Hall Ticket Number:

Code No. : 18622 A

VASAVI COLLEGE OF ENGINEERING *(AUTONOMOUS)*, HYDERABAD

Accredited by NAAC with A++ Grade

B.E. (I.T.) VIII-Semester Main & Backlog Examinations, June-2022

Computer Vision (PE-VI)

Time: **3 hours** Max. Marks: **60**

*Note: Answer all questions from **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	Define ideal points and ideal lines.	2	1	1	1
2.	Describe the principles and limitations of a pinhole camera.	2	2	1	1
3.	What is non maximum suppression in computer vision? Explain.	2	1	2	1
4.	What is Scale-invariant feature transform (SIFT)? Describe its properties.	2	1	2	1
5.	What is segmentation? What are the techniques following split and merge strategy for segmentation?	2	1	3	1
6.	What are Support Vector Machines? What are the advantages and disadvantages of SVMs?	2	1	3	1
7.	Describe convolution and pooling operations with examples.	2	1	4	1
8.	What is anchor box? How anchor boxes are used in YOLO algorithm for object detection.	2	1	4	1
9.	Describe glove-based and vision-based hand gesture recognition, in brief.	2	2	5	1
10.	What is an eigen face? How it is used in face detection?	2	1	5	1
	Part-B (5 × 8 = 40 Marks)				
11. a)	Explain in detail about the 2D Transformations (a) Rotation (b) affine transformations.	4	2	1	1
b)	A Point has coordinates P (2, 3, 4) in x, y, z-direction. The Rotation angle is 90 degrees. Apply the rotation in x, y, z direction, and find out the new coordinates of the point?	4	3	1	2
12. a)	Explain the steps of Harris Corner Detection.	4	2	2	1
b)	What are wavelet and Fourier descriptors? Compare wavelet and Fourier transforms.	4	3	2	2
13. a)	Describe the following region segmentation algorithms (a) K-means (b) Mean shift (c) Normalized Cuts	5	2	3	1

Contd... 2

b)	Suppose we have a two-classes problem (A, ~ A), with a single binary valued feature (x, ~ x). Assume the prior probability P(A) = 0.33. Given the distribution of the samples as shown in the following table, use Bayes Rule to compute the values of posterior probabilities of classes. A ~A X 248 167 ~X 82 503	3	3	3	2
14. a)	Explain the significance of "Parameter Sharing" and "Sparsity of connections" in CNN.	3	2	4	1
b)	Let us consider a Convolutional Neural Network having three different convolutional layers in its architecture as – Layer-1: Filter Size – 3 X 3, Number of Filters – 10, Stride – 1, Padding – 0 Layer-2: Filter Size – 5 X 5, Number of Filters – 20, Stride – 2, Padding – 0 Layer-3: Filter Size – 5 X5 , Number of Filters – 40, Stride – 2, Padding – 0 If we give the input a 3-D image to the network of dimension 39 X 39, then determine the dimension of the vector after passing through a fully connected layer in the architecture.	5	3	4	2
15. a)	Describe various steps in YOLO algorithm for real-time object detection.	4	3	5	2
b)	Illustrate 'the bag of words' algorithms for category recognition.	4	3	5	2
16. a)	Outline Image sensing pipeline, showing the various sources of noise and digital post processing steps.	4	3	1	2
b)	Explain Principal Component Analysis and its application in face recognition.	4	2	2	1
17.	Answer any ***two*** of the following:				
a)	Prove that the intersection of two parallel lines is the point at infinity.	4	3	3	2
b)	What is Stride? Illustrate the effect of high Stride on the feature map in deep CNNs?	4	3	4	2
c)	Explain the major challenges in Visual Question and Answering (VQA)?	4	2	5	1

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	35%
iii)	Blooms Taxonomy Level – 3 & 4	45%

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