

## 19IT512 – Computer Graphics

### IAE 2 Question bank

#### PART - A

1. What is solid modeling?
2. List the steps for computing each frame of a particle system motion sequence.
3. Draw 3D viewing pipeline.
4. Write down the syntax for GL\_VERTEX\_SHADER.
5. Define morphing.
6. What is a Particle system.
7. Define Depth Cueing.
8. Explain Gouraud shading and Phong shading.
9. Differentiate aliasing and anti-aliasing.
10. What is Polygon mesh?

#### PART - B

1. Given a 3D scene with multiple overlapping objects, demonstrate how you would implement and utilize a hidden surface removal technique (such as Z-Buffering or Painter's Algorithm) to correctly render the visible surfaces. Explain your steps and the choice of technique based on the complexity of the scene.
2. Evaluate the effectiveness of different morphing techniques in achieving smooth transitions between two images or shapes. Consider factors such as image alignment, interpolation methods, and mesh generation. Provide a reasoned judgment on which technique would be most suitable for producing realistic effects in a film or animation project.
3. Using the principles of perspective projection, apply one-point, two-point, and three-point perspective projections to draw a 3D object (e.g., a cube) on a 2D plane. Explain the process and reasoning behind choosing a particular type of projection for a given scene or object.
4. With a smooth object's 3D model at hand, apply mesh approximation techniques to generate a polygonal representation while addressing geometric, topological, and resolution constraints. Explain the steps taken and justify your choices in terms of mesh quality and computational efficiency.
5. Where can intricate 3D representations be made using polygon meshes? Describe the process of defining vertices, edges, and faces in a specific 3D modeling software. How would you manipulate these elements to achieve desired shapes and textures? Consider the role of tools for extrusion, scaling, and subdividing in your approach. Finally, illustrate how you would refine a basic mesh to enhance realism in your model.

6. In what ways can 3D things be represented in 2D space using various methods of projection? Describe the practical use of orthographic, isometric, and perspective projections in your design work. How would you select and implement the appropriate projection for a specific project?
7. How can you apply various shading methods to enhance the visual quality of 3D models? Explain the practical use of techniques like flat shading, Gouraud shading, and Phong shading in your modeling projects. How would you choose and implement a specific shading method to achieve desired effects in a given scene?
8. In a 3D model, how may the morphing process be used to switch between several shapes? Summarize the steps involved in creating smooth transformations and how you would implement this in your animation projects.

### **PART - C**

1. Construct a 3D image interactively which displays the image very accurately. Analyze the impact that it has on its color, age, velocity, lifetime, transparency. Propose a solution that efficiently apply shading and render the image clearly in the viewing region.
2. Consider the process of generating a viewing pipeline that enables to render 2D/3D images in a real world scenario where the various particle systems are used to generate the image in scene. Suggest a model that efficiently creates the image and render it efficiently to improve the quality of image.
3. Imagine you are a researcher working on a project to enhance the realism of augmented reality (AR) applications, particularly in the context of interior design. The current AR system lacks convincing lighting effects, and you are considering implementing an advanced illumination model.
4. Construct a 2D/3D scenes interactively which displays the image very accurately to empower users to dynamically sketch and manipulate virtual scenes in real-time, catering to a wide range of industries, including gaming, architecture, and simulation.