

Register Number.....

B.E. DEGREE EXAMINATIONS: APRIL/MAY 2012

Sixth Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

ECE113: Digital Communication

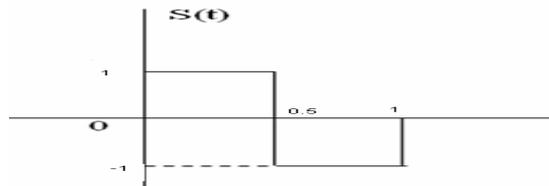
Time: Three Hours

Maximum Marks: 100

Answer All Questions:-

PART A (10 x 1 = 10 Marks)

1. A continuous time signal to be sampled is represented by $x(t) = (4 \sin 6283 t + 5 \sin 12566t)$.
The minimum sampling frequency of this is.....
a. 4 kHz b.4.5 kHz c.4.7 kHz d. 5 kHz
2. If the no. of quantization levels is 64 then the maximum signal to quantization noise ratio of a PCM system with sine wave i/p is
a. 36 dB b.39 dB c.40 dB d.37.8 dB
3. The roll off factor α for the raised cosine pulse with the channel bandwidth of 75 KHz & the data rate of 0.1Mb/s is.....
a. 0.1 b.0.5 c.1.0 d.0.25
4. The signal given below is defined by:



- a. $h(t) = \begin{cases} +1 & \text{for } 0 < t < 0.5 \\ -1 & \text{for } 0.5 < t < 1 \end{cases}$
 - b. $h(t) = \begin{cases} -1 & \text{for } 0 < t < 0.5 \\ +1 & \text{for } 0.5 < t < 1 \end{cases}$
 - c. $h(t) = \begin{cases} +1 & \text{for } 0 < t < 0.5 \\ -0.5 & \text{for } 0.5 < t < 1. \end{cases}$
 - d. $h(t) = \begin{cases} -0.5 & \text{for } 0 < t < 0.5 \\ +1 & \text{for } 0.5 < t < 1 \end{cases}$
5. The probability error expression of non coherent receiver is.....
a. $p_e = \frac{1}{2} \exp(-\frac{E}{2N_0})$ b. $p_e = \frac{1}{2} \exp(-\frac{N}{2N_0})$
c. $p_e = \frac{1}{2} \exp(-\frac{E}{N_0})$ d. $p_e = \exp(-\frac{E}{2N_0})$

1. The bit duration before multiplexing
2. The transmission rate of TDM
3. The duration of each time slot in TDM.
4. The duration of one TDM frame.

(OR)

b) (i) Describe the principle of delta modulation. Draw the appropriate waveforms. What are the distortions producer? (8)

(ii) A DM system is designed to operate at 3 times the Nyquist rate for a signal with 3 kHz bandwidth. The quantizing step size is 250 mV. Determine the maximum amplitude of a 1 kHz input sinusoid for which a delta modulator does not show slope overload. Determine the post filtered output signal-to-quantizing noise ratio for the above signal. (6)

22. a) (i) What is ISI? Derive the expression for Nyquist criteria for distortionless baseband transmission for zero ISI. (10)

(ii) Draw an eye pattern and represent the ways in which it could be used to evaluate the performance of a baseband pulse transmission system. (4)

(OR)

b) (i) The binary data 001101001 are applied to the input of a duo binary system.

1. Construct the duo binary coder output and corresponding receiver output, without a precoder. (2)

2. Suppose that due to error during transmission, the level at the receiver input produced by the second digit is reduced to zero. Construct the new receiver output. (2)

(ii) Derive the optimum impulse response of a matched filter. (10)

23. a) Discuss the generation and detection of QPSK with suitable block diagrams. Draw the constellation diagram and derive the expression for the error probability of a QPSK scheme.

(OR)

b) (i) Explain the generation & detection of coherent BFSK with neat block diagrams. (8)

(ii) Explain the principle of squaring loop method of carrier synchronization. (6)

24. a) (i) Construct the (7,4) linear code word for the generator polynomial $g(D) = 1 + D^2 + D^3$ for the message bits 1001 using systematic encoding rule. (5)

(ii) Sketch the encoder and syndrome calculator for the above polynomial and obtain the syndrome for the received word 1001011. (5)

(iii) State the properties of syndrome. (4)

(OR)

b) (i) Draw the convolution encoder with constraint length $K=3$ and rate $r=1/2$. Encode the sequence 10011 and draw the state diagrams. (8)

(ii) Decode the above coded output using Viterbi algorithm with one bit errors. (6)

25. a) Explain the principle of DS-SS / BPSK transmitter & receiver with suitable diagrams. Also derive its signal to jamming noise ratio.

(OR)

b) (i) Explain the principle of slow FH-SS / MFSK transmitter & receiver with suitable diagrams. (10)

(ii) Write short notes on OFDM. (4)
