

**B.E. DEGREE EXAMINATIONS: APRIL / MAY 2010**

Sixth Semester

**ELECTRONICS AND COMMUNICATION ENGINEERING**

U07EC601: Digital Communication

**Time: Three Hours**

**Maximum Marks: 100**

**Answer ALL Questions:-**

**PART A (10 x 1 = 10 Marks)**

1. Which of the following is not a line code?  
a) NRZ                      b) RZ                      c) HDB3                      d) PCM
2. Slope over load distortion occurs in following any one type of modulation  
a) DM                      b) PCM                      c) DPCM                      d) TDM
3. For ideal channel, the relation between the channel bandwidth B and R is  
a)  $B=2R$                       b)  $R=(1/2)B$                       c)  $B=(1/2)R$                       d)  $B=2^R$
4. In matched filter the value of power spectral density interms of white noise is  
a)  $S_{ni}(f)=2N_0$                       b)  $S_{ni}(f)=N_0/2$                       c)  $S_{ni}(f)=2/N_0$                       d)  $S_{ni}(f)=(N_0)^2$
5. The probability of symbol error depends on ratio of  
a)  $E_s/N_0$                       b)  $N_0/E_s$                       c)  $\sqrt{E_s}/\sqrt{N_0}$                       d)  $\sqrt{N_0}/\sqrt{E_s}$
6. The bandwidth of M-ary FSK technique is  
a)  $2mf_s$                       b)  $2Wfs$                       c)  $4mf_s$                       d)  $\sqrt{2}mf_s$
7. In (n,k) Hamming codes for  $m \geq 3$  the value of block length is  
a)  $n = 2^m$                       b)  $n = 2^m - 1$                       c)  $n = 1 - 2^m$                       d)  $n = 2m - 1$
8. The Generator matrix format is  
a)  $[G] = [I_k | P]$                       b)  $[G] = [P | I_k]$                       c)  $[G] = [P_k | I]$                       d)  $[G] = [I | P_k]$
9. The value of processing gain in spread spectrum communication  
a)  $PG = T_b/T_c$                       b)  $PG = T_c/T_b$                       c)  $PG = T_b T_c$                       d)  $PG = (T_b/T_c)J$
10. In Fast frequency hopping, the value of chip rate  
a)  $R_c = R_h$                       (b)  $R_c > R_h$                       (c)  $R_c > R_h$                       (d)  $R_c = 2^{R_h}$

**PART B (10 x 2 = 20 Marks)**

11. Define Sampling Theorem.
12. Write some advantages in Adaptive modulation technique
13. List the causes for ISI.

14. What are the informations obtained from eye pattern?
15. Define bandwidth efficiency.
16. Write some advantages in m-ary FSK system.
17. Why we go for error detection and correction in digital communication?
18. List the two properties are present in cyclic codes and define these properties.
19. How is spread spectrum signal different from the normal signal?
20. Define slow frequency hopping.

**PART C (5 x 14 = 70 Marks)**

21. a) (i) Discuss in detail Pulse Code Modulation Technique(PCM). (7)  
 (ii) Compare the characteristics of PAM, PWM and PCM systems. (7)  
 (OR)
- b) (i) Explain in detail Delta modulation technique. (7)  
 (ii) Describe in detail Time Division Multiplexing (TDM) technique. (7)
22. a) (i) Describe in detail adaptive equalization technique for data transmission. (7)  
 (ii) Sketch the time response and frequency response of signal with raised cosine pulse spectrum. (7)  
 (OR)
- b) Derive the expression for probability of error and signal to noise ratio of a matched filter.
23. a) (i) Draw a block diagram and explain each blocks in pass band transmission model.(7)  
 (ii) Explain with block diagram of QPSK transmitter and receiver. (7)  
 (OR)
- b) Explain with block diagram, mathematical representation and graphical representation of Binary Phase Shift Keying (BPSK).
24. a) The parity check matrix of a particular (7,4) linear block code is given by

$$[H] = \begin{bmatrix} 1110100 \\ 1101010 \\ 1011001 \end{bmatrix}$$

- (i) Find the generator matrix.
- (ii) List all the code vectors
- (iii) What is the minimum distance between code vectors? (iv). How many errors can be detected and corrected?

**(OR)**

b) Explain with example the following three representations in convolutional encoding.

(i) code tree

(ii) code trellies

(iii) state diagram

25. a) Describe in detail about Direct sequence spread spectrum technique with coherent binary phase shift keying.

**(OR)**

b) Explain with neat block diagram, frequency hop spread spectrum technique.

\*\*\*\*\*