B.TECH SEM – V (2007 COURSE) (ELECTRONICS) : WINTER - 2017

SUBJECT: DIGITAL COMMUNICATION

Day: Tuesday **Time:** 02.30 PM TO 05.30 PM
Date: 16/01/2018 **W-2017-2466** **Max. Marks: 80**

N.B:

1) **Q. No. 1** and **Q. No. 5** are **COMPULSORY.** Out of remaining questions attempt **ANY TWO** questions from each section.
2) Figures to the right indicate **FULL** marks.
3) Answer to both sections should be written in the **SEPARATE** answer book.

SECTION-I

Q.1 **a)** State and explain sampling theorem in time domain. **(05)**
b) State the difference between adaptive delta modulation and delta modulation. **(05)**
c) Briefly explain frame synchronization. **(04)**

Q.2 **a)** Classify random processes and explain any one in detail. **(07)**
b) Compare ideal, natural and flat top sampling. **(06)**

Q.3 **a)** Derive an expression for signal to quantization noise power ratio for delta modulation. Assume that no slope overload distortion exists. **(07)**
b) Explain in detail μ-law and A-law companding. **(06)**

Q.4 **a)** What is need of synchronization in digital communication? Explain in detail operation of Early-late gate synchronizer. **(07)**
b) Sketch the following line code formats for the bit pattern of 11001010. **(06)**
i) Bipolar NRZ ii) Polar NRZ
iii) Unipolar RZ iv) Split phase Manchester
v) Polar quaternary

SECTION-II

Q.5 **a)** What are the features of minimum shift keying (MSK) **(05)**
b) Compare error performance at PSK and FSK signals. **(05)**
c) Compare TDMA and FDMA multiple access schemes. **(04)**

Q.6 **a)** In digital CW communication system, the bit rate of NRZ data stream is 1 Mbps and carrier frequency is 100 MHz. Find the symbol rate at transmission and band width requirement at the channel in the following techniques. **(07)**
i) BPSK system ii) QPSK system
iii) 16-ary PSK

b) With neat block diagram and expressions explain the operation at QPSK transmitter and Receiver. **(06)**

Q.7 **a)** Derive an expression for the error probability of matched filter. **(07)**
b) Explain the operation of optimum receiver. Derive an expression for the probability of error at optimum receiver. **(06)**

Q.8 **a)** PN sequence generator makes use of five shift register and has a chip rate of 10 KHz. Draw a typical schematic for generation of PN sequence. **(07)**
b) With neat block diagram explain the operation of direct spread spectrum system with coherent BPSK. **(06)**

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