The LNM Institute of Information Technology

ECE and CCE

CVFA

Mid Term

Time: 90 minutes **Date:** 16/10/2021 **Max. Marks: 35**

Instructions: *1) There are total of 6 questions and total marks is 30.*

Q1. [5]

Consider the histogram (2, 2, 4, 8, 16, 32, 64, 128), where the number of gray levels is 8. What is the output of histogram equalization? Explain using result how histogram equalization enhances the contrast of an image.

Q2. [5]

In the following image (**Fig. 1**), all pixels with value '1' constitutes a region.

i. Mark the boundary pixels of the region using 4-connectivity.

ii. Also show the different 'm' path possible between pixels 'p' and 'q'.

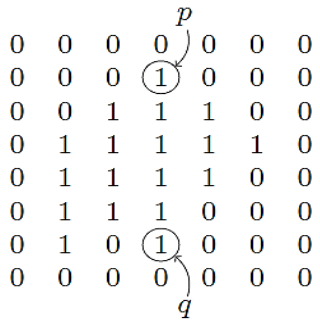

Fig.1

Q3. [5]

Perform the intensity level slicing on the following 3 bit image (**Fig. 2**). Let $r_1 = 3, r_2 = 5$ and $s = 7$, where r_1 and r_2 are the input intensities and s is the output intensity for input between r_1 and r_2. Obtain the image:

i) with background transformation
(i.e. background = 0)

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

Fig. 2

Also show the transformation plots used in this question.

Q4. [5]

What are the different challenges in Computer vision? List atleast 5 challenges with an example.

Q5. [10]

a) What technology/algorithm was used to track an object by finding the pattern of apparent motion of the edges ad surfaces. Name the better version of tracking an object which was designed between the years 2010-2015. What is the advantage of this second technology?

b) Design a system to track the person in a crowded environment. The design should include the block diagram, and justification to which of the above two technology (in part a) will be better. What pre-processing techniques (enhancement techniques) will be used to overcome certain challenges (specify the challenges and corresponding enhancement techniques to be used) in designing this system.

Q6. [5]

Given below are two images (before and after). The 'After' image is the output image that has been obtained after using certain pre-processing technique. Specify what is the pre-processing enhancement technique used? Explain the technique.