begin{cases} 0 & \text{when } n = 0,1 \\ 1 & \text{when } n \neq 0 \end{cases}$

Q3. Assuming the use of a Manchester code for transmission with data varying between  $\pm 3V$ , the maximum permissible probability of error being 0.01 and absolute power of the AWGN in the channel  $N_0 = 1\mu W$ , calculate the maximum permissible data transmission rate in bps. (0.5)

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Q4. The main reason for using Maximum Likelihood detectors is (0.2)

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Q5. The main reason for using Matched filters is (0.2)

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Q6. Duobinary coding allows a controlled amount of ISI from the \_\_\_\_\_ pulse.

However, the transmission happens on \_\_\_\_\_ bandwidth. (0.2)

P.T.O.

Q7. Draw a fully labelled constellation diagram of QPSK system. (0.6)

Q8. Draw the waveform of the following shift keying systems for the bit stream '10010110' (0.3+0.3+0.4 = 1.0)

a) OOK

b) FSK

c) DPSK

Q9. Arrange the following line codes in ascending order of Probability of error. (0.2)

ASK, FSK, PSK, QPSK

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Q10. Draw fully labelled block diagrams of transmitter, coherent receiver and non-coherent receiver for Binary FSK system. (0.2+0.2+0.2=0.6)