(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 <u>ANY FOUR</u> from the following:** **(20M)**
(a) Explain in detail the different 2D transformations.
(b) Discuss the concept of Shader Models.
(c) Explain in detail Dot or Scalar product with suitable example.
(d) A point has coordinates in the x, y, z direction i.e., (5, 6, 7). The translation is done in the x-direction by 3 coordinate and y direction 3 coordinates and in the z- direction by 2 coordinates. Shift the object. Find coordinates of the new position.
(e) Define Quaternion. Explain addition and subtraction of two Quaternions.
(f) Explain in detail culling and clipping.

Q. 2 **Attempt <u>ANY FOUR</u> from the following:** **(20M)**
(a) Explain game engine architecture.
(b) Write a short note on multisampling theory.
(c) Discuss the pygame.int() and pygame.display.set_caption() functions in pygame with example
(d) Explain the significance of texture and resource formats in DirectX.
(e) Discuss 2D and 3D game development with MordenGL.
(f) Describe Resource processing and File system in game engine.

Q. 3 **Attempt <u>ANY FOUR</u> from the following:** **(20M)**
(a) Explain the concept of sprites.
(b) Define game engine strategies when working with unity.
(c) How Rigid body components are essential for creating realistic physics simulation in unity? Explain?
(d) Explain about scripting collision events in unity.
(e) Describe the overview of animation in unity.
(f) Explain unity software interface in detail.

Q. 4 **Attempt <u>ANY FIVE</u> from the following:** **(15M)**
(a) How to calculate 2D areas.
(b) Write a short note on depth buffering.
(c) Define class in unity with example.
(d) Describe the steps in perspective projection.
(e) Write advantages and disadvantages of game engine.
(f) Explain conditional statement in unity.

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