

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

Sixth Semester B.Tech Degree (Hons.) Examination June 2020

**Course Code: CS362****Course Name: COMPUTER VISION**

Max. Marks: 100

Duration: 3 Hours

**PART A***Answer all questions, each carries 3 marks.*

Marks

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|---|--|-----|
| 1 | Explain the role of BRDF in radiometry.                          | (3) |
| 2 | Illustrate the geometry of a pinhole camera.                     | (3) |
| 3 | Explain stereopsis? State the two processes involved in it.      | (3) |
| 4 | How is the conversion from affine to Euclidean images performed? | (3) |

**PART B***Answer any two full questions, each carries 9 marks.*

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|---|--|-----|
| 5 | Explain the role of intrinsic and extrinsic parameters in camera calibration.  | (9) |
| 6 | a) Explain the following terms in detail: (i) Radiosity (ii) Solid angle (iii) Albedo (iv) Specularity                                     | (4) |
|   | b) State and explain Tomasi's and Kanade's factorization algorithm for affine shape from motion.   | (5) |
| 7 | Explain different methods for solving the binocular fusion problem. What role does epipolar geometry play in trying to solve this problem? | (9) |

**PART C***Answer all questions, each carries 3 marks.*

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| 8  | Explain how to obtain hypothesis using invariants.                 | (3) |
| 9  | State the differences between clustering and classification.       | (3) |
| 10 | Explain how to design a pattern recognition system using features. | (3) |
| 11 | Differentiate pose consistency and pose clustering.                | (3) |

**PART D***Answer any two full questions, each carries 9 marks.*

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|----|--|-----|
| 12 | Explain Bayesian Decision Theory. Derive minimum error rate and minimum risk decision rules using Bayes decision theory. | (9) |
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- 13 a) State the cause for uncorrelated estimates of pose. How can this issue be handled? (4)
- b) How is prior probability related to posterior probability? What role do they play in decision making? (5)
- 14 Outline how to perform verification in model based vision. (9)

**PART E**

*Answer any four full questions, each carries 10 marks.*

- 15 a) Explain perceptron learning algorithm. (5)
- b) Describe the minimum mean squared error method for classification. (5)
- 16 a) Explain the working of support vector machines with neat illustrations. (5)
- b) Explain the ID3 algorithm for classification. (5)
- 17 a) What are proximity measures? State two properties of a dissimilarity measure. Mention any two examples for dissimilarity measures, with equations. (5)
- b) Explain the various steps involved in clustering, with a suitable example. (5)
- 18 a) Mention the ways in which neural networks can be used for pattern recognition. (5)
- b) How are genetic algorithms used for pattern classification? (5)
- 19 a) Write a short note on Classification And Regression Trees (CART). Explain with an example. (7)
- b) How are linear discriminant based classifiers different from tree based classifiers? (3)
- 20 a) Explain the K-Means algorithm for clustering, with an example. (6)
- b) What are the different types of features that could be used for clustering? (4)

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