Code No: 156ET **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year II Semester Examinations, August/September - 2024
COMPUTER VISION AND ROBOTICS
(Computer Science and Engineering -IOT)

Time: 3 Hours **Max. Marks: 75**

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a) Define BRDF and give its application. [2]
b) What is Spectral radiance? Give its range of wavelength and unit. [3]
c) Define Fourier Transform. [2]
d) Describe the process of linear filtering. [3]
e) What do you understand by geometry of multiple views? [2]
f) What is human vision? List the characteristics of human vision. [3]
g) Define Hough transform. [2]
h) What is data association? Mention the importance of data association in image processing. [3]
i) List the camera parameters. [2]
j) Describe the process of pinhole imaging. [3]

PART – B

(50 Marks)

2.a) What do you understand by Specular Surfaces? Explain with a suitable diagram.
b) Describe RGB colour space in detail. [5+5]

OR

3.a) Describe the working of an Interreflection Model.
b) What is artificial illumination? Explain various types of artificial light sources. [5+5]

4.a) Discuss the process of sampling and aliasing in detail.
b) What is edge detection in computer vision? Why the edge detection is important in computer vision? [5+5]

OR

5.a) Explain the process of smoothing by averaging.
b) What do you understand by texture? Discuss the three standard problems of texture. [5+5]

6.a) Write short notes on Trinocular Stereo.
b) Explain the process of background subtraction with its potential applications. [5+5]

OR

7.a) Write short notes on Binocular Fusion.
b) Describe the process of image segmentation by clustering pixels. [5+5]

8.a) What is fitting? Write three quite general problems that occur in fitting.
b) Illustrate the usage of Kalman filtering in image processing. [5+5]

OR

9.a) What is the missing data problem? Explain it with a suitable example.
b) What is tracking in image processing? Explain it with the example of vehicle tracking. [5+5]

10.a) What do you understand by camera models and perspective projection? Explain it in detail.
b) Explain the obtaining hypotheses by pose clustering in detail. [5+5]

OR

11.a) What is geometric camera calibration? Why it is important?
b) Write the details of affine transformation in computer vision in detail. [5+5]

---ooOoo---