May, 2019
B.Tech. (EL/EEE) - 4th SEMESTER
SIGNALS AND SYSTEMS (ELPC-404)

Time : 3 Hours]   [Max. Marks : 75

Instructions :

1. It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.

2. Answer any four questions from Part-B in detail.

3. Different sub-parts of a question are to be attempted adjacent to each other.

PART-A

1. (a) Define the termsperiodicity and absolute integrability.   (1.5)

    (b) Enlist salient features oftime-limited signals.   (1.5)

    (c) What is the impulse response of LTI system?   (1.5)

    (d) What do you understand by State-Space Analysis?

                                                          (1.5)

    (e) Give any two applications of DFT.   (1.5)

(f) What is duality property of the Fourier Transform?

(1.5)

(g) Briefly describe magnitude and phase response of a system.

(1.5)

(h) What is the practical importance of system function in signals and systems?

(1.5)

(i) Differentiate between zero-order hold and first-order hold.

(1.5)

(j) Define the term Aliasing.

(1.5)

(1.5)

PART-B

2. (a) Differentiate between continuous and discrete time signals.

(5)

(b) Discuss linearity, shift-invariance and realizability properties of a system.

(10)

3. (a) Define the terms step response, convolution and difference equation. Also explain the concept of characterization of causality and stability of LTI systems.

(9)

(b) Using an example, describe the concept of state transition matrix and its role.

(6)

4. What do you understand by Fourier series representation of periodic signals? State and explain the convolution property of Fourier transform. Also, give its applications.

(15)

5. (a) Make comparison between :
   (i) DTFT and DFT.
   (ii) Laplace transform and Z-transform. (6)

   (b) State and explain Parseval's Theorem. Also, discuss the role and significance of Laplace Transform for continuous time signals and systems. (9)

6. (a) State and explain sampling theorem. Also discuss its implications. (8)

   (b) Discuss the relation between continuous and discrete time systems. (7)

7. Write short notes on the following :
   (a) Application of signal and system theory. (8
   (b) Z-transform for discrete time signals and systems. (7

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