Q.2 a. Discuss the channel characteristics importances in digital-communication.
Answer: Page number 05-06 of Text Book

b. A discrete memory less source has an alphabet of five symbols with probabilities 0.4, 0.2, 0.2, 0.1, 0.1 respectively. Compute Huffman code for this source, the average code word length and entropy of this code.
Answer: Page number 25-28 of Text Book

Q.3 a. Explain the principle of quadrature sampling of band - pass signal.
Answer: Page number 142-143 of Text Book

b. Explain TDM in brief with the help of block diagram.
Answer: Page number 162 to 165 of Text Book

c. Explain practical aspect of sampling in detail.
Answer: Page number 154 to 161 of Text Book

Q.4 a. Explain Robust quantization. Also explain μ- law and A – law companding.
Answer: Page number 193-198 of Text Book

b. The ramp signal $x(t) = at$ is applied to a delta modulator that operates with a sampling period T_S and step size $\Delta = 2\delta$.

(i) Show that slope-overload distortion occurs if $\delta < aT_{S,}$.

(ii) Sketch the modulator output for the following three values of step size.

- $\delta = 0.75\, aT_S$
- $\delta = aT_S$
- $\delta = 1.25aT_S$

Answer: Page number 232 of Text Book

Q.5 a. Explain in detail the Nyquist criterion for distortion less base band binary transmission. What are its practical limitation and solution of these limitations?
Answer: Page number 245 to 252 of Text Book

b. Construct NRZ bipolar format for the binary sequence 011010110.
Answer: Page number 267 of Text Book

c. Explain base band M- ary PAM system in brief.
Answer: Page number 263 of Text Book

Q.6 a. With the help of neat sketch explain coherent binary PSK transmitter and receiver.
Answer: Page number 275 to 279 of Text Book

  b. List the coherent modulation techniques.
Answer: Page number 275 of Text Book

  c. Give comparison of binary and quaternary modulation techniques in brief.
Answer: Page number 310-311 of Text Book

Q.7 a. Explain Gram-Schmidt Orthogonalization procedure with the help of block diagram and mathematical analysis.
Answer: Page number 60-64 of Text Book

  b. Explain the properties of matched filter.
Answer: Page number 92-94 of Text Book

Q.8 a. Explain the frequency hopped spread spectrum with the help of suitable block diagram.
Answer: Page number 462-463 of Text Book

  b. A PN sequence is generated using a feedback shift register of length, $m = 4$. The chip rate is 10^7 chips per second. Find the following parameters.
  1) PN sequence length.
  2) Chip duration of the PN sequence.
  3) PN sequence period.
Answer: Page number 471 of Text Book

Q.9 Write Short note on any **TWO** of the following:
 (i) T1 System.
 (ii) Applications of digital modulation techniques.
 (iii) Applications of spread spectrum techniques.
Answer:
(i) Page number 221 of Text Book
(ii) Page number 348-351 of Text Book
(iii) Page number 467-469 of Text Book

TEXT BOOK

Digital Communications, Wiley Student Edition, Simon Haykin