

Roll No.

Total No. of Pages : 02

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B.Tech. (Electronics & Communication Engineering) (Sem.-4)

SIGNALS AND SYSTEMS

Subject Code : BTEC-403-18

M.Code : 77568

Date of Examination : 03-06-23

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- a) Define periodic signals with the help of suitable example.
- b) Differentiate between continuous and discrete time signals.
- c) What do you mean by differential and difference equations?
- d) Check the system $y(t) = ax(t) + b$ for linearity, where a and b are constants.
- e) Name any two signals for which Fourier transform is not defined.
- f) Explain the differentiation property of Fourier transform.
- g) What is sampling theorem?
- h) What is the relationship between DTFT and Z-transform?
- i) Differentiate between unit step response and unit impulse response.
- j) Define linear shift-invariant system with example.

SECTION-B

2. Determine whether $x[n]$ is energy or power signal

$$x[n] = u[n]$$

3. Consider an input $x[n]$ and a unit-impulse response of an LTI system $h[n]$ given by

$$x[n] = r[n], \quad h[n] = u[n]$$

Where $r[n]$ is a ramp sequence given by $r[n] = nu[n]$. Find the response $y[n]$.

4. Calculate the Fourier transform of the following signal

$$x(t) = \text{sgn}(t)$$

5. Explain probability distribution function in brief.

6. Determine the Z-transform of

$$x[n] = 7\left(\frac{1}{3}\right)^n u[n] + 6\left(\frac{1}{2}\right)^n u[n]$$

SECTION-C

7. Explain the following in brief :

- a) Unit step signal
- b) Unit impulse signal
- c) Signum function
- d) Sinc function

8. Explain CTFT and its properties in detail.

9. Explain the significance Region Of Convergence [ROC] in Z transform. Discuss any five properties of ROC.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.