Code No: RT32032 **R13** SET - 1

III B. Tech II Semester Regular Examinations, April - 2016

INTERACTIVE COMPUTER GRAPHICS

(Mechanical Engineering)

Time: 3 hours Maximum Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	List various output devices used in computers.	[3M]
	b)	Derive the transformation matrix for rotation about X&Z axis.	[4M]
	c)	Explain about window to viewport and viewport to window transformations.	[3M]
	d)	What is a closed and open curve?	[4M]
	e)	Explain about visible surface detection.	[4M]
	f)	Explain about backface detection.	[4M]

PART -B

2	a)	Explain the functioning of a Plasma display system.	[8M]
	b)	Explain various hardcopy output devices.	[8M]
3		Explain flood fill algorithm with an example showing stack position at each step.	[16M]
4		Demonstrate Sutherland-Hodgeman polygon clipping algorithm with an example.	[16M]
5		Derive the blending functions for a Bezier surface 3x3.	[16M]
6		Derive the transformation matrix to reflect an object about an arbitrarily selected plane.	[16M]
7		Write short notes on	
	a)	Animation specification involving accelerations.	[5M]
	b)	Motion specifications in animation.	[5M]
	c)	Homogeneous coordinates.	[6M]

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Code No: RT32032 **R13** SET - 2

III B. Tech II Semester Regular Examinations, April - 2016

INTERACTIVE COMPUTER GRAPHICS

(Mechanical Engineering)

Time: 3 hours Maximum Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	Explain the difference between random scan and raster scan devices.	[3M]
	b)	Derive the transformation matrix for rotation about X&Y axis.	[4M]
	c)	Explain the cohen-sutherland clipping algorithm.	[4M]
	d)	Explain about wireframe modeling.	[4M]
	e)	Explain the need for concatenation of matrices.	[3M]
	f)	Discuss about motion specification.	[4M]

PART –B

2		Explain various input and output devices.	[16M]
3		Prove that a uniform scaling ($S_x = S_y$) and a rotation form a commutative pair of operations but that, in general, scaling and rotation are not commutative operations.	[16M]
4		Compare the number of arithmetic operations performed in the Cohen-Sutherland and the Cyrus-Beck line-clipping algorithms for two different line orientations relative to a clipping window.	[16M]
5		Determine the blending functions for uniform, periodic B-spline curves of degree 3.	[16M]
6		Write the depth buffer algorithm and demonstrate with an example.	[16M]
7		Write short notes on	
	a)	Key frame systems.	[5M]
	b)	General computer animation functions.	[5M]
	c)	Parallel and perspective projections.	[6M]

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Code No: RT32032 **R13** SET - 3

III B. Tech II Semester Regular Examinations, April - 2016

INTERACTIVE COMPUTER GRAPHICS

(Mechanical Engineering)

Time: 3 hours Maximum Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	Explain the functioning of CRT monitor.	[4M]
	b)	Derive the transformation matrix for rotation about Y&Z axis.	[4M]
	c)	Explain the liang barsky algorithm.	[4M]
	d)	Write the shortcomings of Bezier curves.	[3M]
	e)	Derive the relation for rotation about XY plane, YZ plane and XZ plane.	[4M]
	f)	Explain about keyframe system.	[3M]

PART -B

2		Explain in detail about any four input devices.	[16M]
3		Show that transformation matrix for a reflection about the line y = x, is equivalent to a reflection relative to the x axis followed by 2 counterclockwise rotation of 90^o.	[16M]
4	a)	Derive the window-to-viewport transformation equations **by** first scaling the window to the SIZE of the viewport and then translating the scaled window to the viewport position.	[16M]
5		Derive blending functions for a B-spline surface of degree 3x3.	[16M]
6		Derive the transformation matrix for scaling an object by scaling factor S in a direction defined by the directional angles α, β, γ.	[16M]
7		Write short notes:	
	a)	Generation of in-betweens key frames using linear interpolation	[5M]
	b)	Raster animation	[5M]
	c)	Back face detection.	[6M]

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Code No: RT32032 **R13** SET - 4

III B. Tech II Semester Regular Examinations, April - 2016

INTERACTIVE COMPUTER GRAPHICS

(Mechanical Engineering)

Time: 3 hours Maximum Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	Explain various input devices used.	[4M]
	b)	Explain DDA algorithm.	[4M]
	c)	Explain about viewing function.	[4M]
	d)	Explain about CSG modeling.	[3M]
	e)	Explain about Z buffer algorithm.	[4M]
	f)	Explain about animation sequence.	[3M]

PART -B

2	Explain the functioning of any two monitors with applications.	[16M]
3	Show that transformation matrix, for a reflection about the line y = -x, is equivalent to a reflection relative to the y axis followed by a counterclockwise rotation of 90^0.	[16M]
4	Carefully discuss the rationale behind the various tests and methods for calculating the intersection parameters u_1 and u_2 in the Cyrus-Beck line-cllpping algorithm.	[16M]
5	Explain about any two shading algorithms in detail.	[16M]
6	Write scan line algorithm for visible surface detection and explain with an example.	[16M]
7	Write short notes on	
	a) Animation specification implementing the acceleration-deceleration calculation.	[5M]
	b) Computer animation languages.	[5M]
	c) 3-D clipping.	[6M]

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