Total number of printed pages – 4 **B. Tech**

CPEC 5304

Sixth Semester Examination – 2008

DIGITAL COMMUNICATION TECHNIQUES

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 in brief. Provide suitable illustration whereever necessary. : 2×10

   (a) What is the purpose of DFT ? Is it a linear operation ?

   (b) Draw a PWM and PPM waveforms.

   (c) What is the need of signaling in a PCM system ?

P.T.O.

(d) Show the spectrum of a BPSK if the data rate is B bps.

(e) State the properties of MSK modulation.

(f) Is BFSK a power efficient modulation technique ? Justify.

(g) Bring out two differences between thermal noise and quantization noise.

(h) What is the power of a periodic signal given by $A\sin\omega_0 t$?

(i) What is meant by an optimum filter ? Why is it called so ?

(j) Give the signal space representation of 8PSK.

2. (a) Give the circuits for generating PAM, PWM and PPM signals. Draw suitable waveforms for each in order to justify your answer. 5

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

3. (a) What is the advantage of QPSK over BPSK ? Give the signal space representation of both of the modulation schemes. 2+2

(b) Derive an expression for the bit error probability of a BPSK signal. 6

4. (a) What is the need for pulse shaping ? Explain how ISI is avoided in Nyquist's criterion. 5

(b) Compare the bit error probability of BPSK and BFSK. 5

5. (a) For what type of noise is Shanon's channel capacity theorem valid ? Hence compute the capacity of a typical telephone channel. 5

(b) Why parity check bit coding is done ? How is it different from line coding ? What factors determine the probability of error with coding ? Justify. 5

6. (a) Why timing extraction is required in a digital communication system ? Explain any scheme for this. 5

(b) What is an algebraic code ? Discuss any one such code. 5

7. (a) Compare BPSK and DPSK with the help of appropriate diagrams wherever necessary. In which case is the bit error probability higher and why ? 5

(b) Is a convolutional code an algebraic code? Justify. Discuss a convolutional code generation. 5

8. (a) What is baseband transmission ? Explain a baseband signal receiver by explaining each block. Give an example of baseband transmission. 5

(b) What is meant by bandwidth – SNR tradeoff ? What is its significance ? 5