Total No. of Questions : 6]

SEAT No. :

P5073

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T.E./Insem.-621

T.E. (E & TC) (Semester - I)

DIGITAL COMMUNICATION

(2015 Pattern)

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

Instructions to the candidates:

1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right side indicate full marks.*
4) *Assume suitable data if necessary.*

Q1) a) Draw block diagram of PCM transmitter and explain its working. **[6]**

b) A DM transmitter is designed to operate at 3 times Nyquist rate for a signal with 3 KHz bandwidth. Find the maximum amplitude of the 1KHz sinusoid to avoid slope overload if step size is 250 mV. **[4]**

OR

Q2) a) Draw block diagram of DM receiver and explain its working. **[6]**

b) Find a signal g(t) which is band limited to 1Hz and its samples are

$g(0) = 1, g(\pm 0.5) = g(\pm 1) = g(\pm 1.5) =$ ----- $= 0$. **[4]**

Q3) a) Draw block diagram of T1 carrier system. **[6]**

b) What absolute bandwidth is required to transmit an information rate of 8kbps using 64 level baseband signaling over a raised cosine channel with roll off factor of 40%. **[4]**

OR

Q4) a) What is scrambling? Why is its use? **[4]**

b) Draw the line codes - Unipolar RZ, Polar NRZ, AMI, Manchester, Polar RZ and quaternary polar for the bit stream 10110100. **[6]**

P.T.O.

Q5) a) Define Random Process. Differentiate between random variable and random process. **[6]**

b) Find mean of a random process defined as $x(t) = A\cos(2\pi f_c t + \varnothing)$ where $\varnothing$ is a uniformly distributed over $(0, 2\pi)$. **[4]**

OR

Q6) a) What is Stationary Process? Explain. **[6]**

b) What is white noise? Explain. **[4]**