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## CS602 Computer Graphics

Final Term Examination - February 2005

Time Allowed: 150 Minutes

Please read the following instructions carefully before attempting any of the questions:

1. Please Attempt all the questions. Note that you have to complete the paper in the given period of time so attempt all the questions according to their Marks.
2. 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.
  - c. Write all steps, missing steps may lead to deduction of marks.

**\*\*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.**

You can copy the symbols given below if you need them

$\Phi$  ,  $\theta$  ,  $\propto$

Total Marks: 75

Total Questions: 13

### Question No. 1

Marks : 10

Write an algorithm that can subdivide faces of tetrahedron (type of polyhedron having 4 faces) to depth level 2 and draw after subdivision. Consider the vertices are  $V_1(X_1, Y_1, Z_1) \dots V_{n-1}(X_{n-1}, Y_{n-1}, Z_{n-1})$ ,  $V_n(X_n, Y_n, Z_n)$  where  $n=4$ .

### Question No. 2

Marks : 1

Which of the following is valid difference between Bitmap graphics and vector graphics:

- Bitmap graphics have limited colors
- Bitmap graphics are scalable
- Bitmap graphics gives realistic image
- Vector graphics create more realistic image

### Question No. 3

Marks : 10

Differentiate between quadratic and cubic parametric curves and write equations for cubic parametric curve.

### Question No. 4

Marks : 1

If N bits are required to store a pixel then:

- $2^N$  colors are used in the image
- N colors are used in the image
- $2^N$  colors are used in the image
- N! colors are used in the image

**Question No. 5****Marks : 1**

Which of the following statements is not true about flood-fill and boundary-fill algorithms?

- Both can be implemented as recursive as well as iterative methods
- Both are used for filling of close figure
- Flood-fill is best for filling of triangle
- A complex polygon can be filled with 8 connected approach

**Question No. 6****Marks : 6**

Write down steps required for scan-line filling algorithm?

**Question No. 7****Marks : 6**

Given below is the rotation equation about z-axis use this to derive rotation equations about x-axis and y-axis?

$$X' = X \cdot \cos(\theta) - Y \cdot \sin(\theta)$$

$$Y' = X \cdot \sin(\theta) + Y \cdot \cos(\theta)$$

$$Z' = Z$$

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

Write an algorithm to draw N points Bezier curve?

**Question No. 9****Marks : 12**

Define the following in view of Lighting Equation:

- a) Specular Reflection
- b) Ambient Light
- c) Diffuse Reflection

**Question No. 10****Marks : 12**

A Quad has vertices A (0.2, 0.2, 1.0), B (0.5, 0.2, 1), C (0.5, 0.5, 1.0), D (0.2, 0.5, 1.0). Calculate surface normal? Given light source has vertex L (0.8, 0.2, 1.0); Taking light factor  $I=0.5$  and surface type=0.5; Calculate light vector and light for vertices A, B, C and D?

**Question No. 11****Marks : 1**

The difference between Flat shading and Phong shading is that:

- Flat shading produces smooth shades and Phong does not
- Flat shading uses one color and Phong uses two colors
- Flat shading does not produce shining spot and Phong does that
- Phong shading does not produce shining spot and flat does that

**Question No. 12****Marks : 6**

Explain 'Alpha Blending' and its usage.

**Question No. 13****Marks : 1**

What is meant by Resolution:

- Number of horizontal pixels \* Number of Vertical Pixels
- Number of horizontal pixels \* Number of Vertical Pixels \* Number of colors
- Number of horizontal pixels \* Number of Vertical Pixels \* Number of colours \* Refresh Rate

- Number of horizontal pixels \* Number of Vertical Pixels \* Number of colours \* Number of Buffers