C **Reg. No. :** | | | | | | | | | | | | |

Question Paper Code: U6603

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2024

Sixth Semester

Electronics and Communication Engineering

21UEC603-IMAGE PROCESSING & ANALYSIS

(Regulations 2021)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. _____ mimic the human visual system. CO1-U

   (a) Computer vision (b) Computer Graphics

   (c) Image processing (d) Image

2. A binary image pixel is represented by ----------bit. CO1-U

   (a) One (b) Two (c) Four (d) Eight

3. Canny edge detection algorithm is based on CO1- U

   (a) Ideal model (b) step edge (c) real model (d) smoothing model

4. For the total number of 1650 test patterns, only the 65 are correctly recognized test patterns, calculate the accuracy rate. CO2- App

   (a) 38.25 (b) 25.38 (c) 46.38 (d) 38.46

5. Identify the kind of learning algorithm for “facial identities for facial expressions”. CO1- U

   (a) Prediction (b) Recognition patterns

   (c) Recognizing anomalies (d) Generating patterns

PART – B (5 x 3= 15 Marks)

6. Differentiate computer vision and computer graphics. CO1- U

7. Justify Karhunen -Loeve transform is an optimal transform. CO1- U

8. What is region based image segmentation? CO2-App

9. Consider a 4 X 4 matrix as shown below: CO1- U

1	3	2	1
2	9	1	1
1	3	2	3
5	6	1	2

Applying max pooling on this matrix and find the new matrix.

10. State the function of K – means clustering. CO1- U

PART – C (5 x 16= 80 Marks)

11. (a) Illustrate the concept of radiometry using thin lens. CO1- U (16)

Or

(b) (i) Given a triangle with points (1, 1), (0, 0) and (1, 0). Apply shear parameter 2 on X axis and 2 on Y axis and find out the new coordinates of the object. CO1- U (16)

(ii) Given a square object with coordinate points A(0, 3), B(3, 3), C(3, 0), D(0, 0). Apply the scaling parameter 2 towards X axis and 3 towards Y axis and obtain the new coordinates of the object.

12. (a) How finite sequence of equally-spaced samples of a function is converted into a same-length sequence of equally-spaced samples of the discrete-time Fourier transform ? CO2-App (16)

Or

(b) Define Histogram equalization of an image.A 3-bit image of size 4×5 is shown below. Compute the histogram equalized image. CO2-App (16)

0	1	1	3	4
7	2	5	5	7
6	3	2	1	1
1	4	4	2	1

13. (a) Analyze the performance of dilation and erosion morphological operation for image segmentation in detail with examples. CO4-App (16)

Or

(b) Perform region splitting and merging for the given input image. CO4-App (16)

5	6	6	6	7	7	6	6
6	7	6	7	5	5	4	7
6	6	4	4	3	2	5	6
5	4	5	4	2	3	4	6
0	3	2	3	3	2	4	7
0	0	0	0	2	2	5	6
1	1	0	1	0	3	4	4
1	0	1	0	2	3	5	4

14. (a) Analyze the pattern recognition problem and explain its various stages with neat diagram. CO5-App (16)

Or

(b) Identify which method is suitable for processing the pixel data and image recognition and implement with suitable derivations. CO5-App (16)

15. (a) Consider an image containing one arbitrary object. Apply affine transformation for the following cases: CO6-Ana (16)

i. Rotation

ii. Translation

Or

(b) Consider an image containing one arbitrary object. Apply affine transformation for the following cases: CO6-Ana (16)

i) Rotation

ii) Translation