



PRESIDENCY UNIVERSITY

BENGALURU

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Mid - Term Examinations – MARCH 2026

Date: 10 – 03- 2026

Time: 02:00pm – 03:30pm

School: SOE	Program: BTech		
Course Code: ECE3029	Course Name: Digital Image Processing		
Semester: VI	Max Marks: 50	Weightage: 25%	

CO - Levels	C01	C02	C03	C04	C05
Marks	6	32	12	--	--

Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks.

5Q x 2M=10M

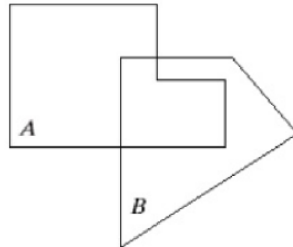
1	What are the components that characterize a two dimensional image $f(x,y)$?	2 Marks	L2	C01
2	Calculate the number of bits required to store the following images. 1. A binary image of size 1024x1024. 2. 10-bit gray image of size 298x320. 3. 24-bit color image of size 10,22,986.	2 Marks	L3	C02
3	Draw the different components that are used in a general-purpose image processing system.	2 Marks	L2	C01
4	How does m adjacency mitigate the ambiguity of 8 adjacency? Demonstrate with an example.	2 Marks	L2	C01
5	List the different forms of Spatial Intensity level transformation carried on digital images that maps a pixel value "r" of input image into a pixel value "s" in output image.	2 Marks	L3	C03

Part B

Answer the Questions.

Total Marks 40M

6.	<p>Considering the two Regions (Sets) A and B as shown in the figure, perform the following Logical Operations.</p> <ol style="list-style-type: none"> i. A AND B ii. A OR B 	10 Marks	L3	CO2
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Or

7.	<p>A Common measure of transmission for digital data is the baud rate that is defined as the number of bits transmitted per second. Generally, transmission is accomplished in packets consisting of a start bit, a byte (8 bits) of information, and a stop bit. Using these facts, answer the following:</p> <ol style="list-style-type: none"> i. How many minutes would it take to transmit a 1024 X 1024 image with 256 gray levels using a 56K baud modem? ii. What would the time be at 750K baud, a representative speed of a phone DSL (digital subscriber line) connection? 	10 Marks	L3	CO2
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8.	<p>Consider a square with vertices (0,2) (2,0) (0,0) (2,2) translated with vector (2,3). The translated object is then scaled by (2,2). Draw the new transformed figures and the original square figure.</p>	10 Marks	L3	CO2
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Or

9.	<p>Consider the image segment shown. Let $V = \{1,2\}$.</p> <ol style="list-style-type: none"> i. Compute the lengths of the shortest 4, 8 and m path between pixels "p" and "q". If a particular path does not exist between these two points, explain why. ii. Repeat the same problem for $V = \{2,3,4\}$. <div style="text-align: center; margin-top: 10px;"> <pre> 3 4 1 2 0 0 1 0 4 2(q) 2 2 3 1 4 (p)3 0 4 2 1 1 2 0 3 4 </pre> </div>	10 Marks	L3	CO2
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10.	For the 3-bit 5X5 size image segment shown below, perform intensity level slicing with background and without background for $r_1=3$ and $r_2=5$.	10 Marks	L3	CO3																									
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Or

11.	An image segment is shown below. Let V be the set of gray-level values used to define connectivity in the image. Compute the Euclidean distance, city block distance, chessboard distance and D_m distances between pixels p and q , for $V = \{2,3\}$.	10 Marks	L3	CO2																									
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12.	Histogram is a graphical representation of the intensity distribution of an image. In simple terms, it represents the number of pixels for each intensity value considered. Consider a gray-scale image in matrix form, perform histogram equalization on this image and scale the intensity to 1:20.	10 Marks	L3	CO3
$\begin{bmatrix} 3 & 2 & 4 & 5 \\ 7 & 7 & 8 & 2 \\ 3 & 1 & 2 & 3 \\ 5 & 4 & 6 & 7 \end{bmatrix}$				

Or

13.	For a given 5x5 image perform Bit Plane Slicing by estimating the possible bit planes. Explain the significance of bit plane slicing in digital image processing	10 Marks	L3	CO3																									
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