

## CS602 Computer Graphics

Mid Term Examination – February 2005

Time Allowed: 90 Minutes

### Instructions

Please read the following instructions carefully before attempting any question:

1. This examination is closed book, closed notes, closed neighbors.
2. Answer all questions.
  - a. There is no choice.
  - b. You will have to answer correctly all questions in this examination to get the maximum possible marks.
3. Do not ask any questions about the contents of this examination from anyone.
  - a. If you think that there is something wrong with any of the questions, attempt it to the best of your understanding.
  - b. If you believe that some essential piece of information is missing, make an appropriate assumption and use it to solve the problem.
4. You are allowed to use any Software for Diagrams and Symbols like MS Word, MathType and Visio etc.

NOTE:

For your convenience we are providing you the following symbols, so that you can copy them & paste wherever they are needed in the respective questions.

□, ∅, Ø, , |, , , an, θ, □

**\*\*WARNING: Please note that Virtual University takes serious note of unfair means. Anyone found involved in cheating will get an `F` grade in this course.**

Total Marks: 50

Total Questions: 22

**Question No. 1**

**Marks : 05**

What is Rendering?

**Question No. 2**

**Marks : 01**

The circle and ellipse are symmetric across 8 octants.

- ☐ True
- ☐ False

**Question No. 3**

**Marks : 01**

UV light is used in Plasma Panel displays to excite phosphor.

- ☐ True
- ☐ False

**Question No. 4**

**Marks : 01**

Which of the following is not true about matrices:

- ☐  $A+B = B+A$
- ☐  $a(A + B) = aA + aB$
- ☐  $(AT)T = AT$
- ☐  $A + (B + C) = (A + B) + C$

**Question No. 5**

**Marks : 05**

Why is the Bresenham's line drawing algorithm more efficient than the DDA line drawing algorithm? Give precise one line answer.

**Question No. 6**

**Marks : 01**

According to Odd Parity Rule, a point is inside the polygon, if:

- ☐ Line from an outside point to this point does not cross the edges odd number of times
- ☐ Line from any point to this point crosses the edges odd number of times
- ☐ Line from an outside point to this point crosses the edges odd number of times
- ☐ Line from this point to any point outside the polygon intersects any edge

**Question No. 7****Marks : 01**

As opposed to direct memory access method, BIOS routines provide an easier and faster method of drawing pixels on screen.

- ☐ True
- ☐ False

**Question No. 8****Marks : 06**

Describe the Right Handed Rule for determination of direction of axes.

**Question No. 9****Marks : 05**

What is Viewing Frustum?

**Question No. 10****Marks : 05**

How is the efficiency of circle drawing algorithms improved?

**Question No. 11****Marks : 01**

A Polygon is complex, if the line connecting:

- ☐ Any two points outside the polygon intersects its boundary
- ☐ Any two points inside the polygon intersects its boundary
- ☐ A point inside the boundary with any point outside, does not intersect the polygon boundary
- ☐ Any two vertices, intersects some edge of polygon.

**Question No. 12****Marks : 01**

When a point  $P(x,y)$  is rotated by  $\theta$  the coordinates of transformed point  $P'$  are given as:

- ☐  $x' = x \cos(\theta) - y \sin(\theta), \quad y' = x \sin(\theta) + y \cos(\theta)$
- ☐  $x' = y \cos(\theta) - x \sin(\theta), \quad y' = y \sin(\theta) + x \cos(\theta)$
- ☐  $x' = x \cos(\theta) + y \sin(\theta), \quad y' = x \sin(\theta) - y \cos(\theta)$
- ☐  $x' = y \cos(\theta) + x \sin(\theta), \quad y' = y \sin(\theta) - x \cos(\theta)$

**Question No. 13****Marks : 01**

The amount of time it takes to illuminate a specific location on phosphor coated screen is called Persistence.

- ☐ True
- ☐ False

**Question No. 14****Marks : 05**

Give homogeneous translation matrix for 2D transformation.

**Question No. 15****Marks : 01**

Incremental line drawing algorithm makes use of the equation of straight line.

- ☐ True
- ☐ False

**Question No. 16****Marks : 01**

In matrix multiplication:

- ☐ The two matrices must be square
- ☐ The number of rows of 1st matrix must be the same as the number of columns of the second.
- ☐ The two matrices must either be row matrices or column matrices
- ☐ The number of columns of 1st matrix must be the same as the number of rows of the second.

**Question No. 17****Marks : 01**

In Horizontal retrace, after completion of all the pixels in a scan line, the refreshing continues from the 1<sup>st</sup> pixel of the next scan line.

- ☐ True
- ☐ False

**Question No. 18****Marks : 01**

Parity Rule is used to determine whether a pixel is inside a polygon or not.

- ☐ True
- ☐ False

**Question No. 19****Marks : 01**

In Pixmap exactly one bit is used to hold color value of each pixel.

- ☐ True
- ☐ False

**Question No. 20****Marks : 01**

When dot product of two vectors equals zero, this implies that the two vectors are:

- ☐ parallel to each other
- ☐ orthogonal (perpendicular) to each other.
- ☐ intersect each other
- ☐ equal to each other

**Question No. 21**

**Marks : 04**

**What is meant by Trivial Accept?**

**Question No. 22**

**Marks : 0**

**The Boundary Fill and Flood Fill algorithms:**

- ☐ Must use 4-connected approach
  - ☐ Must use 8-connected approach
  - ☐ May use 4-connected or 8-connected approach
  - ☐ Must not use recursive approach
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