**SRM Institute of Science and Technology**

**Batch 2 / SET C**

**College of Engineering and Technology**

**DEPARTMENT OF ECE**

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

**Academic Year: 2023-2024 (EVEN)**

**Answer Key**

**Test: CLAT- 1** **Date:15/02/2024**

**Course Code & Title: 21ECC204T Signal Processing Duration: 12:30–01:30 PM**

**Year & Sem: II Year/ IVSem Max. Marks: 25**

**Course Articulation Matrix:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| S.NO | 18ECC204T- Signal Processing | Program Outcomes (PO) | | | | | | | | | | | | Program Specific outcomes (PSO) | | |
| Course Outcomes (CO) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 |
| 1 | Summarize the classification of Signals and Systems and various operations on signals | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| 2 | Apply Fourier Transform and Laplace transform on solving continuous time signals and systems | - | 2 | - | 3 | - | - | - | - | - | - | - | - | - | - | 2 |
| 3 | Apply Discrete Fourier Transform and Z-transform on Discrete time signals and systems | - | 2 | - | 3 | - | - | - | - | - | - | - | - | - | - | 2 |
| 4 | Design Finite Impulse Response Filters using different types of windowing techniques | - | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | 3 |
| 5 | Design analog and digital Infinite Impulse Response Filters | - | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | 3 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Part – A (5x3 = 15 Marks)**  **Instructions: Answer any 5 Questions** | | | | | |
| **Q. No** | **Question** | **Marks** | **BL** | **CO** | **PO** |
|  | a. Determine r(t) from u(t)    b. Determine unit impulse function from unit step function | **3** | **2** | **1** | **1** |
|  | Sketch and Evaluate -1 + 2 u(n) | **3** | **3** | **1** | **2** |
|  | Draw a continuous time signal for  X(t) = u(t+1) +2u(t)-u(t-1)-u(t-2)-u(t-3) | **3** | **1** | **1** | **1** |
|  | Sketch and determine whether the signal is periodic 2n u(-n)  (2 Marks)  Given signal is aperiodic (1 Marks) | **3** | **3** | **1** | **2** |
|  | Evaluate   1. Product of two odd signals      1. Product of odd and even signal | **3** | **1** | **1** | **1** |
|  | Express the various components of discrete time sinusoidal signal. Define its fundamental period | **3** | **1** | **1** | **1** |
|  | Estimate the power and energy of the signal .  X(t) = 5 -2 ≤ t ≤ 2 | **3** | **3** | **1** | **2** |
| **Part – C (1 x 10 = 10 Marks)** | | | | | |
| **8.** | For the continuous-time signal shown below    a.Give the functional represenation (3)    b.Check whether periodic (2)  Given signal donot repeats, so its aperiodic (2 Marks)  c.Determine the energy of the signal (5) | **10** | **3** | **1** | **2** |
| **Or** | | | | | |
| **9.** | A system is defined by y(t) = x(t)sin(Ωct). Determine whether it is   1. Memoryless (1) b) causal (1) c) Linear (3)   d) Time variant (3) e) Stable (2) | **10** | **2** | **1** | **1** |

**Course Outcome (CO) and Bloom’s level (BL) Coverage in Questions**

**Evaluation Sheet**

**Name of the Student: Register No.:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Part- A (5 x 3= 15 Marks)** | | | | | |
| **Q. No** | **CO** | **PO** | **Maximum Marks** | **Marks Obtained** | **Total** |
| **1** | **1** | **1** | **3** |  |  |
| **2** | **1** | **2** | **3** |  |
| **3** | **1** | **1** | **3** |  |
| **4** | **1** | **2** | **3** |  |
| **5** | **1** | **1** | **3** |  |
| **6** | **1** | **1** | **3** |  |
| **7** | **1** | **2** | **3** |  |
| **Part- B (1 x 10= 10 Marks)** | | | | | |
| **8** | **1** | **2** | **10** |  |  |
| **9** | **1** | **1** | **10** |  |

**Consolidated Marks:**

|  |  |  |
| --- | --- | --- |
| **CO** | **Maximum Marks** | **Marks Obtained** |
| **1** | **25** |  |
| **Total** | **25** |  |

|  |  |  |
| --- | --- | --- |
| **PO** | **Maximum Marks** | **Marks Obtained** |
| **1** | **22** |  |
| **2** | **19** |  |
| **Total** | **41** |  |

**Signature of Course Teacher**

**Approved by the Course Coordinator Approved by the Academic Advisor**