Registration No. :

Total number of printed pages – 2

B. Tech

CPEC 5304 (Old)

Sixth Semester (Back) Examination – 2013
DIGITAL COMMUNICATION TECHNIQUES
BRANCH : EC, ETC

QUESTION CODE : B342

Full Marks – 70

Time : 3 Hours

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

1. Answer the following questions :   2 ×10

   (a) What is the minimum required sampling rate for an analogue signal of the form $X(t) = A \sin(\omega_0 t) \times \cos(2\omega_0 t)$ to avoid aliasing ?

   (b) What do you mean by optimum filter ? Why is it called so ?

   (c) What are the advantages of QPSK over BPSK ?

   (d) What is the power of the periodic signal given by $X(t) = A \sin(\omega_0 t)$?

   (e) What is a matched filter ? What is the meaning of "Matched" here ?

   (f) What is Gaussian noise ? What is its physical significance ?

   (g) What is Shannon's theorem ?

   (h) Give a signal space representation of 8 PSK.

   (i) What is PAM ? Draw a simple circuit to obtain PAM signal.

   (j) Draw the NRZ and RZ code for the digital data 10110001.

2. (a) What is the difference between coherent and non-coherent detection? Why PSK is always preferred over ASK in coherent detection ?   5

   (b) Draw the basic block diagram of digital communication system and explain each block.   5

3. (a) What is Pulse Width Modulation (PWM) ? Explain the generation and detection of PWM signal ?   5

P.T.O.

(b) State the bandwidth of the following signal and comment : 5

(i) QPSK

(ii) DPSK

(iii) QAM

(iv) BPSK.

4. (a) Define baud rate and bit rate ? Compare with suitable example. 5

(b) A digital communication system operates in 2.4-2.48 GHz ISM band with 8 channels (10 MHz BW each, including the guard spacing). At each channel, 8-ary FSK is employed. System operates at 2000 channel/second and transmits 8 symbols at each channel. Calculate the bit rate. 5

5. (a) Compare delta modulation and adaptive delta modulation. 5

(b) What is need of pulse shaping ? Explain how inter symbol interference (ISI) is avoided in Niquist criterion ? 5

6. (a) What is entropy ? Derive its expression. 5

(b) What are algebraic codes ? Discuss any one such code. 5

7. (a) Derive the error probability expression for MPSK ? 5

(b) Describe channel noise ? State its effects. 5

8. Write short notes on any **two** : 5×2

(a) Convolution Coding

(b) QPSK transmitter

(c) Antialiasing Filter

(d) The Matched Filter.