Total No. of Questions : 6]

SEAT No. :

P32

[Total No. of Pages : 2

Oct./TE/Insem.-146
T.E. (E & TC)
DIGITAL COMMUNICATION
(2015 Pattern) (Semester - I) (304181)

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates:

1) ***Q1 or Q2, Q3 or Q4, Q5 or Q6.***
2) ***Neat diagram must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume suitable data, if necessary.***

Q1) a) With the block diagram explain the generation and reconstruction of PCM signal. **[5]**

b) Considers a DM system designed to accomodate analog message signals limited to bandwidth W = 5KHz. A sinusoidal test signal of amplitude A = 1 Volt and frequency fm = 1KHz is applied to the system. The sampling rate of the system is 50 KHz. **[5]**

i) Calculate the minimum step size required to minimize slope overload.

ii) Calculate SNR of the system for the specified sinusoidal test signal.

OR

Q2) a) Explain with block diagram. Adaptive delta modulation. **[5]**

b) Explain how compounding improves the signal to noise ratio of PCM system with respect to μ-law. **[5]**

Q3) a) Explain T_1 multiplexing system in detail. **[5]**

b) Given a six channel main multiplexes with fs = 8 KHz. Device a telemetry system including a marker that accommodates six input signals having following bandwidth 8.0, 3.5, 2.0, 1.8 and 1.2 KHz. Make sure that successive samples of each input signal are equispaced in time. Calculate the resulting baseband transmission bandwidth. Draw the block schematic of designed telemetry system. **[5]**

OR

P.T.O.

Q4) a) Draw waveforms for the bit sequence 11010100 to **[5]**

i) RZ unipolar

ii) NRZ polar

iii) Bipolar NRZ

iv) Manchester

v) Polar Quaternary NRZ

b) What is bit synchronization? Explain closed loop bit synchronizer. **[5]**

Q5) a) If $X(t) = A\cos(2\pi f_c t + \phi)$ is random process with ϕ is a random variable uniformly distributed over $(0, 2\pi)$ Prove that $x(t)$. is ergodic in mean. **[5]**

b) Explain random process with classification. **[5]**

OR

Q6) a) Explain various sources of noise. **[5]**

b) Given a random process x (t) = k, where k is an random variable uniformly distributed in the range (–1, + 1). Find process is wide sense stationary or not. **[5]**

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