REG.NO.:

# VIT

Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

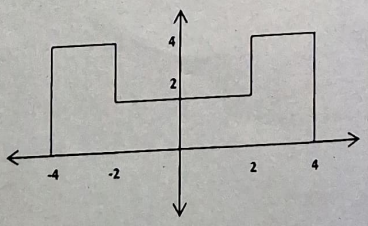
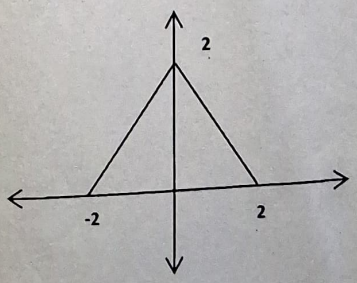
SLOT:B2+TB2

**SCHOOL OF ELECTRONICS ENGINEERING**
**CONTINUOUS ASSESSMENT TEST - I**
**FALL SEMESTER 2025-2026**

**Programme Name & Branch** :B.Tech -ECE and BML
**Course Code and Course Name** :BECE202L Signals and Systems
**Faculty Name(s)** : Dr. M KARTHIKEYAN, Dr. RAJESH N , Dr. NAWAZ SHAFI, Dr. JAGANA BIHARI PADHY, Dr. SARANYA K.C.
**Class Number(s)** : VL2025260100449,3482,3484, 3485,3493
**Date of Examination** : 18-08-2025
**Exam Duration** : 90 minutes
**Maximum Marks: 50**

**General instruction(s):**

- Answer All Questions
- M - Max mark; CO – Course Outcome; BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)
- Course Outcomes
  1. Differentiate between various types of signals and understand the implication of operations on signals.
  2. Understand terms like causal, dynamic, linear, time invariant and stability of systems; also compute impulse response of both continuous-time and discrete-time systems.

| Q. No | Question | M | CO | BL |
|---|---|---|---|---|
| 1. | Find and sketch the first derivates of following signals<br>a. $x(t) = u(t) - u(t-a),\ a > 0$<br>b. $x(t) = t[u(t) - u(t-a)],\ a > 0$<br>c. $x(t) = sgn(t)$ | 10 | 1 | 2 |
| 2. | Classify the following signals shown in figure 1 and figure 2 as energy signals, power signals or neither.<br>  <br><br>Figure 1<br>  <br><br>Figure 2 | 10 | 1 | 2 |
| 3. | The discrete-time LTI system with x[n] as input and y[n] as output is shown in figure 3. Given are the individual impulse responses of the LTI subsystems.<br>$h_1[n] = \frac{1}{2}(\delta[n] + \delta[n-1])$ | 10 | 2 | 3 |

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$h_2[n] = \frac{1}{4}(\delta[n] - \delta[n-1])$

$h_3[n] = 2\delta[n]$

$h_4[n] = -2\left(\frac{1}{2}\right)^n u[n-1])$

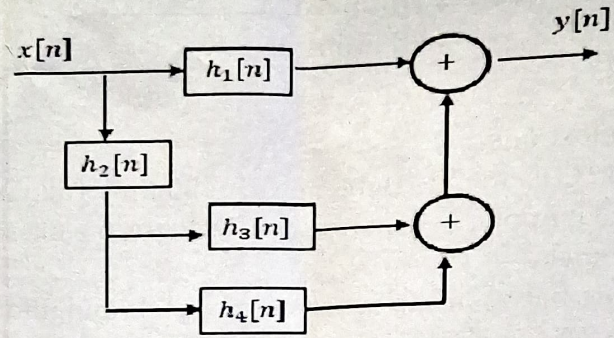


Figure 3

a) Compute the impulse response of the system.

b) Compute the step response of the system.

| | | | | |
|---|---|---|---|---|
| 4. | A) Test the Causality, Linearity, Memory and Time Variant of the system given below. $y(t) = e^{x(t)} + \frac{dx(t)}{dt}$ B) Test stability of the following system. $y(t) = e^t x(t)$ | 10 | 2 | 2 |
| 5. | Let a discrete-time LTI system have the impulse response: $h[n] = (0.5)^n \cdot u[n]$ and the input signal:$x[n] = u[n] - u[n-5]$. Compute the output $y[n]$ | 10 | 2 | 3 |