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MAR_APR 2026 SUMMER EXAMINATION

1154 B.Tech. CBCS

Sub. Name: Signal and Systems

Sub. Code: 66316/80807/81067

Day and Date: Thursday ,14-05-2026 **Total Marks: 70**

Time: 02:30 PM To 05:00 PM

Instructions: **1. All questions are compulsory**
2. Assume suitable data wherever necessary and mention it boldly
3. Figures to the right indicate full marks

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Q1) Solve following MCQ. **[14]**

i. A signal $x(t)$ can be transformed to $x(at)$ by using which of the below operation?

A. time shifting
B. time reversal
C. amplitude scaling
D. none of these

ii. The Fourier transform of rectangular pulse is _____

A. gate signal
B. sinc signal
C. step signal
D. none of these

iii. A system whose output at any time instant depends on present and past input is called as _____

A. linear
B. causal
C. time variant
D. none of these

iv. The twiddle factor W_4^3 is equal to _____

A. +j
B. 1
C. -j
D. -1

v. A signal whose region of convergence is entire z-plane is _____

A. shifted unit step signal
B. unit sample signal

C. unit step signal
D. none of these

vi. Which of the below realization structure uses common delays at input and output samples?
A. Direct form I
B. Direct form II
C. both A and B
D. none of these

vii. A DT system is characterized by _____
A. differential equation
B. difference equation
C. quadratic equation
D. none of these

Q2) Solve any two of the following **[14]**

a. Explain time reversal and time shifting operation on DT signal with suitable example. **[7]**

b. Determine whether the systems given by system equation are time variant or time invariant? 1. y(n) = n.x(n), 2.y(t)=x(t) +x(t-1) **[7]**

c. Determine Fourier Transform of $x(t) = e^{-t}.u(t)$. **[7]**

Q3) Solve any two of the following. **[14]**

a. Discuss even and odd signals by considering sine wave and cosine wave as an example. **[7]**

b. Discuss with example BIBO stable and unstable systems. **[7]**

c. Discuss Dirichlet's conditions for the existence of Fourier transform of any signal x(t). **[7]**

Q4) Solve any two of the following. **[14]**

a. Determine z-tansform of x(n) = u(n) - u(n-4) and indicate possible ROC condition. **[7]**

b. Determine 4-point DFT of sequence x(n) = {2,-3, 4, 1} **[7]**

c. Compare Direct form I and Direct Form II realization structures. **[7]**

Q5) Solve any two of the following. **[14]**

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a. Using convolution property of z-transform determine convolution sum of x[n]={1, 2, 3,2} and h[n]={1,2,2} **[7]**

b. State and prove linearity property of DFT. **[7]**

c. Explain what do you mean by transfer function of DT system. Find transfer function of DT system given by difference equation, y(n) - 5/6y(n-1) + 1/6y(n-2)= x(n) + 2x(n-1) using direct form -I realization structure. **[7]**

End Of Question Paper

Important Note for Chief Exam Officer / SRPD Coordinator / Sr Supervisor/ Student -
This Question Paper may be distributed for following Subjects as common code.
सदरची प्रश्नपत्रिका खालील विषयांकरिता वितरित करता येईल.

1] (101) Bachelor of Engineering (81067) Signal and Systems Part 3 SEM 5
2] (101) Bachelor of Engineering (66316) Signals and Systems Part 3 SEM 5
3] (1154) B.Tech. CBCS (80807) Signal and Systems Part 3 SEM 5

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