| Invigilator's Signature and Date |
|---|

**Set-1**

# KIIT DEEMED TO BE UNIVERSITY

**Spring End Semester Examination-2022**

| | |
|---|---|
| **Roll No.** | |
| **Registration No.** | |
| **Name** | |
| **Date of Exam** | |

## IMAGE PROCESSING (IT3033)

6th Semester B.Tech

**SECTION-A**

**(Answer All Questions)**

**Time: 30 Minutes** **Full Marks = 2 × 7 = 14 Marks**

| Question No | Question | Write the correct option here. |
|---|---|---|
| Q.No:1 | Which among the following statements are correct<br>a) The smallest detectable change in intensity is called intensity resolution<br>b) Smallest detectable detail in an image is called spatial resolution<br>c) Using insufficient number of intensity levels in smooth areas results in false contouring<br>d) All of these | |
| Q.No:2 | Identify the incorrect statement<br>1) This noise caused by sharp & sudden disturbances in the image signal is known as impulse noise.<br>2) Recovering an image that has been blurred in some way is an example of Restoration.<br>3) Addition of impulse noise creates an effect of black and white dots in an image.<br>4) Recovering an image that has been blurred in some way is an example of Enhancement<br><br>a) Only (2)<br>b) (1), (2) and (3) only.<br>c) (3) only<br>d) (4) only | |
| Q.No:3 | A low pass filter highlights<br>a) Low intensity components<br>b) Mid intensity components<br>c) High intensity components<br>d) It is no way related to any intensity components | |

| | | |
|---|---|---|
| Q.No:4 | Which one comes under the bayesian method of object recognition?<br>a) Bayesian belief network<br>b) Decision stump<br>c) Random forest<br>d) None of the above | |
| Q.No:5 | Below given a group of Huffman codes (HC)<br>HC1:01, 100, 101, 111, 0101<br>HC2:01, 100, 101, 111, 0001<br>HC3:100, 101, 111, 110<br>Identify the correct statements regarding the above codes<br><br>a) HC1 and HC2 are correct set of codes<br>b) HC2 and HC3 are correct set of codes<br>c) All are correct set of codes<br>d) Data insufficient | |
| Q.No:6 | Identify the incorrect statement/statements with respect to morphological processing<br>1) Closing smoothes contours but incapable of fusing narrow breaks.<br>2) Morphological filters can be used for denoising<br>3) Dilation can bridge the gap and produces a binary image where lowpass filtering can bridge the gap but produces a gray scale image.<br><br>a) (1) Only<br>b) (2) and (3) Only<br>c) (3) Only<br>d) All of these | |
| Q.No:7 | The DFT of the image patch $A = \begin{bmatrix} 2 & 2 \\ 2 & -2 \end{bmatrix}$ is<br>a) $\begin{bmatrix} 3 & 0 \\ 0 & 0 \end{bmatrix}$<br>b) $\begin{bmatrix} 4 & 0 \\ 0 & 0 \end{bmatrix}$<br>c) $\begin{bmatrix} 4 & 4 \\ 4 & -4 \end{bmatrix}$<br>*d)* $\begin{bmatrix} 4 & 0 \\ 0 & -4 \end{bmatrix}$ | |

*********

Invigilator's Signature and Date

**Set-1**

# KIIT DEEMED TO BE UNIVERSITY

**Spring End Semester Examination-2022**

## IMAGE PROCESSING (IT3033)

6th Semester B.Tech

## SECTION-B

**(Answer Any Three Questions.)**

**Time: 1 Hour and 30 Minutes** **Full Marks = 12 × 3 = 36 Marks**

Q.No:8 Derive the expression for DFT matrix of order 4x4. Find DFT of the following 4x4 image patch and retrieve your image back from the transform.

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

[4+4+4]

Q.No:9 Find the average length and coding efficiency to transmit the message "**SUCCESS**" using Huffman coding scheme.
If each symbol needs 8 bit for complete representation before Huffman coding, then what will be the compression ratio and redundancy achieved after using Huffman coding to represent the symbols in transmitting the message.
What will be the code to transmit the message "USE". Decode it.

[2+2+2+2+2+2]

Q.No:10 a) Explain different morphological operators used in image processing.

b) Develop a morphological operation based algorithm for detection of boundary of an object in a binary image. [6+6]

Q.No:11 a) As per your university norms, students can visit the library beyond class hours for self study. The student has to keep his/her bag and goods on a rack just outside the library during his stay in the library. A student filed a complain that, during his stay inside the library his mobile is missing from his bag which is kept on the rack outside the library room. Suggest some image processing based solution to identify the person involved in this mischievous activity. What are the challenges you may face in finding the solution. You may illustrate your answer with some suitable block diagram or pictorial representation if required

b) Discuss matching shape number approach for recognising the shape of the pattern with an example.

[6+6]

*********