



VIT

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

REG.NO.: 24BXT0014

SLOT: B1+TB1

SCHOOL OF HEALTHCARE SCIENCE AND ENGINEERING

CONTINUOUS ASSESSMENT TEST - I

WINTER SEMESTER 2025-2026

Programme Name & Branch : B.Tech BHT

Course Code and Course Name : BHST303L Image Processing and Data Analysis

Faculty Name(s) : Dr. Kishor Lakshminarayanan

Class Number(s) : VL2025260500995

Date of Examination : 28/01/2026

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 (Type the CO statements covered in this question paper. Use the CO number as per the syllabus copy)
 1. Demonstrate an understanding of image acquisition, sampling and transformation
 2. Ability to use image processing operators to restore or enhance corrupted images
 3. Explain the effects and uses of the various image processing techniques on digital images

Q. No	Question	Module	Marks
1.	Explain image sensing and acquisition in a digital image processing system. Describe the full pipeline starting from the scene illumination to the formation of a digital image, including the role of sensors, optics, and digitization. Add a neat block diagram and briefly mention at least two practical issues	1	10
2.	Explain the concepts of spatial resolution and gray-level resolution, and write short notes on aliasing and quantization error	1	10
3.	A 3-bit grayscale image has intensity levels $rk=0,1,2,3,4,5,6,7$ with the following pixel counts: $[n_0, n_1, n_2, n_3, n_4, n_5, n_6, n_7] = [10, 20, 30, 40, 40, 30, 20, 10]$. Total pixels $N=200N$. Compute the normalized histogram $p(rk)$	2	10
4.	Explain the image degradation/observation model and derive the Wiener filter in the frequency domain.	2	10
5.	Differentiate lossless and lossy compression with suitable examples. Describe any one lossless algorithm	3	10
