(Time: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) Write a short note on Change of axes.
(b) Describe the function of Shader Model.
(c) State and explain Parallel light, Spot Light, Specular light.
(d) Explain the concept of homogeneous coordinate system with a suitable example.
(e) How Trigonometric interpolation used in Game programming, explain with a suitable example.
(f) Discuss implementation of 3D Shearing and 3D Rotation.

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

(a) Describe various game engine tasks.
(b) How collisions can be implemented in game design, explain with any three tools of collision.
(c) What is texture? Discuss various data resource formats which can be used in Direct3D.
(d) Write the steps to initialize Direct3D.
(e) Explain use of ModernGL as Game development tool in 2D and 3D.
(f) Discuss the use of NumPy in Python for game development.

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

(a) Define function in unity. Which functions can be used in Unity game development?
(b) What is component in Unity? Describe various components used in basic unity game development.
(c) How rotation and scaling operations can be applied on objects in Unity, discuss with examples.
(d) Which rigidbody components are necessary to create realistic physics simulations in Unity? Explain any four in detail.
(e) Describe overview of Unity's UI system.
(f) Write a note on Animation in Unity.

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

(a) Write a short note on Perspective projection.
(b) Consider a vector r has its tail defined by coordinates (x,y) =(1,1) and head by (x',y')=(3,4) .Calculate the magnitude of vector.
(c) Describe any three human interface devices available for gaming purposes.
(d) Write the code to create render target view.
(e) Explain any three game design strategies in Unity.
(f) Discuss use of primitive data types in Unity with example.

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