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(2125)

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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,
- define $f(x)$ at each point of discontinuity by the average value;
 - find the Fourier series of $f(x)$.

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

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

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

OR

2. For a given $2\frac{1}{4}$ -periodic function, find its Fourier series.

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

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

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SECTION - B

3. Explain the following:
- Source of Noise (6)
 - Noise temperature. (6)
 - 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 $x(t) = A \cos[2\pi 10^7 t + 50 \sin(2\pi 10^4 t)]$
- Identify the carrier frequency. (6)
 - Identify the frequency of the modulating signal. (7)
 - 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)