

B.TECH SEM – V (2007 COURSE) (ELECTRONICS) : SUMMER

- 2018

SUBJECT: DIGITAL COMMUNICATION

Day: **Wednesday**

Date: **23/05/2018**

S-2018-2671

Time: **10.00 AM TO 01.00 PM**

Max Marks: 80

N.B:

- 1) **Q.No.1 and Q.No.5 are COMPULSORY.** Out of remaining attempt **ANY TWO** questions from each section.
- 2) Answer to both sections should be written in **SEPARATE** answer book.
- 3) Neat diagram must be drawn **WHENEVER** necessary.
- 4) Figures to the right indicate **FULL** marks.
- 5) Assume suitable data if necessary.

SECTION-I

- Q.1**
- a) Define mean, correlation and covariance function of random process. (03)
 - b) Discuss granular noise and slope overload distortion. (06)
 - c) What are the desirable properties of line codes? (05)
- Q.2**
- a) State the sampling theorem. Prove the sampling theorem in time domain. (07)
 - b) Discuss the following terms: (06)
 - i) Stationary process
 - ii) Ergodic process
- Q.3**
- a) With suitable block diagram discuss the working of PCM system in detail. (07)
 - b) Write the short note on ITU standards. (06)
- Q.4**
- a) What is the need of synchronization in digital communication? Discuss the operation of costas loop synchronization for carrier recovery. (07)
 - b) The binary data 10110100 is transmitted over a baseband channel. Draw the waveforms for transmitted data using following formats: (06)
 - i) Bipolar NRZ
 - ii) Polar RZ
 - iii) Unipolar NRZ

SECTION-II

- Q.5**
- a) How P-N sequence is generated from pseudo random sequence generator? (05)
 - b) What is Gaussian MSK? State applications of GMSK. (05)
 - c) Derive an equation of SNR of matched filter. (04)
- Q.6**
- a) With the help of block diagram describe QASK transmitter and receiver. (07)
 - b) Compare the performance of QPSK and ASK with respect to following points. (06)
 - i) Modulation scheme
 - ii) Bits per signal
 - iii) Detection methods
 - iv) Minimum Euclidian distance
 - v) Symbol duration
 - vi) Minimum bandwidth
- Q.7**
- a) Derive an expression of probability of error of Matched filter? (07)
 - b) Discuss the operation of Optimum receiver. (06)
- Q.8**
- a) A PN sequence is generated using four stage shift registers. Find generated output sequence if the initial contents of the shift registers are 1000. If the chip rate is 10^5 chips/second. Calculate chip and PN sequence duration. (07)
 - b) What is spread spectrum? Describe DSSS transmitter and receiver. (06)

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