APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
Scheme for Valuation/Answer Key
Scheme of evaluation (marks in brackets) and answers of problems/key
SEVENTH SEMESTER B.TECH DEGREE EXAMINATION (S), MAY 2019
Course Code: CS401
Course Name: COMPUTER GRAPHICS

Max. Marks: 100   Duration: 3 Hours

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

1	Any four differences- 1 mark each	(4)
2	Usage of 8-way symmetry - 2 marks, Symmetric points - 2 marks.	(4)
3	DDA line algorithm steps- 4 marks	(4)
4	Definition of homogeneous coordinate system- 1 mark, Significance- 2 marks, Representation of translation, rotation , scaling in HCS – 1 mark	(4)
5	Definition of: window – 1 mark, viewport- 1mark, windowing transformation- 2 marks.	(4)
6	Steps involved in 3D scaling/Matrix representation of each transformation in the sequence- 3 marks, Composite scaling matrix- 1 mark	(4)

$$\begin{bmatrix} sx & 0 & 0 & (1-sx)xf \\ 0 & sy & 0 & (1-sy)yf \\ 0 & 0 & sz & (1-sz)zf \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

7	Explanation on parallel and perspective projections- 2 marks each	(4)
8	Explanation of back face removal method(3 marks), figure(1 mark)	(4)
9	Computation of shortest 4-path (1 mark), shortest 8-path (1.5 mark),Computation of shortest m-path (1.5 mark)	(4)
10	i) Explanation on horizontal and vertical neighbours of a pixel (2 marks)	(4)
	ii) Definition of digital path (1 mark)	
	iii) Definition of connected set(1 mark)	

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

11	a)	Explanation on raster system architecture ,video controller, refresh operations, display processor- 4 marks, Figure – 2 marks	(6)
	b)	Components of DVST - 1 mark, Working – 2 marks	(3)

12   a)   Explanation and procedure for Boundary fill algorithm – 4 marks   (4)

      b)   Steps – 2 marks, Finding pixel co-ordinates – 3 marks   (5)

          [Hint: (1,1) (2,2) (3,2) (4,3) (5,3) (6,4) (7,4) (8,5)]

13   a)   Final answer – 1 mark each   (2)

          [Hint : for 12 bits/pixel- 7.5 MB, for 24 bits/pixel -15 MB]

      b)   Working of shadow mask CRT- 3 marks, Figure-1 mark   (4)

      c)   Explanation of non-zero winding number rule – 2 marks, Figure – 1 mark   (3)

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

14   a)   (i) Point after Translation - 1 mark, (ii) Point After scaling - 1 mark,   (4)

          (iii) Point after rotation - 2 marks

      b)   Proof and steps- 3 marks [Hint: $R(\theta 1). R(\theta 2)= R(\theta 2). R(\theta 1)$]   (3)

      c)   Point clipping conditions- 2 marks   (2)

15   a)   Explanation of algorithm and Rules for processing polygon edges- (3 + 2) marks   (6)

          Figure – 1 mark

      b)   Rotation matrix about X-axis R(45) – 1 mark   (3)

          Computation of New coordinates – 2 marks

          [Hint: A'=(0,-1/√2, 1/√2), B'=(2, -1/√2, 1/√2), C'= (2, 2/√2, 4/√2), D'=(0, 2/√2, 4/√2), E'=(0,0,0), F'=(2,0,0), G'=(2, 3/√2, 3/√2), H'=(0, 3/√2, 3/√2)]

16   a)   Quadric surface – 1 mark, Explanation on any one quadric surface – 2 marks   (3)

      b)   Region Codes – 1 mark, Explanation of clipping procedure – 4 marks, Example- 1 mark   (6)

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

17   a)   Four differences (1 mark each)   (4)

      b)   Explanation on depth sorting method (4 marks)   (8)

          Explanation of tests to identify overlapping surface + figure(4 marks)

18   a)   Block diagram-(2 marks) , Brief explanation of each component(4 marks)   (6)

      b)   Edge detection using Sobel(2.5 marks)   (6)

          Edge detection using Prewitt(2.5 marks)

          Advantage of Sobel operator(1 mark)

19   a)   Figure (1 mark), Derivation steps (4 marks), Final transformation matrix(1 mark)   (6)

      b)   Histogram equalization (1 mark). Significance (1 mark)   (2)

c)   Definition of histogram - 1 mark, Histogram of four basic image types:(dark   (4)
image ,light image, low contrast and high contrast images.) - 3 marks

****