[Total No. of Questions - 9] [Total No. of Printed Pages - 3]
(2125)

15205

B. Tech 6th Semester Examination

Digital and Analog Communication (OS)

CS-6001

Time : 3 Hours **Max. Marks : 100**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt one question from each Section A, B, C and D. Section E is Compulsory.

SECTION - A

1. For a 2L-periodic function given on one full period,
   (i) define f(x) at each point of discontinuity by the average value;
   (ii) find the Fourier series of f(x).

   (a) $f(x)=\begin{cases} 3, & -2<x<3, \\ -1, & 0<x<2, \end{cases}$ (7)

   (b) $f(x)=\begin{cases} 0, & 0<x<1, \\ 1, & 1<x<2, \end{cases}$ (7)

   (c) $f(x)=\begin{cases} x, & -2\pi<x<0, \\ -1, & 0<x<2\pi, \end{cases}$ (6)

OR

2. For a given 2¼-periodic function, find its Fourier series.

   (a) $f(x)=\cos x, -\pi<x<\pi,$ (10)

   (b) $f(x)=\begin{cases} 2\pi+x, & -\pi\le x<0, \\ 0, & 0\le x<\pi \end{cases}$ (10)

[P.T.O.]

SECTION - B

3. Explain the following:
   (a) Source of Noise (6)
   (b) Noise temperature. (6)
   (c) Spectral components of noise (8)

OR

4. What are the main sources of noise? Explain the response of narrow band filter to noise? (20)

SECTION - C

5. An FM signal is described by $x(t)=A\cos[2\pi 10^7 t+50\sin(2\pi 10^4 t)]$
   (a) Identify the carrier frequency. (6)
   (b) Identify the frequency of the modulating signal. (7)
   (c) Find the peak frequency deviation and modulation index. (7)

OR

6 (a) Distinguish between different pulse modulation schemes with neat diagrams. (10)
   (b) Explain Quantization and determine the quantization error of a uniform quantizer. (10)

SECTION - D

7. Derive Expressions for quantization noise and signal to noise ratio in a PCM system using a uniform quantiser. (20)

OR

8. (a) A sinusoidal signal is to be transmitted using PCM. An output SNR of 55.8 dB is required. Find the number of representation levels required to perform this operation. (10)

(b) What are the type of errors encountered in data transmission system? Explain the methods used to overcome the errors. (10)

SECTION - E

9. Short answer type questions:

(i) Define bandwidth efficiency.

(ii) Distinguish between FM and AM.

(iii) Draw the block diagram of BFSK transmitter.

(iv) What is bandwidth need to transmit 4 kHz voice signal using AM?

(v) Write one advantage and one disadvantage of delta modulation.

(vi) What is meant by fading?

(vii) Differentiate between PPM and PAM.

(viii) What is delta modulation?

(ix) Define sampling theorem.

(x) What is Parsevals theorem? (10×2=20)