



Reg. No. :

Name :

**Sixth Semester B.Tech. Degree Examination, May 2013
(2008 Scheme)**

08.604 : DIGITAL COMMUNICATION (T)

Time: 3 Hours

Max. Marks :100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Explain how PAM modulator and demodulator work.
2. Derive an expression for processing gain of ADM.
3. Explain Duobinary coding. What are its advantages ?
4. Specify the Nyquist rate and Nyquist interval for the following signals :
 - a) $x(t) = \sin^2(200 \pi t)$
 - b) $x(t) = \sin c(400 t)$
5. Explain the properties of matched filters.
6. Draw the signal space diagram of offset Quadrature Phase Shift Keying (OQPSK) system.
7. Define coherence time and coherence bandwidth.
8. State the properties of PN sequences.
9. A slow FH/MFSK system has the following parameters. The number of bits per MFSK symbol = 4, The number of MFSK symbols per hop = 3. Calculate the processing gain of the system.
10. A direct sequence spread binary phase shift keying system uses a feedback shift register of length 19 for the generation of the PN sequence. Calculate the processing gain of the system. **(10×4=40 Marks)**





PART – B

Answer **any two** questions from **each Module**. Each question carries **10** marks.
(6×10= 60 Marks)

Module – I

11. With a block diagram, explain the functioning of DM system.

12. Consider a signal, $s(t) = \begin{cases} A, & 0 \leq t \leq T \\ 0, & \text{otherwise} \end{cases}$

- Determine the impulse response of the matched filter and state it as a function of time.
 - Plot the output of the matched filter as a function of time.
 - What is the peak value of the output ?
13. Define ISI. Obtain the condition for distortionless transmission of baseband binary data.

Module – II

- Explain the working of QPSK system and derive the expression for probability of error for QPSK.
- Explain the Gram Schmidt orthogonalization procedure.
- Explain the maximum a posteriori probability rule and describe how probability rule is applied in a maximum likelihood receiver.

Module – III

- Explain the techniques for generation of PN sequences. What are the properties of PN sequences ?
- Explain the working of FH/DSSS system. A fast FH/MFSK system has the following parameters. The number of bits per MFSK symbol = 4, The number of hops per MFSK symbol = 4. Calculate the processing gain of the system.
- The processing gain of a spread spectrum system may be expressed as the ratio of the spread bandwidth of the transmitted signal to the spread bandwidth of the received signal. Justify this statement for the DS/BPSK system.