VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

IBRAHIMBAGH, HYDERABAD-31

Department of Computer Science and Engineering

#### Name of the Course: Image Processing

Assignment – 2

Name of the Faculty: C.Gireesh Date of submission: 06-04-2024

Class: B.E CSE-A VI Sem Time: 4.20 PM

Academic Year: 2023-24

**Set-1(**Top 10 Students: **1602-21-733-005, 012, 13, 20, 26, 29, 32, 36, 37, 63)**

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| Q. No | Questions | Marks | BTL | Course Outcome |
| 1. | Consider a spatial mask that averages the four closest neighbors of a  point (*x*, *y*), but excludes the point itself from the average.  **(a)** Find the equivalent filter,H(u,v) , in the frequency domain.  **(b)** Show that your result is a lowpass filter. | 2 | 3 | CO3 |
| 2. |  | 3 | 3 | CO3 |

**Set-2 (1602-21-733-001,02,03,04,06,07,08)**

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| Q. No | Questions | Marks | BTL | Course Outcome |
| 1. | Consider a checkerboard image in which each square is 0.5 \* 0.5 mm. Assuming that the image extends infinitely in both coordinate directions, what is the minimum sampling rate (in samples/mm) required to avoid aliasing? | 2 | 3 | CO3 |
| 2. | What is period and frequency of each of following digital sequences (*Hint:* Think of these as square waves.)  **(a) \*** 0 1 0 1 0 1 0 1 . . .  **(b)** 0 0 1 0 0 1 0 0 1 . . . .  **(c)** 0 0 1 1 0 0 1 1 0 0 1 1 . . . | 3 | 3 | CO3 |

**Set-3 (1602-21-733-009, 10,11,14,15,16,17)**

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| Q. No | Questions | Marks | BTL | Course Outcome |
| 1. | Compute DFT for the given hypothetical image  f(x,y) = | 2 | 3 | CO3 |
| 2. | Compute the IDFT for the sample set F(u) = {11, -3+2j, -1, -3-2j} at u= 0,1,2,3. | 3 | 3 | CO3 |

**Set-4(18,19,21,22,23,24,25)**

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| Q. No | Questions | Marks | BTL | Course Outcome |
| 1 | Find DFT for the sample set f(x)={1,2,1,2} at x = 0,1,2,3. | 2 | 3 | CO3 |
| 2 | Given an input image Obtain the sharpened image using Butterworth highpass filter. | 3 | 3 | CO3 |

**Set-5(27,28,30,31,33,34,35)**

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| Q. No | Questions | Marks | BTL | Course Outcome |
| 1 | Compute the IDFT for the sample set F(u) = {0, 2j, 0, -2j} at u= 0,1,2,3. | 2 | 3 | CO3 |
| 2 | Given an input image Obtain the smoothed image using Butterworth lowpass filter. | 3 | 3 | CO3 |

**Set-6(38,39,40,41,42,43,44)**

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| Q. No | Questions | Marks | BTL | Course Outcome |
| 1 | Given the input sample set {2,1,1,1}, of a continuous function f(t) taken at x = (0,1, 2, 3). Compute the DFT for the input sample set. | 2 | 3 | CO3 |
| 2 | Find the Fourier transform of the given function  f(t, z) = A for –T/2 ≤ t ≤ T/2 and -Z/2 ≤ z ≤ Z/2  = 0 otherwise | 3 | 3 | CO3 |

**Set-7(46,47,48,49,51,52,53)**

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| Q. No | Questions | Marks | BTL | Course Outcome |
| 1 | Given the input sample set {0, 2, 3, 4}, of a continuous function f(t) taken at x = (0,1, 2, 3). Compute the DFT for the input sample set. | 2 | 3 | CO3 |
| 2 | Given an input image Obtain the smoothed image using ideal lowpass filter. | 3 | 3 | CO3 |

**Set-8(54,55,56,57,58,59,60)**

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| Q. No | Questions | Marks | BTL | Course Outcome |
| 1 | Given the input sample set , of a continuous function f(t,z) taken at { (0,0), (0,1), (1,0), and (1,1) }. Compute the 2-D DFT for the input sample set. | 2 | 3 | CO3 |
| 2 | Consider the function with unit standard deviation. Compute the sample set fm,n for (m,n)={(-1,0),(0,-1)(0,0),(0,1),(1,0)} taken at uniform intervals ∆T = 1, ∆Z = 1. | 3 | 3 | CO3 |

**Set-9(61, 62,64,65,66,67,135)**

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| Q. No | Questions | Marks | BTL | Course Outcome |
| 1 | Compute the 2-D DFT for the input sample set , of a continuous function f(t,z) taken at { (0,0), (0,1), (1,0), and (1,1) }. | 2 | 3 | CO3 |
| 2 |  | 3 | 3 | CO3 |

**Set-10(136,301,302,303,304,305,306,307)**

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| Q. No | Questions | Marks | BTL | Course Outcome |
| 1 | Given an input image Obtain the sharpened image using Ideal highpass filter. | 2 | 3 | CO3 |
| 2 | Prove that both the continuous and discrete 2-D Fourier transforms are translation invariant | 3 | 3 | CO3 |