SRM INSTITUTE OF SCIENCE AND TECHNOLOGY, RAMAPURAM
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ANSWER KEY SUBMISSION

Date of Exam & Session	11/08/23	Category of Exam	CLA1
Course Name	COMPUTER VISION	Course Code	18CSE390T
Name of the Faculty submitting	Dr.S.DEEPA	Date of submission of Answer Key	11/08/23
Department to which the Faculty belongs to	CSE	Total Marks	25

PART A (10x1= 10)
ANSWER ALL THE QUESTIONS

Q.No.	MCQ Question	Marks	CO	BL	PI
1.	A. A _______ can be recorded using a normal light source. a) Holograph b) Photography c) Holography **d) Photograph**	1	1	1	2.5.1
2.	The translation distances (dx, dy) is called as a) Translation vector b) Shift vector **c) Both Translation vector and shift vector** d) Neither Translation vector nor shift vector	1	1	2	1.2.1
3.	In 2D-translation, a point (x, y) can move to the new position (x', y') by using the equation a) x'=x+dx and y'=y+dx **b) x'=x+dx and y'=y+dy** c) X'=x+dy and Y'=y+dx d) X'=x-dx and y'=y-dy	1	1	1	4.7.1
4.	To generate a rotation , we must specify **a) Rotation angle ☐** b) Distances dx and dy c) Rotation distance d) All of the mentioned	1	1	1	1.2.1

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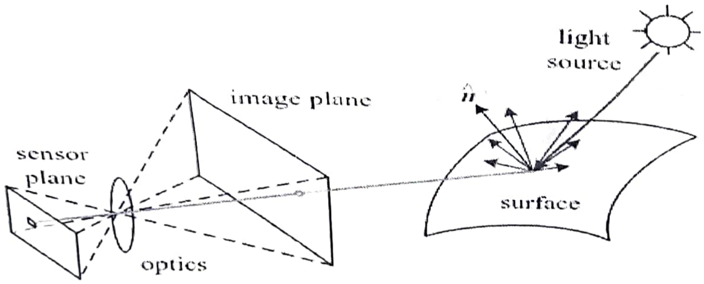
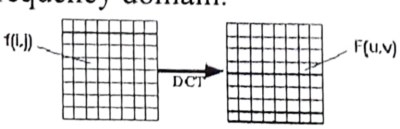
5.	Which transformation distorts the shape of an object such that the transformed shape appears as if the object were composed of internal layers that had been caused to slide over each other? a) Rotation b) Scaling up c) Scaling down **d) Shearing**	1	1	2	4.7.1

PART-B (2x4= 8)
ANSWER ALL THE QUESTIONS

Q.No.	Question	Marks	CO	BL	PI
6.	**Analyse Photometric image formation and explain about Light scatters when it hits a surface.**  Light is emitted by one or more light sources and is then reflected from an object's surface. A portion of this light is directed towards the camera. This simplified model ignores multiple reflections, which often occur in real-world scenes	4	1	3	2.5.1
7.	**Elaborate in detail about discrete cosine transform in Fourier transform** The discrete cosine transform (DCT) helps separate the image into parts (or spectral sub-bands) of differing importance (with respect to the image's visual quality). The DCT is similar to the discrete Fourier transform: it transforms a signal or image from the spatial domain to the frequency domain.  	4	1	3	2.5.1

PART-C (1x12= 12)
ANSWER ANY ONE OF THE FOLLOWING QUESTIONS

Q.No.	Question	Marks	CO	BL	PI
8.a	**Discuss about point operators in image processing transforms.** ❖ **Pixel transforms** x is in the D-dimensional domain of the functions (usually D = 2 for images) and the functions f and g operate over some range, which can either be scalar or vector-valued, e.g., for color images or 2D motion For discrete images, the domain consists of a finite number of pixel locations, x = (i, j), and we can write $g(i,j) = h(f(i,j))$ ❖ **Color transforms** Adding the same value to each color channel not only increases the apparent intensity of each pixel, it can also affect the pixel's hue and saturation Chromaticity coordinates or even simpler color ratios can first be computed and then used after manipulating the luminance Y to re-compute a valid RGB image with the same hue and saturation. ❖ ***Compositing and matting*** Compositing equation C = (1-α)B + αF . The images are taken from a close-up of the region of the hair in the upper right part of the lion This operator attenuates the influence of the background image B by a factor (1-α) and then adds in the color (and opacity) values corresponding to the foreground layer F It is convenient to represent the foreground colors in pre-multiplied form, i.e.αF But, when matting using local color consistency, the pure un-multiplied foreground colors F are used, since these remain constant (or vary slowly) in the vicinity of the object edge (OR)	12	1	1	12.5.1
8.b	**Explain briefly about Geometric primitives and transformations with neat diagram** **Geometric Primitives** • **2D points can also be represented using homogeneous coordinates,** $\tilde{x} = (\tilde{x}, \tilde{y}, \tilde{w}) \in P^2$ • **2D Lines can also be represented using**	12	1	2	2.6.1

homogeneous coordinates, $\tilde{l} = (a, b, c)$

- **3D Plane can also be represented as homogeneous coordinates, $\tilde{m} = (a, b, c, d)$, with a corresponding plane equation**

$$\bar{\mathbf{x}} \cdot \tilde{\mathbf{m}} = ax + by + cz + d = 0$$

Transformations

Transformation	Matrix	# DoF	Preserves	Icon
translation	$\begin{bmatrix} \mathbf{I} & \mathbf{t} \end{bmatrix}_{2\times3}$	2	orientation	
rigid (Euclidean)	$\begin{bmatrix} \mathbf{R} & \mathbf{t} \end{bmatrix}_{2\times3}$	3	lengths	
similarity	$\begin{bmatrix} s\mathbf{R} & \mathbf{t} \end{bmatrix}_{2\times3}$	4	angles	
affine	$\begin{bmatrix} \mathbf{A} \end{bmatrix}_{2\times3}$	6	parallelism	
projective	$\begin{bmatrix} \tilde{\mathbf{H}} \end{bmatrix}_{3\times3}$	8	straight lines	

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