

(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 ANY FOUR from the following: (20M)

- (a) Explain 3D Transformations with an Example.
- (b) State the difference between dot product and cross product of vectors.
- (c) Explain in detail Change of axes.
- (d) Define Lighting. Explain the following lightning
i. point light ii. Directional light iii. Spot light
- (e) Explain the concept of Interpolation.
- (f) Explain how to Derive a unit normal vector for a triangle.

Q. 2 Attempt ANY FOUR from the following: (20M)

- (a) Write a note on textures and data resource formats available in Direct 3D.
- (b) Describe use of Pygame with various key features in 2D and 3D game development, with examples.
- (c) Write a note on Game engine.
- (d) Discuss how to initialize Direct 3D and create the device and Context.
- (e) Enlist various gaming tools used by mobile game developers. Describe any two.
- (f) Explain working of swap chain and page flipping.

Q. 3 Attempt ANY FOUR from the following: (20M)

- (a) How do you script collision events in Unity, and why are they important?
- (b) Briefly explain the Asset Store in Unity and define the terms Assets and Materials in the Unity environment.
- (c) Write a short note on Rect Transform and the Physics component in Unity.
- (d) Explain the difference between Update(), FixedUpdate(), and Start() methods, and the concept of Sprites in Unity.
- (e) Explain the Unity Development Environment, including Rigid-body components and the concept of Colliders.
- (f) Briefly explain the steps to create a game in Unity and the concept of using multiple scenes.

Q. 4 Attempt ANY FIVE from the following: (15M)

- (a) Write a short note on 3D Reflection.
- (b) What is 3D ModernGL. Explain its key elements.
- (c) How can games be published, and what are Build Settings in Unity?
- (d) Explain the any three Shader Models
- (e) Explain any two human interface devices.
- (f) Define the following Unity terms:
a) Game object
b) Scene