Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

VII SEMESTER B.TECH. (INFORMATION TECHNOLOGY / COMPUTER AND COMMUNICATION ENGINEERING)

END SEMESTER EXAMINATIONS, NOVEMBER 2017

SUBJECT: PROGRAM ELECTIVE – IV: COMPUTER VISION [ICT 4018]

REVISED CREDIT SYSTEM
(23 / 11 / 2017)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer ALL the questions.
- Missing data, if any, may be suitably assumed.

1A. Give step by step procedure to identify and describe the image feature using Scale Invariant Feature Transform (SIFT). **5**

1B. If F is the fundamental matrix of the camera-pair (P, P'), then what is the fundamental matrix for (P', P) ? **3**

1C. Apply Sobel filter for the data given in Table: Q.1C and identify the edge points. Use threshold as 9. **2**

Table: Q.1C

10	20	30	40	50
50	40	30	20	10
30	20	10	40	50
10	15	-25	0	10
10	-10	-25	-30	0

2A. How to use HOG descriptor for human detection in an image? **5**

2B. Create 3 x 3 Gaussian filter and smoothen the image block given below: **3**

10	5	15	15	20
5	5	25	25	10
10	20	20	10	25
10	15	15	5	25
5	15	10	5	25

2C. Prove that in perspective projection nearest objects look bigger. **2**

3A. How to identify the interest points in the image using Harris corner detection technique? **5**

3B. Give step by step procedure for text segmentation using histogram based thresholding. **3**

3C. List the set of properties invariant under
   i. Orthogonal Transform
   ii. Affine Transform
2

4A. How to segment the circle in an image using Hough transform? 5

4B. Explain the method for face detection using principal component analysis. 3

4C. Show that two-dimensional LoG can be separated into 4 one-dimensional Convolutions. 2

5A. Using Principal Component Analysis (PCA) to reduce the dimensionality of the data given below:

X1	X2
5	10
10	20
20	30
30	40
40	50
50	60
60	70
70	80

5

5B. Derive the equation for optical flow for pure translation along Z-axis. 3

5C. Give equation for epi-polar line in the right camera, if x is a point on the left camera and F is fundamental matrix. Also specify the rank of fundamental matrix. 2