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FINALTERM EXAMINATION
Spring 2010
CS602- Computer Graphics (Session - 4)

Question No: 1 (Marks: 1) - Please choose one

Which of the following is NOT a modern application for Computer Graphics-----

- ▶ Stop-motion animation
- ▶ Computer Aided Geometric Design
- ▶ Video Games
- ▶ Scientific Visualization

Question No: 2 (Marks: 1) - Please choose one

Both Boundary Filling and Flood filling algorithms are non-recursive techniques,

- ▶ False
- ▶ True



Question No: 3 (Marks: 1) - Please choose one

TV series are made as simply as possible from the animation point of view. This approach is generally known as -----.

- ▶ Full animation
- ▶ Limited animation
- ▶ Low animation
- ▶ High resolution

Question No: 4 (Marks: 1) - Please choose one

An eight frame run cycle that ----- frame/frames to each step gives a fast and vigorous dash. At this speed the successive leg positions are quite widely separated and may need dry brush or speed lines to make the movement flow.

- ▶ Two
- ▶ One
- ▶ Three
- ▶ Four

Question No: 5 (Marks: 1) - Please choose one

----- reflection is the effect of reflecting light toward the direction from which it came, no matter the orientation of the surface.

- ▶ Forward scattering
- ▶ Diffuse Lambertian
- ▶ Backscattering
- ▶ Retro

Question No: 6 (Marks: 1) - Please choose one

What makes this really challenging to model is that the index of refraction for most materials is a function of the----- of the light. This means that not only is there a shift in the angle of refraction, but that the shift is different for differing -----of light.

- ▶ Reflecting angle, Reflecting angle
- ▶ Refracting angle, Refracting angle
- ▶ Frequency, Frequency
- ▶ Wavelength, Wavelength

Question No: 7 (Marks: 1) - Please choose one

The reflected light wave turns out to be a -----case since light is reflected at the same angle as the incident wave (when the surface is smooth and uniform, as we'll assume for now).

- ▶ Abnormal
- ▶ Complex
- ▶ Simple
- ▶ Unknown

Question No: 8 (Marks: 1) - Please choose one

Tessellation can be adaptive to the _____ degree of curvature of a surface.

- ▶ Local
- ▶ Static
- ▶ Global
- ▶ Variable

Question No: 9 (Marks: 1) - Please choose one

_____ sets the reshape callback for the *current window*. The reshape callback is triggered when a window is reshaped.

- ▶ glutMainLoop
- ▶ glutIdleFunc
- ▶ glutReshapeFunc
- ▶ glutDisplayFunc

Question No: 10 (Marks: 1) - Please choose one

Signed integer color components, when specified, are linearly mapped to floating-point values such that the most positive representable value maps to 1.0, and the most negative representable value maps to ----- . Floating-point values are mapped directly.

- ▶ -1.0
- ▶ 0.0
- ▶ 2.0
- ▶ 1.0

Question No: 11 (Marks: 1) - Please choose one

NURBS stands for-----.

- ▶ Non Universal Rational Binary Spline
- ▶ Non Uniform Rational Binary Splines
- ▶ Non Uniform Rational Beta Splines
- ▶ Non Universal Rational Beta Splines

Question No: 12 (Marks: 1) - Please choose one

An orthogonal set of vectors-----



- ▶ Must be a set of linearly independent vectors
- ▶ Must be a set of linearly dependent vectors
- ▶ Must be made up of the basis vectors (e_1 , e_2 , and e_3)
- ▶ Can be made up of any set of vectors

Question No: 13 (Marks: 1) - Please choose one

Bezier curve is numerically the ----- of all the polynomial-based curves used in these applications.

- ▶ None of the given
- ▶ Most stable
- ▶ Less stable
- ▶ Most unstable

Question No: 14 (Marks: 1) - Please choose one

Bezier curve is the ideal standard for representing the -----
piecewise polynomial curves.

- ▶ None of the given
- ▶ Non complex
- ▶ Most complex
- ▶ **More complex**

Question No: 15 (Marks: 1) - Please choose one

Keep polygon orientations consistent to make sure that when viewed from the outside, all the polygons on the surface are oriented in the same direction.

- ▶ None of the given
- ▶ Neither
- ▶ Different
- ▶ **Same**



Question No: 16 (Marks: 1) - Please choose one

The ----- is most simple example that exhibits the property self similarity.

- ▶ Mosse
- ▶ Fern
- ▶ None of the given
- ▶ Thohar

Question No: 17 (Marks: 1) - Please choose one


A common mistake people make when creating three-dimensional graphics is to start thinking too soon that the final image appears on a flat, two-dimensional

screen. Avoid thinking about which pixels need to be drawn, and instead try to visualize ----- space.

- ▶ Multi-dimensional
- ▶ One-dimensional
- ▶ Two-dimensional
- ▶ **Three-dimensional**

Question No: 18 (Marks: 1) - Please choose one

Which of the following properties of rational Bezier curves fails if the weight assigned to a control point is negative?

- 
- ▶ End-point interpolation
 - ▶ Variation Diminishing
 - ▶ Symmetry
 - ▶ Convex-Hull

Question No: 19 (Marks: 1) - Please choose one

In the Phong reflection model, there are 3 constants (a, b, c) which are used to describe the qualities of which of the following phenomena?

- ▶ The attenuation of a point light source with distance
- ▶ The size (in each dimension) which the light is assumed to have
- ▶ The amount to perturb reflection vectors as they are mirrored across the normal
- ▶ The material reaction to ambient, diffuse and specular light (respectively)

Question No: 20 (Marks: 1) - Please choose one

The Phong reflection model simplifies light-matter interactions into (essentially) 4 vectors and a number of constants. Which piece of the Phong model is responsible for giving spheres their bright white spots?

- ▶ Specular
- ▶ Diffuse
- ▶ Ambient

Question No: 21 (Marks: 1) - Please choose one

When you hit a surface in ray tracing, generally shadow rays are tested against all objects in a scene. If these rays come back saying they hit an object in the scene, which of the following do you do?

- ▶ add all components (i.e. ambient, diffuse and specular) from that light source to the object.
- ▶ add all EXCEPT the ambient light from that light source to the object (i.e. diffuse and specular)
- ▶ add only the ambient light from that light source to the object
- ▶ add none of the light from that light source to the object

Question No: 22 (Marks: 1) - Please choose one

The ColorSpace tool is a handy tool that we can use to interactively add two colours together to see the effects of the various strategies for handling oversaturated colours.

- ▶ False
- ▶ True

Question No: 23 (Marks: 1) - Please choose one

A polygon is usually defined by a sequence of ----- and Edges.

- ▶ Ending lines
- ▶ Points
- ▶ Vertices
- ▶ Edges

Question No: 24 (Marks: 1) - Please choose one

Which of the following properties of Bezier curves guarantees that a line passes through the control polygon as many times or more times than the line passes through the Bezier curve itself?

- ▶ End-point interpolation
- ▶ Variation Diminishing
- ▶ Symmetry
- ▶ Convex-Hull

Question No: 25 (Marks: 1) - Please choose one

Parity is a concept used to determine which _____ lie within a polygon.
(Choose best suitable answer)

- ▶ Edge
- ▶ Vertices
- ▶ Pixels
- ▶ None of the given



Question No: 26 (Marks: 1) - Please choose one

The actual filling process in boundary filling algorithm begins when a point _____ of the figure is selected.

- ▶ Outside the boundary
- ▶ Inside the boundary
- ▶ At boundary
- ▶ None of the given

Question No: 27 (Marks: 1) - Please choose one

Weiler-Atherton Polygon Clipping technique modify the vertex-processing procedures for window boundaries so that _____ polygons are displayed correctly.

- ▶ Convex
- ▶ Concave
- ▶ Complex
- ▶ None of the given

Question No: 28 (Marks: 1) - Please choose one

If a line connecting any two points within a polygon does not intersect any edge,

then it will be a _____ polygon.

- ▶ Convex
- ▶ Concave
- ▶ Complex
- ▶ None of the given

Question No: 29 (Marks: 1) - Please choose one

_____ can be defined as a mapping of point $P(x, y, z)$ onto its image $P'(x', y', z')$ in the view plane which constitutes the display surface.

- ▶ Mapping plane
- ▶ Three Coordinate Planes
- ▶ View plane
- ▶ Projection

Question No: 30 (Marks: 1) - Please choose one

The reflected light wave turns out to be a / an _____ case since light is reflected at the same angle as the incident wave (when the surface is smooth and uniform, as we'll assume for now).

- ▶ Unknown
- ▶ Simple
- ▶ Complex
- ▶ Abnormal



Question No: 31 (Marks: 2)

Write down the equation of tangent vector (should be in the form of parametric functions)?

Question No: 32 (Marks: 2)

What is meant by spotlight?

A light containing a minimum of the following parameters: light location, target location and penumbra.

Theater lights or bulbs enclosed in a lamp shade are good examples of spotlights. A spot light is like a point light, but its light rays are restricted to a well defined cone. It is often used to direct the viewers eye to certain parts of the scene.

Question No: 33 (Marks: 2)

Describe polygon clipping briefly.

An algorithm that clips a polygon is rather complex. Each edge of the polygon

must be tested against each edge of the clipping window, usually a rectangle. As a result, new edges may be added, and existing edges may be discarded, retained, or divided. Multiple polygons may result from clipping a single polygon. We need an organized way to deal with all of these cases.

Question No: 34 (Marks: 2)

How the world look like in following situations?

1. Without ambient light
2. With too much ambient light

Ambient light means the light that is already present in a scene, before any additional lighting is added. It usually refers to natural light, either outdoors or coming through windows etc. It can also mean artificial lights such as normal room lights.

Photography and video work rely largely or wholly on ambient lighting.

Ambient light can be a real trouble if it conflicts with what the photographer wants to achieve. For example, ambient light may be the wrong color temperature, intensity or direction for the desired effect. In this case the photographer may choose to block out the ambient light completely and replace it with artificial light.



Question No: 35 (Marks: 3)

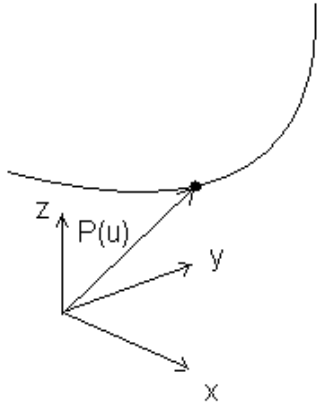
Give (Conditions) at least three points to draw good computer generated lines?

Question No: 36 (Marks: 3)

Differentiate between functions using gl and glu prefixes of glut library?

Question No: 37 (Marks: 3)

Explain following figure in term of drawing curve:



Question No: 38 (Marks: 3)

Which OpenGL command is used to define material properties of the object, also name two of these properties?

predefine the material properties which will be consequently assigned to objects when you define them with the glColor command. This is done by making the following call:

```
glColorMaterial(GL_FRONT, GL_AMBIENT_AND_DIFFUSE);
```

Question No: 39 (Marks: 5)

What is difference between glLoadIdentity function and glLoadMatrix function ?

The **glLoadIdentity** function replaces the current matrix with the identity matrix. It is semantically equivalent to calling **glLoadMatrix** with the identity matrix

$$\begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

but in some cases it is more efficient.

Error Codes

The following is the error code and its condition.

GL_INVALID_OPERATION: **glLoadIdentity** was called between a call to **glBegin** and the corresponding call to **glEnd**.

glLoadMatrix replaces the current matrix with the one whose elements are specified by m . The current matrix is the projection matrix, modelview matrix, or texture matrix, depending on the current matrix mode (see glMatrixMode).

Question No: 40 (Marks: 5)

Why do we use curves? What are the advantages of using curves?

