Reg. No. | | | | | | | | | | |

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

SEVENTH SEMESTER B.TECH. (INSTRUMENTATION AND CONTROL ENGG.)

END SEMESTER DEGREE EXAMINATIONS, NOVEMBER - 2019

SUBJECT: DIGITAL IMAGE PROCESSING [ICE 4021]

TIME: 3 HOURS MAX. MARKS: 50

Instructions to candidates :*Answer ALL questions and missing data may be suitably assumed.*

1A. With an example, explain the process of image formation in the eye.

1B. Explain an image acquisition system using single sensor and sensor strips.

1C. Write a short note on Mach band effect.

(4+4+2)

2A. Describe the followings with an example,

i) City-block distance ii) Spatial resolution

2B. Let V = {1,2}, show the possible 8-path and m-path from (1,3) to (3,3) for the following image segment.

0	1	1
0	2	0
0	0	1

2C. Perform the histogram equalization of the 5×5 image, whose data is shown in Table below and plot histogram of an image before and after equalization.

Gray level	0	1	2	3	4	5	6	7
No. of pixels	0	0	9	12	4	0	0	0

(2+3+5)

3A. Discuss exponential and uniform noise with its PDF.

3B. Explain the following with relevant graphs,

i) Contrast stretching ii) Log transformation

3C. With a neat block diagram, explain the steps involved in homomorphic filtering approach for image enhancement and list the advantages.

(2+3+5)

4A. Explain and compare the first order and second order entropy estimation for an image.

4B. Describe lossy compression technique with its processing stages.

4C. Compute the LZW coding for the given sequence 39 39 126 126; 39 39 126 126; 39 39 126 126; 39 39 126 126.

(2+4+4)

5A. With mathematical formulation explain top-hat transformation.

5B. Explain how to detect the edges of an object in the given scene using image gradient.

5C. Mention the importance of computer aided diagnostic tool and explain the stages required to automate the diagnostic process using medical images.

(2+3+5)

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