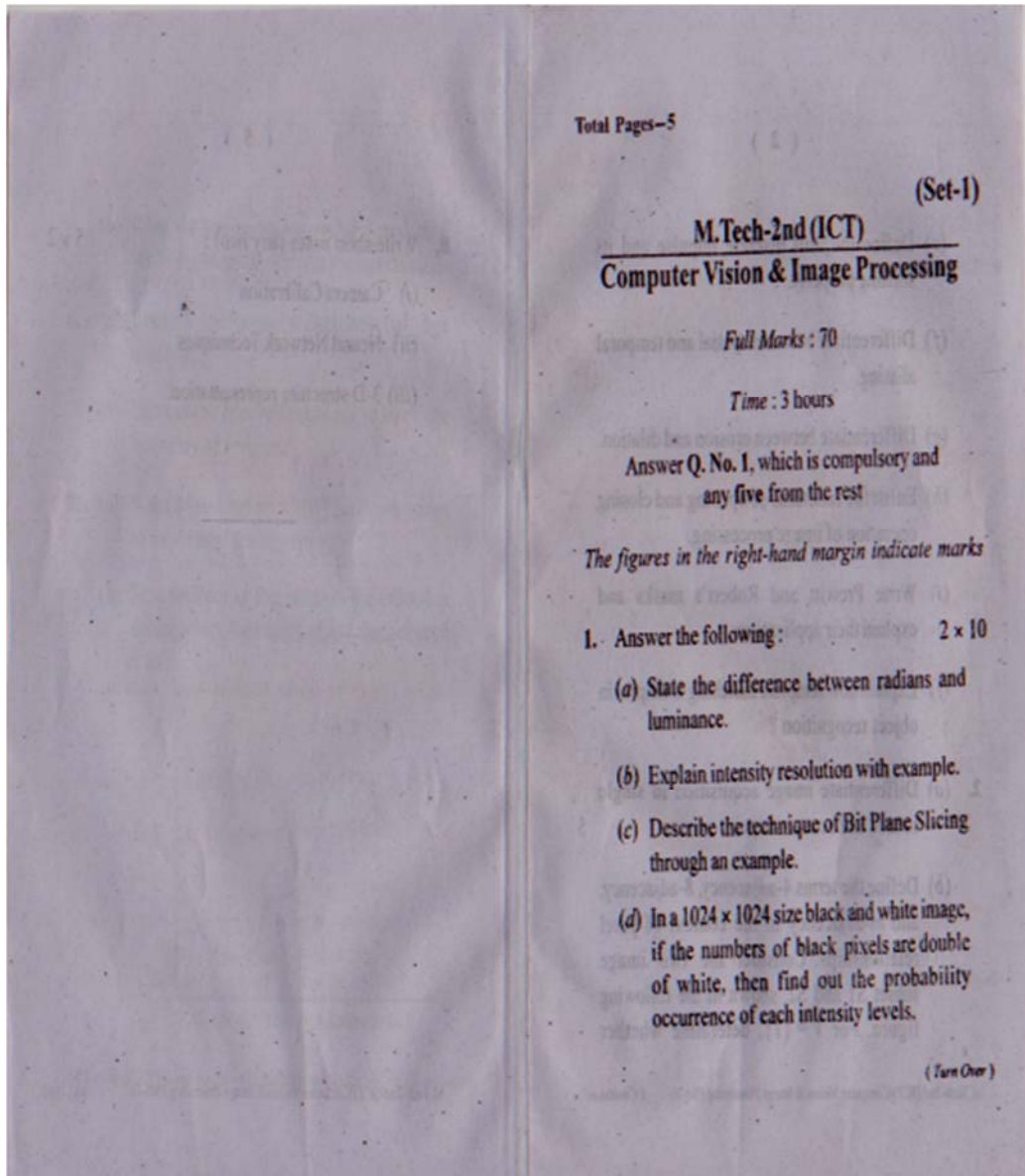# VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING & INFORMATION TECHNOLOGY

SESSION 2014-2015 (EVEN SEMESTER)

Total Pages—5

(Set-1)

M.Tech-2nd (ICT)

Computer Vision & Image Processing

Full Marks : 70

Time : 3 hours

Answer Q. No. 1, which is compulsory and
any five from the rest

The figures in the right-hand margin indicate marks

1. Answer the following :   2 × 10

   (a) State the difference between radians and luminance.

   (b) Explain intensity resolution with example.

   (c) Describe the technique of Bit Plane Slicing through an example.

   (d) In a 1024 × 1024 size black and white image, if the numbers of black pixels are double of white, then find out the probability occurrence of each intensity levels.

(e) Define the unit discrete impulse and its shifting property.

(f) Differentiate between spatial and temporal aliasing.

(g) Differentiate between erosion and dilation.

(h) Enlist the functions of opening and closing operation of image processing.

(i) Write Prewitt and Robert's masks and explain their applications.

(j) Explain how template matching is helpful in object recognition ?

2. (a) Differentiate image acquisition in single sensor and sensor stripes.   5

(b) Define the terms 4-adjacency, 8-adjacency, and m-adjacency in the context of pixel relationships. Consider the two image subset S1 and S2, shown in the following figure. For $V = \{1\}$, determine whether

the two points 'p' and 'q' are (i) 4-adjacent, (ii) 8-adjacent, or (iii) m-adjacent.   5

S_1 S_2

0	0	0	0	0	0	0	1	1	0
1	0	0	1	0	0	1	0	0	1
1	0	0	1	0	①	1	0	0	0
0	0	1	1	p①	0	0	0	0	0
0	0	1	1	1	0	0	1	1	1

3. (a) Describe different methods of classification.   5

(b) Explain how the spatial feature of an object is extracted for image processing purpose.   5

4. (a) Write two transformation techniques with their applications.   5

(b) Describe how the Ideal and Butterworth low-pass filter works.   5

5. (a) Differentiate between smoothing and sharpening of linear filters.   5

(4)

(b) What do you mean by unsharp masking ?
Write the steps to perform the operation.   5

6. (a) Explain different techniques of age
detection.   5

(b) List out the Moore Technique to track the
boundary of a region.   5

7. (a) What do you mean by MPP ? Write the steps
to implement the algorithm.   5

(b) Find the Fourier Transform of the following
figure where the values of x varies between
0 to 3.   5
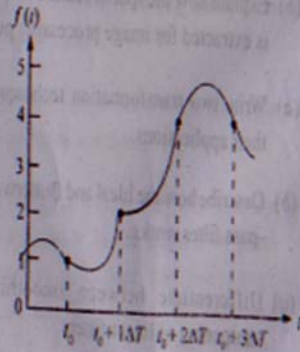
(5)

8. Write short notes (any *two*) : 5×2

(*i*) Camera Calibration

(*ii*) Neural Network Techniques

(*iii*) 3-D structure representation.

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