

**B.TECH. SEM -V ELECTRONICS 2014 COURSE (CBCS) : WINTER  
- 2017**

**SUBJECT: DIGITAL COMMUNICATION SYSTEMS**

Day: **Tuesday**  
Date: **16/01/2018**

**W-2017-2146**

Time: **02.30 PM TO 05.30 PM**  
Max. Marks: 60

**N.B.:**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Draw neat and labeled diagrams **WHEREVER** necessary.
- 4) Answers to both the sections should be written in the **SEPARATE** answer book.

**Q.1** The probability distribution function  $f_x(x)$  of a random variable is given as [10]

$$f_x(x) = \begin{cases} kx^2 & ; 1 \leq x \leq 2 \\ kx & ; 2 \leq x \leq 3 \end{cases}$$

Determine value of K, CDF. Plot CDF.

**OR**

- a) With suitable example, explain the concept of continuous and discrete random variable. [05]
- b) Define & explain the terms moments, expectation, variance and standard deviation. [05]

**Q.2** Draw the block diagram of Delta modulation (DM) transmitter and receiver. [10]  
Explain in detail.

**OR**

- a) Compare uniform and non-uniform quantization used in PCM system? [05]
- b) With the help of waveforms explain the difference between natural and flat top sampling. [05]

**Q.3** a) Derive an expression for signal to noise ratio of matched filter. [06]

b) Discuss in detail Intersymbol Interference (ISI). [04]

**OR**

State and explain the properties of matched filter. [10]

**Q.4** With neat block diagram and waveforms explain the generation and reception QPSK signal. [10]

**OR**

a) In a QPSK system the bit rate of NRZ bit stream is 10 Mbps and carrier frequency is 1GHz. Find the symbol rate of transmission and bandwidth requirement of the channel. [05]

b) Explain the advantages and disadvantages of MSK as compared to QPSK. [05]

**Q.5** The generator polynomial of a (7, 4) cyclic code is  $G(P) = P^3 + P + 1$ . Find all code vectors for the code in systematic form. [10]

**OR**

a) List the advantages and disadvantages of cyclic codes. [05]

b) How error correction and detection capabilities of block codes are related to minimum distance  $d_{min}$ ? [05]

**Q.6** Explain in detail fast and slow frequency hop spread spectrum system. [10]

**OR**

a) Enumerate the properties of PN sequence. [05]

b) With the help of block schematic explain the principle of CDMA. [05]

\* \* \* \* \*