# UNIVERSITY OF PUNE <br> [4362]-223 <br> S.E. (Information Technology) Examination-2013 (Computer Graphics) (2008 Course) 

[Time: 3 Hours]
[Max. Marks: 100]

## Instructions:

1 Answer three questions from Section I and III questions from section II.
2 Answers to the two sections should be written in separate answer-books.

3 Neat diagrams must be drawn wherever necessary.
4 Black figures to the right indicate full marks.
5 Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.
6 Assume suitable data, if necessary.

## SECTION I

Q. $1 \quad$ a. Consider the line from $(5,5)$ to $(13,9)$. Use the Bresenham's algorithm to rasterize the line.
b. Explain filtering technique for anti-aliasing
c. Explain raster scan display

## OR

Q. 2 a. Explain the term display file and display file interpreter. Explain two data structures for implementing display file.
b. Explain DDA line drawing algorithm along with its advantages and disadvantages.
$\left.\begin{array}{llll}\text { Q.3 } & \text { a. } & \begin{array}{l}\text { Give 2D transformation matrices for translation and } \\ \text { scaling. Prove that two successive 2D-rotations about } \\ \text { the origin commute. }\end{array} & {[8]} \\ \text { b. } & \begin{array}{l}\text { Explain flood fill algorithm for filling polygons } \\ \text { c. }\end{array} & \begin{array}{l}\text { Give the homogeneous coordinate transformation } \\ \text { matrix for counter clockwise rotation about the origin }\end{array} & {[8]}\end{array}\right]$

## OR

\(\left.$$
\begin{array}{ll}\text { Q. } 4 & \text { a. } \quad \begin{array}{l}\text { Find the reflection of a point } \mathrm{A}[5,9] \text { about the line } \\
\mathrm{y}=\mathrm{x}+5\end{array}
$$ <br>
Find the transformation matrix that transforms the <br>
given square \mathrm{ABCD} to half its size with centre still <br>
remaining at the same position. The coordinates of <br>
square are: \mathrm{A}(1,1), \mathrm{B}(3,1), \mathrm{C}(3,3), \mathrm{D}(1,3) . Also find <br>

resultant coordinates of square.\end{array}\right\}\)| Explain parallel projections and perspective projection |
| :--- |
| Q. $5 \quad$ a. detail. |

i) Never a vanishing point,
ii) at most one vanishing point,
iii) at most two vanishing point,
iv) at most three vanishing points.

## OR

Q. $6 \quad$ a. Explain general parallel projection onto a given plane. The view plane passes through a point $\mathrm{V}\left(\mathrm{x}_{0}, \mathrm{y}_{0}, \mathrm{z}_{0}\right)$ and normal to the view plane is given by $\mathrm{N}=\mathrm{n}_{1} \mathrm{i}+\mathrm{n}_{2} \mathrm{j}+\mathrm{n}_{3} \mathrm{k}$. The direction of projection is given by vector $\mathrm{V}=\mathrm{a}_{\mathrm{i}}+\mathrm{b}_{\mathrm{j}}+\mathrm{c}_{\mathrm{k}}$. Give your answer stepwise along with transformation matrix at each step.
b. Write short note on (any two)
i> Polygon inside Test
ii> Joystick
iii> Polygon meshes

## SECTION II

Q. $7 \quad$ a> Explain HSV and YIQ colour models
b> Explain in detail the steps for designing animation sequences

## OR

Q. $8 \quad$ a> Explain different methods of controlling animation
b> Write short notes on
i> Colour mixing
ii> RGB colour model
Q. $9 \quad$ a> What is Jittering? State the advantages of distributed ray tracing.
b> Explain diffuse reflection
c> What is the basic purpose of ray tracing algorithm?
Explain ray tracing to find shadows

## OR

| Q. 10 | a> | Compare Gaurand and Phong's method of shading | [8] |
| :---: | :---: | :---: | :---: |
|  | b> | Explain Specular reflection with figure in detail | [8] |
| Q. 11 | a> | Explain cubic spline interpolation methods | [8] |
|  | b> | Explain in brief Monte-Carlo method for rendering OR | [8] |
| Q. 12 | a> | How fractals are used to generate fractal surfaces? | [8] |
|  |  | Give two examples of fractal surfaces. |  |
|  | b> | Write a short note on (any two) | [8] |
|  |  | i> GPU |  |
|  |  | ii> Quadratic Surfaces |  |
|  |  | iii> Texture Mapping |  |

