

(A constituent unit of MAHE, Manipal)

VII SEMESTER BTECH. (E & C) DEGREE END SEMESTER EXAMINATION DECEMBER 2021-JANUARY 2022

SUBJECT: MOTION AND GEOMETRY BASED METHODS IN COMPUTER VISION

(ECE - 4078)

TIME: 75 minutes

MAX. MARKS: 20

Instructions to candidates

- Answer **ALL** questions.
- Missing data may be suitably assumed.

Q. No.	Part B- Questions	Marks
1A.	Discuss the method of using computational molecules to smooth range images. Compare this method with Gaussian smoothing, with the help of illustrations.	4
1B.	Compare the result of filtering an image with an ideal and a Gaussian high pass filters. With the help of a diagram, show the effect of varying the parameter sigma from $\sigma=10$ to $\sigma=60$, on filtering of the image.	3
1C.	A video sequence shows a train running along a track without changing its direction and speed. Estimate the path of this train using a dynamic model.	3
	(4+3+3=10)	
2A.	Figure below shows the pixels along a row for the left and right scanlines of astereo-camera, with occlusions. Determine the optimal path for stereo-matchingusing dynamic programming and calculate the cost function.Left scanline2 5 9 12 10 7 8 1 4 5 3 11Right scanline2 5 9 7 8 1 9 7 4 5 3 11	4
2B.	 i. Calculate the minimum number of 3D scene points needed to obtain a perspective structure from motion from three cameras. ii. Demonstrate with the help of an example how Hartley's normalization helps to reduce errors in weak calibration. 	3
2C.	Give a comparison of the frame bearing groups for estimating transformations from 2D to 2D and 3D to 3D. Justify how frame bearing groups help in estimation of transformations. $(4+2+2-10)$	3
	(4+3+3=10)	