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(2064)

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B. Tech 6th Semester Examination

Digital and Analog Communication

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 coefficient a_0.

$$f(x) = \begin{cases} 5, & -1 < x < 0, \\ -1, & 0 < x < 2, \end{cases} \qquad (20)$$

OR

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

   (a) $f(x) = 3, \ -\pi < x < \pi,$ (10)

   (b) $$f(x) = \begin{cases} 2, & -\pi < x < 0, \\ -1, & 0 < x < \pi, \\ \frac{1}{2}, & x = -\pi, 0, \pi, \end{cases} \qquad (10)$$

SECTION - B

3. Explain frequency domain representation of noise with suitable examples. (20)

OR

4. What are the main sources of noise in data communication? Explain narrow band filtering with an example. (20)

SECTION - C

5. (a) How do you generate Frequency Modulation using direct & indirect methods? Explain both methods with suitable diagrams. (10)

   (b) Define Frequency Modulation. Derive the equation of FM wave. (10)

OR

6. Explain the basic principles used for FM and AM transmitters and receivers? (20)

SECTION - D

7. (a) What are uniform and non uniform quantization? Derive the SNR ratio for uniform Quantizer (10)

   (b) Draw the block diagram of Delta modulator and explain its operation. What are its advantages over PCM? (10)

OR

8. (a) Differentiate between PCM. PWM and PPM? (10)

   (b) Explain in detail about the operation of PCM transmitter and receiver. (10)

SECTION - E

9. Short answer type Questions:

(i) Give the time and frequency shifting properties of Fourier transform,

(ii) What is Nyquist criterion?

(iii) Give the mathematical expression for FM and AM waves.

(iv) Name the methods used for generation of SSB-SC signals.

(v) Discuss the term Modulation index.

(vi) Discuss frequency deviation.

(vii) What is Partition noise?

(viii) Give the power relation for an AM wave in terms of modulation index.

(ix) What is carson's rule?

(x) What is the difference between PWM and PPM?

(10×2=20)