University of Engineering & Management, Kolkata
2nd Term Examination, November, 2023
Programme Name: B.Tech in CSE / CSE (AIML) / CSE (IOT, CYS, BCT)
Semester: 5th
Course Name: Signals and Systems
Course Code: ESCCSE501

Full Marks: 30 | Date: 8th November, 2023 | Time: 3.30 pm – 4.30 pm

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Part - A
Attempt 5 questions
Each question carries 2 Marks (2 X 5)

1.A. What do you mean by signal? Also state the names of various system.

Or

1.B. Draw the impulse function and impulse train function with proper explanation.

2.A. State the various properties of convolution with proper symbols & notations.

Or

2.B. Evaluate overall impulse response when two systems whose impulse responses are $h_1(t)$ & $h_2(t)$, are in parallel.

3.A. State Fourier Series expansion of a signal. Also state the various coefficient of Fourier Series.

Or

3.B. State merits and demerits of Fourier Transform.

4.A. State Sampling Theorem.

Or

4.B. What is Nyquist Rate? What is Aliasing ?

5.A. What do you mean by pole & zero of a system?

Or

5.B. Find the Z Transform of the following function: $x(n) = \{1, 2, 3, 2, 1\}$

Part - B
Attempt 2 questions
Each question carries 5 Marks (5 X 2)

6.A. State and explain Dirichlet's Condition for Fourier Series.

Or

6.B. State and prove Duality property of Fourier Transform.

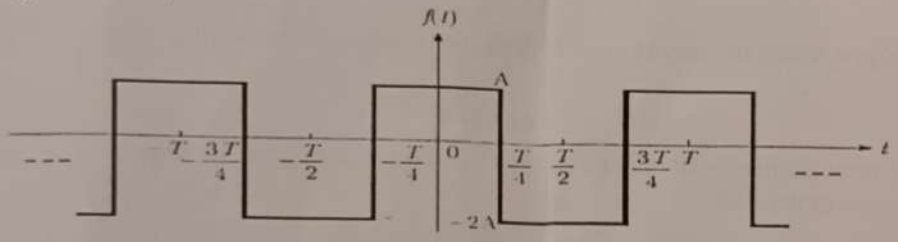
7.A. What do you mean by region of convergence of Laplace Transform? Explain the properties of ROC in s-plane.

Or

7.B. Define ROC of Z transform. State the effects of the properties of region of convergence on Z transform.

Part - C
Attempt 1 question
Each question carries 10 Marks (10 X 1)

8.A. Evaluate the trigonometric Fourier series coefficients of the following periodic signal. Where, $T = 2\pi$.



Or

8.B.i Find the Fourier transform of ***Unit Step*** function. Using the result find the Fourier Transform of ***Signum*** Function. 5

8.B.ii Evaluate the Laplace Transform of x(t):

$$x(t) = e^{-at}u(t), \quad where\ a > 0$$

Also find & draw the ROC. 5