

(2 ½ Hours)

[Total Marks: 75]

- N.B.**
- 1) All questions are compulsory.
 - 2) Figures to the right indicate marks.
 - 3) Illustrations, in-depth answers and diagrams will be appreciated.
 - 4) Mixing of sub-questions is not allowed.

Q. 1 Attempt all Questions**(15)****(A) Choose the correct alternative.****(10)**

- (i) Which of the following function represents $y=mx+c$?
 - (a) Linear
 - (b) Cubic
 - (c) Trigonometric
 - (d) Quadratic
- (ii) _____ is the angle of rotation about the z -axis.
 - (a) roll
 - (b) pitch
 - (c) yaw
 - (d) None
- (iii) To get the depth information _____ is used.
 - (a) Back Buffer
 - (b) Depth Buffer
 - (c) Font Buffer
 - (d) Swap Buffer
- (iv) Blender, 3Delight, Corona etc are examples of ?
 - (a) API
 - (b) Rendering Engines
 - (c) Scripting language
 - (d) Graphics card
- (v) The UI Control that is not visible on the screen is?
 - (a) Text
 - (b) Image
 - (c) Mask
 - (d) Rawimage
- (vi) Lambert's law states that light intensity on a surface is proportional to the _____ of the angle between the surface normal vector and light source direction.
 - (a) sine
 - (b) cosine
 - (c) tangent
 - (d) cosec
- (vii) _____ is the transformation equation for Scaling.
 - (a) $x' = x.sx, y' = y.sy$
 - (b) $x' = x + sx, y' = y + sy$
 - (c) $x' = -x, y' = y$
 - (d) $x' = x + y \tan \beta, y' = y$

- (viii) To render the target, texture target view is created using _____.
 - (a) ID3D11DeviceContext
 - (b) ID3D11RenderTargetView
 - (c) IDXGISwapChain
 - (d) ID3D11ShaderResourceView
- (ix) In the _____ primitive topology every two Vertices in the draw, forms an individual line.
 - (a) point
 - (b) Line list
 - (c) Point list
 - (d) Line
- (x) The type of light that emits light equally in all directions is called _____.
 - (a) Point
 - (b) Spot
 - (c) Diffuse
 - (d) Directional

(B) Fill in the blanks. (5)
 (Debug.Alert,Magnitude,Network Manager,Frustum, Scene view,Debug.Log, 0, direction,1)

- (i) The _____ of a vector r is represented by $\|r\|$.
- (ii) For 2D transformation the value of third coordinate i.e. $w =$ _____
- (iii) Volume of the space the camera sees is _____.
- (iv) _____ is used to create a Multiplayer project
- (v) We use _____ to send message to Unity console

Q.2 Attempt the following:(ANY THREE) (15)

- (A) Explain 2D Rotation about an Arbitrary Point.
- (B) How does Dot product helps in Back Face Detection?
- (C) Explain the architecture of the GPU.
- (D) Explain 3D translation , 3D Scaling with suitable examples.
- (E) Explain the concept of perspective projection
- (F) Explain how to derive a unit normal vector for a triangle.

Q.3 Attempt the following:(ANY THREE) (15)

- (A) Explain the concept of swap Chain and page flipping.
- (B) Explain the following lighting
 - a. Diffuse lighting
 - b. Ambient lighting
 - c. Specular lighting
- (C) Draw and explain the stages of the rendering pipeline of DirectX.
- (D) State the properties of Bezier curves.
- (E) Explain the different topologies used in Input Assembler stages.
- (F) Write a short note on the Vertex Shader stage and define the matrix for View space.

- Q. 4 Attempt the following:(ANY THREE) (15)**
- (A) Describe any two rendering engines
 - (B) Explain the use of Physics in Unity projects
 - (C) Define MR and mention its applications
 - (D) Explain with code snippet the use of FixedUpdate() in Unity Script
 - (E) Write a short note on Head mount display
 - (F) Explain the steps in creating multiplayer project in Unity

- Q. 5 Attempt the following:(ANY FIVE) (15)**
- (A) Explain in detail Direction Cosine
 - (B) Explain in detail Cross or Vector Product with suitable example.
 - (C) What is Blending and mention the Blending equation, Blend Operations , Blend Factors and Blend State. (with reference to DirectX)
 - (D) Mention any two differences between AR,VR and MR
 - (E) What is an Animation clip and how it is created?
 - (F) Write a note on the COM object.
 - (G) Illustrate the concept of a homogeneous coordinate system
 - (H) What are raycasters? Explain in brief.
