Registration no: | | | | | | | | | | |

Total Number of Pages: 02 **M.Tech.**
ETPC101

1st Semester Back Examination 2017-18
MODERN DIGITAL COMMUNICATION TECHNIQUES
BRANCH: COMMUNICATION ENGG, COMMUNICATION SYSTEMS, ELECTRO & COMM. ENGG, ELECTRO & TELECOMMUNICATION ENGG
Time: 3 Hours
Max Marks: 70
Q.CODE: B927

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions:** **(2 x 10)**

a) What are the advantages of non-linear quantization over linear quantization?
b) Compare between natural sampling and flat-top sampling.
c) Draw Differential and Manchester line codes for an input bit stream 10111001
d) State the sequence of generation of source code, line code and channel code.
e) State the importance of basic SNR parameter E_b/ N_0 in digital communication.
f) What is roll-off factor of a pulse shaping filter? What is its range?
g) State advantages and disadvantages of M-ary over binary data transmission.
h) What is an anti-podal signal? State the probability of error, P_B , in case of an anti-podal signal.
i) Draw the trellis diagram for the input sequence [0 1 1 0 1 0 0 0].
j) State advantages of spread spectrum technique.

Q2 **a)** Explain in details about the partially Coherent Receiver. **(5)**
b) Explain IQ modulation and demodulation. **(5)**

Q3 **a)** How DPCM is better than PCM? Explain the operation of DPCM system with neat block diagrams of its transmitter and receiver. **(5)**
b) A television signal has a BW of 7.5 MHz. The signal is sampled at a rate of 20% above the Nyquist rate and binary coded with a code of word length 8-bits to obtain a PCM signal. Determine the binary pulse rate in bits per second and the minimum bandwidth required to transmit the signal. **(5)**

Q4 **a)** Represent a White noise with orthogonal waveforms and derive the variance of it. **(5)**
b) What is a matched filter? Derive the transfer function of a matched filter. **(5)**

Q5 **a)** What is ISI? Explain how it affects digital data transmission. How can it be reduced? **(5)**
b) Explain how equalization filter helps in reducing ISI. Explain various types of equalization filters used in reducing ISI. **(5)**

Q6 **a)** Show that PN-auto- correlation function in a spread spectrum system is equal to (1/p), where ‘p’ is the number of chips. **(5)**
b) Describe a direct sequence spread spectrum signal transmission system. Derive the processing gain and performance of the system. **(5)**

Q7 What is MSK? What is the value of deviation ratio ,h for MSK? Explain the operation of an MSK system in detail along with neat diagrams of its transmitter and receiver. **(10)**

Q8 **Write short answer on any TWO :** **(5 x 2)**

a) Tapped-delay prediction filter
b) Range equation of an antenna
c) S-ALOHA and R-ALOHA
d) Binary PSK receiver