PVP 20

Code: 20EC4701A

IV B.Tech - I Semester – Regular/Supplementary Examinations
OCTOBER 2024

DIGITAL IMAGE PROCESSING
(ELECTRONICS & COMMUNICATION ENGINEERING)

Duration: 3 hours Max. Marks: 70

Note: 1. This paper contains questions from 5 units of Syllabus. Each unit carries 14 marks and have an internal choice of Questions.
2. All parts of Question must be answered in one place.

BL – Blooms Level CO – Course Outcome

			BL	CO	Max. Marks
UNIT-I					
1	a)	Enlist various fundamental steps in digital image processing with neat block diagram.	L2	CO1	7 M
	b)	Illustrate 4, 8 connectivity and M-adjacency with an example.	L3	CO2	7 M
OR					
2	a)	Articulate the basic concepts of sampling and quantization in the generation of digital image.	L3	CO1	7 M
	b)	Illustrate in detail about basic gray level transformations.	L3	CO3	7 M
UNIT-II					
3	a)	Define histogram of image. Explain the concept of histogram equalization technique for image enhancement.	L3	CO4	7 M

<table>
<tr><td></td><td>b)</td><td>Illustrate spatial filtering in image enhancement.</td><td>L3</td><td>CO1</td><td>7 M</td></tr>
<tr><td colspan="6">OR</td></tr>
<tr><td rowspan="2">4</td><td>a)</td><td>Articulate homomorphic filtering in detail.</td><td>L3</td><td>CO3</td><td>7 M</td></tr>
<tr><td>b)</td><td>Illustrate about image smoothing in frequency domain.</td><td>L3</td><td>CO3</td><td>7 M</td></tr>
<tr><td colspan="6">UNIT-III</td></tr>
<tr><td rowspan="2">5</td><td>a)</td><td>Discuss about the functional block diagram of a general image compression system.</td><td>L2</td><td>CO1</td><td>7 M</td></tr>
<tr><td>b)</td><td>The following figure shows a list of 7 symbols and their probabilities. It is assumed that these symbols are generated by a Discrete Memory-less Source (DMS).
<table>
<tr><th>Symbol</th><th>Probability</th></tr>
<tr><td>k</td><td>0.05</td></tr>
<tr><td>l</td><td>0.2</td></tr>
<tr><td>u</td><td>0.1</td></tr>
<tr><td>w</td><td>0.05</td></tr>
<tr><td>e</td><td>0.3</td></tr>
<tr><td>r</td><td>0.2</td></tr>
<tr><td>?</td><td>0.1</td></tr>
</table>
(i) Derive a Huffman code for the given symbols.
(ii) Calculate the compression ratio.</td><td>L3</td><td>CO2</td><td>7 M</td></tr>
<tr><td colspan="6">OR</td></tr>
</table>

6	a)	Illustrate fidelity criteria in image compression.	L3	CO1	7 M
	b)	Articulate lossy compression in detail.	L3	CO1	7 M
UNIT-IV					
7	a)	Articulate the basics of intensity thresholding in image segmentation.	L3	CO2	7 M
	b)	Explain edge linking in image segmentation.	L2	CO1	7 M
OR					
8	a)	Illustrate about boundary detection in detail.	L3	CO2	7 M
	b)	List and illustrate detection of discontinuities in image segmentation.	L3	CO2	7 M
UNIT-V					
9	Illustrate color models in image processing.		L3	CO4	14 M
OR					
10	Articulate Pseudo color image processing.		L3	CO4	14 M