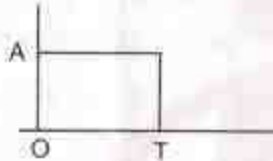


(b) Give a block schematic for generation and reception of M-ary PSK. 6

6. (a) What do you mean by an optimum filter? Derive its transfer function. 6

(b) For the signal shown below, find out the corresponding optimum filter's impulse response. Show your steps clearly. 4



7. (a) Give the circuit for realizing DM. Explain its working. 4

(b) Draw circuits for generating PWM and PPM. Explain their operation. 6

8. (a) What is Nyquist criterion of zero ISI? Enumerate. 4

(b) Derive the Fourier transform of a raised cosine pulse. 6

Total number of printed pages – 4 B. Tech

CPEC 5304

Sixth Semester Examination – 2009

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 wherever necessary. : 2×10

(a) What is the purpose of Line coding? Write down two desirable properties of a line code.

(b) What is the optimum receiver for recovery of a digital signal from noise?

- (c) What is pulse shaping ? Is it applied to a digital signal or analog signal ?
- (d) Why SNR is important in a digital communication system ? Can you recover a signal with 0 dB SNR ?
- (e) What is the need of quantization of signals ? Can you transmit a PCM signal without it ?
- (f) Are quantization noise and thermal noise different ? Justify.
- (g) Draw a simple circuit that can do sampling.
- (h) Write down two advantages of MSK.
- (i) What do you mean by orthogonal signals ? Why are they important ?
- (j) Can you express channel capacity in logarithmic bases other than 2 ? Justify.
2. (a) What is full quality speech bit rate ? How is it derived ? How much bandwidth is required to transmit this signal? 1+2+2

- (b) In the above problem, what is the peak signal-to-quantizing noise power ? Derive the formula you have used. 5
3. (a) Compute the parity check bit polynomial for the cyclic (7, 4), Hamming code when the message is 1001. Take the generator polynomial as $P^3 + P + 1$. Write down the complete code polynomial. 3+2
- (b) Give a circuit for realizing the above code. 2
- (c) Discuss a method by which you can decode the above code. 3
4. Show the effect on spectrum of a signal $m(t)$ when it is multiplied by a periodic square wave of frequency ω and amplitude swing $\pm v$. How can you detect such a signal ? Suggest a scheme. 10
5. (a) Is m -ary PSK bandwidth efficient or power efficient ? Justify. Give the signal space representation of it. 4