(Time: 2$^{1/2}$ Hours)   (Total Marks:75)

N.B   1) All questions are compulsory
     2) Figures to the right indicate marks
     3) Mixup of questions not allowed

Q1a   Choose the correct answer from the given options: **5**

1   The relation between vertices, faces and edges of a 3D Polygon object is given as
     a)   Vertices= faces – edges +2   b)   Vertices= faces + edges+2
     c)   Vertices= faces – edges --2   d)   Vertices=faces+ edges --2

2   The basic building block in 3D object model is
     a) Rectangle   b) triangle   c) polygon   d) cube

3   Which one of the following is not a valid geometric transformation
     a) Scaling   b) Revolution   c)   Rotation   d) Reflection

4   The API used in Unity 3D is
     a) OpenGL   b) Direct3D   c)   OpenGL ES   d) Proprietary API

5   The process of computing pixel color from projected 3D triangle is known as
     a) Blending   b) Shading   c)Rasterization   d) positioning

Q1b   Answer in one or two sentences: **5**

1   Mention the four co-ordinate systems used in graphics pipeline
2   What is the relation between a Quarternion and its inverse
3   State the Pythagoras theorem for 3D
4   Mention the use of interpolant in computer graphics
5   Define the Term Virtual Reality and give its application

Q1c   Fill in the blanks taking answer from the pool of values: **5**

**[Controller, Swapping, Double,Presenting, Animation, Stencil, Tessellation, Translation,
Rigidbody]**

1   Interchanging the roles of back buffer and front buffer is called -----------

2   A 8 bit ------------------ Buffer is always attached to depth buffer
3   Subdividing the triangles of a mesh to add new triangles is called ---------------
4   -------------- allow game objects to act under the control of Physics Engine.
5   Manipulating images and objects in dynamic medium as moving images is called----------------

Q2   **Answer any Three from the following:**   **15**

1   Define Lambert's law and explain its use in lighting calculation
2   Explain in detail the stages in the rendering pipeline
3   Describe any two 2D transformation in detail
4   Bring out the advantages of GPU architecture
5   Differentiate between super sampling and multisampling techniques
6   Write a short note on Direct 3D Feature levels

Q3   **Answer any Three from the following :**   **15**

1   What are B-Splines .State its types and advantages
2   Describe the steps in perspective projection
3   Explain the procedure of interpolating two Vectors
4   Obtain the Hessian Normal form for a straight line
5   Describe the intersection points of two straight lines
6   Write a short note on Quarternions

Q4   **Answer any Three from the following :**   **15**

1   Explain the use of assest and assest store in unity 3D
2   Define HMD and explain any two such devices
3   What is meant by specular lighting
4   Explain the term MR and state its applications
5   Describe how a material is associated with a game object in Unity 3D.
6   Explain the following functions with example Update() and FixedUpdate().

Q5   **Answer any Three from the following:**   **15**

1   Describe how parallelism is achieved in GPU Architecture
2   Explain the depth buffering technique applied on Graphic objects
3   Write a short note on Linear Interpolation
4   Explain the AddForce method used with Scripting in Unity
5   Define Components and explain how they are used with game objects

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