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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER M.TECH DEGREE EXAMINATION, July 2018

Branch:

Electronics and Communication Engineering

Stream(s):

Signal Processing

Course Code & Name:

01EC 7315: Computer Vision

Answer *any two full* questions from *each* part

Limit answers to the required points.

Max. Marks: 60 Duration: 3 hours

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PART A

1.	a.	Derive the perspective projection equation. State the assumptions used.	7
	b	Prove that parallel lines when imaged, converge at a point.	2
2.		Explain in detail the steps for computing scale-invariant feature transform (SIFT).	9
3.	a.	Explain the use of Hough transform for line detection.	5
	b.	Explain Harris corner point detector.	4

PART B

4.		Explain in detail the steps involved in structure from motion (SFM) method for 3D reconstruction.	9
5.	a.	What is aperture problem in optical flow?	2
	b.	Derive the Horn-Schunck algorithm for computation of optical flow.	7
6.	a.	Derive the optical flow constraint equation.	3
	b.	Prove that optical flow obtained using Lucas-Kanade algorithm is the least squared solution of optical flow constraint equation.	6

PART C

7.	a.	Define shape from shading.	3
	b.	Derive an equation for surface normals posing shape from shading as an optimization problem.	6
8.	a.	Explain in detail the steps for object detection using histogram of oriented gradients (HOG).	8

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	b.	Explain any two measures used to evaluate the performance of an object detection algorithm http://www.ktuonline.com	4
9.	a.	Differentiate face detection and face recognition problems in computer vision.	4
	b.	Explain the Eigen faces method for face recognition in images.	8

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