

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech S7 (S) Examination Sept 2020

Course Code: CS401**Course Name: COMPUTER GRAPHICS**

Max. Marks: 100

Duration: 3 Hours

PART A*Answer all questions, each carries 4 marks.*

- | | | Marks |
|----|--|-------|
| 1 | Describe simple random scan display system and draw its architecture. | (4) |
| 2 | Describe Flat Panel Display and explain its different categories. | (4) |
| 3 | Which are the steps involved in window to viewport coordinate transformation in 2D? | (4) |
| 4 | Magnify the triangle ABC with A(0, 0), B(1, 1) and C(5, 2) to twice its size while keeping C(5, 2) fixed. | (4) |
| 5 | Show that the composition of two successive rotations are additive i.e. $R(\theta_1) \cdot R(\theta_2) = R(\theta_1 + \theta_2)$. | (4) |
| 6 | Derive the linear equation for a 3D object and test whether the coordinates are inside or outside the plane. | (4) |
| 7 | Define the terms (i) Centre of projection (ii) Principal vanishing point | (4) |
| 8 | Differentiate between the object space and image space method for the hidden surface removal of an image. | (4) |
| 9 | Describe the basic concepts of sampling and quantization with a neat sketch. | (4) |
| 10 | Write any six differences between perspective projection and parallel projection | (4) |

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

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|----|--|-----|
| 11 | a) Generate the points between the end points of a line viz.(2,2) and (9,6) by using Bresenham's line drawing algorithm. | (5) |
| | b) Scan convert the line segment with end points (30,20) and (15,10) using DDA line drawing algorithm. | (4) |
| 12 | a) With a suitable figure, describe the shadow masking techniques in CRT. | (5) |
| | b) Write a note on any two interactive graphics input devices. | (4) |
| 13 | a) Derive the Initial decision parameter of midpoint circle drawing algorithm. | (6) |
| | b) Describe the relevance and various methods of inside-outside test used in polygon filling. | (3) |

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

- 14 Explain the Sutherland Hodgeman algorithm for polygon clipping with an example. (9)
- 15 Consider a triangle at (2,2), (10,2), (2,10). Perform the following 2D transformations in succession and find the resultant vertices (9)
- (i) Scale with respect to (2,2) by scaling factors (2,2) respectively along x and y directions.
- (ii) Rotate by 90^0 counter clockwise direction
- 16 a) Briefly explain the steps involved in clipping a line using Mid point Subdivision algorithm. (5)
- b) Explain how polygon meshes are used for 3D modelling. (4)

PART D*Answer any two full questions, each carries 12 marks.*

- 17 a) Differentiate between oblique and orthogonal projection. (4)
- b) Explain histogram matching with an example. (8)
- 18 a) Describe in detail the depth buffer visible surface detection technique. Derive the equation to find the depth values for a surface position (x, y). (9)
- b) Explain the terms adjacency and connectivity in the context of digital images. (3)
- 19 a) Explain the scan –line method used in visible surface detection with an example. (4)
- b) Consider the image segment and compute the length of the shortest 4- , 8- and m-path between p and q by considering two set of values for V: (8)
- (i) $V=\{0,1,2\}$
- (ii) $V=\{1,2\}$.

If a particular path does not exist explain the reason for the above two cases of

V .	3	4	1	2	0
	0	1	0	4	2(q)
	2	2	3	1	4
(q)3	0	4	2	1	
	1	2	0	3	4
