C–4590

Sub. Code
82633

B.Sc. DEGREE EXAMINATION, APRIL 2025

Third Semester

Game Programming

GAME ENGINE – I

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A $(10 \times 1 = 10)$

Answer **all** questions.

1. In a 3D game, what is typically included in a "rig"?

   (a) Textures for the model

   (b) The skeleton used for animations

   (c) The game's storyline

   (d) The user interface elements

2. What is the purpose of working in a 3D scene in game development?

   (a) To adjust the game's difficulty

   (b) To manage 2D sprites

   (c) To position and manipulate 3D game objects

   (d) To handle network communications

3. What are prefabs in game development?

(a) Predefined assets that can be reused

(b) Temporary files used during game compilation

(c) Scripts that manage game physics

(d) Sound files for game effects

4. In collision detection, what does a "trigger" refer to?

(a) A script that automatically saves the game

(b) A collider that detects overlap but does not apply physics

(c) An event that starts the game

(d) A method for rendering graphics

5. What is raycasting commonly used for in game development?

(a) Rendering textures

(b) Detecting collisions

(c) Creating animations

(d) Managing user input

6. What type of joint would you use to simulate a door hinge in a 3D physics engine?

(a) Fixed Joint

(b) Hinge Joint

(c) Spring Joint

(d) Slider Joint

7. What does global illumination in rendering typically simulate?

(a) Direct sunlight only

(b) Only artificial light sources

(c) Both direct and indirect lighting

(d) Only ambient light

8. Which of the following effects is commonly achieved using particle systems in games?

(a) Character animation

(b) Physics-based simulations

(c) Lens flare

(d) Smoke and fire effects

9. In networking concepts, what is the role of a server?

(a) To display the game UI

(b) To handle client requests and manage game state

(c) To play background music

(d) To control player animations

10. What does the term "Instantiate" refer to in game development?

(a) Removing an object from the game

(b) Creating an instance of a game object at runtime

(c) Loading the game's main menu

(d) Saving the game state

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Discuss the importance of 3D game objects within a 3D scene. How do they interact with other elements in the game world?

Or

(b) Outline the steps involved in importing a 3D model into a game engine, including considerations for rigging and animations.

12. (a) Discuss the importance of prefabs and tags in game development. Provide examples of their use.

Or

(b) Outline the basic methods used in 3D scripting. How do these methods interact with game objects?

13. (a) Discuss the role of raycasting in navigation and pathfinding within a 3D game environment.

Or

(b) Outline the different types of joints used in 3D physics. Give a brief example of how each type might be used in a game.

14. (a) Discuss the importance of particle effects in games. Provide examples of how particle systems can be used to enhance the visual experience.

Or

(b) Outline the concept of global illumination in rendering. How does it differ from traditional lighting techniques?

15. (a) Discuss the role of information sharing to HUD in games. Provide examples of how HUD elements can improve game play.

Or

(b) Outline the importance of sound and music in game development. How do they contribute to the overall game experience?

Part C $(5 \times 8 = 40)$

Answer **all** questions, choosing either (a) or (b).

16. (a) Describe the workflow of creating and integrating 3D models, rigs, and animations into a game engine. Include details on tools and software commonly used in the industry.

Or

(b) Explore the various aspects of working in a 3D scene in game development. Discuss how developers manage and manipulate game objects, and the impact of these practices on game play and user experience.

17. (a) Explain collision detection and triggers in detail. Discuss how they are implemented in a game engine and provide examples of their use in a 3D game.

Or

(b) Explore the scripting of basic 3D methods in game development. How are these scripts used to control game behaviour, and what are some common challenges faced by developers when scripting in 3D environments?

18. (a) Explain the principles of 3D physics in game development. Discuss how joints are used to create realistic interactions between objects, providing detailed examples of different joint types.

Or

(b) Explore the techniques and algorithms used in navigation and pathfinding for 3D games. How do these techniques ensure that characters move efficiently and realistically within the game world?

19. (a) Investigate the process of rendering to texture in game development. Explain the steps involved and the practical applications of this technique. Provide examples of its use in modern games.

Or

(b) Describe the components and importance of a graphical user interface (GUI) in games. How do developers ensure that the GUI is both functional and aesthetically pleasing?

20. (a) Explore the process of integrating sound and music into a game. Describe the tools and techniques used by developers to create immersive audio experiences and provide examples from popular games.

Or

(b) Analyze the role of the HUD in providing information to players. Discuss the design considerations for ensuring that the HUD is informative without being intrusive and provide examples of well-designed HUDs in games.

———————

C–4591

Sub. Code
82634

B.Sc. DEGREE EXAMINATION, APRIL 2025

Third Semester

Game Programming

ADVANCED GAME MATH AND PHYSICS

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A $(10 \times 1 = 10)$

Answer **all** questions.

1. What is a subspace in the context of vector spaces?

   (a) A space that contains all possible game objects

   (b) A subset of a vector space that is also a vector space

   (c) A coordinate system for 2D games

   (d) A method for rendering game graphics

2. What is the main purpose of affine transformations in game development?

   (a) To generate random numbers

   (b) To manage game resources

   (c) To perform linear transformations and translations

   (d) To create game levels

3. What is the dot product of two vectors primarily used to determine?

(a) The sum of the vectors

(b) The angle between the vectors

(c) The cross product of the vectors

(d) The distance between the vectors

4. Which operation can be used to find a vector perpendicular to two given vectors in 3D space?

(a) Dot product

(b) Addition

(c) Subtraction

(d) Cross product

5. What does Newton's first law of motion state?

(a) $F = ma$

(b) For every action, there is an equal and opposite reaction

(c) An object at rest will stay at rest, and an object in motion will stay in motion unless acted upon by an external force

(d) Energy cannot be created or destroyed

6. In the context of rigid body kinematics, what is the term used to describe the motion of an object without considering the forces that cause the motion?

(a) Dynamics

(b) Statics

(c) Kinetics

(d) Kinematics

7. What is the primary characteristic of deformable bodies in physics?

(a) They do not change shape under any force

(b) They can change shape when subjected to forces

(c) They move with constant velocity

(d) They have infinite mass

8. Which of the following best describes elasticity?

(a) The ability of a material to resist deformation

(b) The force exerted by a material when deformed

(c) The ability of a material to return to its original shape after deformation

(d) The measure of a material's weight

9. In the context of stress and strain, what is strain?

(a) The force applied to a fluid

(b) The deformation caused by applied stress

(c) The pressure of a gas

(d) The temperature change in a fluid

10. What is the primary goal of implementing a simplified 2D model for fluid flow in games?

(a) To increase game resolution

(b) To simulate realistic fluid behavior with less computational complexity

(c) To improve game sound quality

(d) To enhance character animations

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain the importance of understanding different number systems in the context of game mathematics. How do they apply to game development?

Or

(b) Describe how systems of linear equations can be used in game physics. Provide an example to illustrate their application.

12. (a) Explain the basic operations and properties of vectors in the context of game development. How are these operations used in game physics?

Or

(b) Describe the advanced operations and properties of vectors. Provide examples of how these operations can be applied in complex game scenarios.

13. (a) Explain the classification of rigid bodies in the context of game physics. How are different types of rigid bodies used in game simulations?

Or

(b) Describe the principles of rigid body kinematics. How are these principles applied to animate objects in a game?

14. (a) Explain the concept of deformable bodies in game physics. How do they differ from rigid bodies?

Or

(b) Describe the relationship between stress and strain in the context of elasticity. How are these concepts applied in game physics?

15. (a) Discuss the conservation laws relevant to fluid flow. How are these laws applied in the development of fluid simulation models?

Or

(b) Outline the steps involved in implementing a simplified 2D model for fluid flow in a game. What are the key considerations to ensure realistic behavior?

Part C $(5 \times 8 = 40)$

Answer **all** questions, choosing either (a) or (b).

16. (a) Investigate the applications of matrices in game development, focusing on their use in transformations and animations. Provide detailed examples to demonstrate their importance.

Or

(b) Describe the process of performing affine transformations in game development. Explain how these transformations are used to manipulate game objects and enhance gameplay.

17. (a) Investigate the use of vectors in game physics. Explain how vector operations are essential in simulating movement, collision detection, and other physical interactions in games.

Or

(b) Describe the mathematical formulation and application of quaternions in game development. Provide detailed examples of how quaterions are used to achieve smooth and efficient rotations.

18. (a) Investigate the concept of momentum in rigid body dynamics. Explain the conservation of momentum and its applications in game physics, providing detailed examples.

Or

(b) Describe the different forms of energy relevant to rigid body motion. Explain how kinetic and potential energy are used in simulating realistic physical interactions in games.

19. (a) Investigate the properties and applications of elasticity in game physics. Explain how understanding elasticity helps in creating more realistic game environments.

Or

(b) Describe the mathematical modeling of mass-spring systems. Discuss how these systems are used to simulate complex deformations in games.

20. (a) Explore the conservation laws (mass, momentum, and energy) in fluid dynamics. Explain their significance in developing both 2D and 3D fluid simulation models for games.

Or

(b) Analyze the process of implementing simplified 3D models for fluid flow in games. Discuss the challenges involved and the techniques used to balance realism and computational efficiency.

———————

C–4592

Sub. Code
82636

B.Sc. DEGREE EXAMINATION, APRIL 2025

Third Semester

Game Programming

GAME NETWORKING TECHNIQUES

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A $(10 \times 1 = 10)$

Answer **all** questions.

1. The device operates at the Data Link layer of the OSI model and is used to divide a network into segments is

   (a) Hub

   (b) Switch

   (c) Router

   (d) Modem

2. Which of the following is NOT a method of encryption?

   (a) AES

   (b) DES

   (c) RSA

   (d) FTP

3. The primary purpose of a firewall in network security is

   (a) To speed up network performance

   (b) To protect against unauthorized access

   (c) To provide a backup connection

   (d) To detect hardware failures

4. Which wireless security protocol is the most secure among the following?

   (a) WEP

   (b) WPA

   (c) WPA2

   (d) WAP

5. The role of a matchmaking system in a multiplayer game is

   (a) To save the game sate

   (b) To pair players together for a game

   (c) To control NPC behavior

   (d) To manage network resources

6. What term is used to describe characters controlled by the game rather than by players?

   (a) NPCs

   (b) Players

   (c) Hosts

   (d) Clients

7. What does RPC stand for in network communications?

(a) Remote Procedure Call

(b) Real-time Processing Code

(c) Random Packet Collision

(d) Recursive Path Computation

8. What is the main purpose of customizing spawning with authority in a network game?

(a) To improve game graphics

(b) To ensure authorized spawning actions

(c) To enhance sound effects

(d) To manage server load

9. What is the purpose of host migration in a multiplayer game?

(a) To initiate game updates

(b) To transfer the host role to another player

(c) To enhance game security

(d) To manage NPC behaviour

10. Which term describes the functions that handle transitions during host migration?

(a) Network Manager Callbacks

(b) Migration Manager Callbacks

(c) Scene Management

(d) Matchmaking

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Brief about different types of network topologies and their respective advantages and disadvantages.

Or

(b) Explain in detail about the function of a router in a computer network.

12. (a) Discuss in detail about the mechanisms of error detection and correction in data transmission.

Or

(b) Pen down in detail about the differences between WEP, WPA, and WPA2 in terms of security features and vulnerabilities.

13. (a) Discuss in detail about the role of NPCs (Non-Player Characters) in network multiplayer games.

Or

(b) Briefly explain about the importance of network context in multiplayer games.

14. (a) Explain about the concept of matchmaking in multiplayer games.

Or

(b) Explain in detail about the remote procedure calls (RPC) are used in multiplayer games.

15. (a) Discuss in detail about the role of Network Manager Callbacks in a multiplayer game.

Or

(b) Explain in detail about the process of discovering local players in a networked game environment.

Part C $(5 \times 8 = 40)$

Answer **all** questions, choosing either (a) or (b).

16. (a) Explain in detail about various routing algorithms used in computer networks

Or

(b) Discuss in detail about the process of data encoding and decoding in network communications.

17. (a) Elaborate on the OSI model, including the primary functions, protocols, and services

Or

(b) Compare and contrast Bluetooth, Wireless, and mobile networks in terms of their data transmission methods

18. (a) Explain in detail about the challenges and solutions associated with implementing non-player characters

Or

(b) Infer the broad view about the impact of network context on multiplayer games.

19. (a) Explain in detail about the process of setting up a network player in a multiplayer game project.

Or

(b) Pen down in detail about the challenges and techniques involved in game state management for multiplayer games.

20. (a) Discuss in detail about the concept and importance of host migration in multiplayer games.

Or

(b) Explain in detail about the functions and significance of migration manager callbacks in the context of host migration.

———————

C–4593

Sub. Code
82643

B.Sc. DEGREE EXAMINATION, APRIL 2025

Fourth Semester

Game Programming

GAME ENGINE — II

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions.

1. The purpose of the Content Browser is

   (a) Editing the game geometry

   (b) Applying lighting effects

   (c) Managing and organizing assets

   (d) Creating materials

2. What type of object is a Static Mesh?

   (a) A texture that glows

   (b) A movable object in the scene

   (c) A 3D model that does not animate

   (d) A lighting effect

3. What type of map is used to create terrains in game engines?

(a) Emissive Map

(b) Height Map

(c) Diffuse Map

(d) Opacity Mask

4. What does Vertex Painting allow you to do?

(a) Apply video textures

(b) Paint textures directly onto meshes

(c) Create destructible objects

(d) Animate characters

5. What does AI stand for in game development?

(a) Artificial Input

(b) Animated Interface

(c) Artificial Intelligence

(d) Active Interaction

6. What is the function of HUD in a game?

(a) To create 3D models

(b) To display health and other in-game information

(c) To manage game sounds

(d) To edit landscapes

7. Which feature is commonly used in side-scroller games?

(a) Dynamic lighting

(b) AI roaming

(c) Teleporting players

(d) Side scroller mechanics

8. What type of game play element is a “Countdown Timer”?

(a) A health regeneration system

(b) A timed gameplay challenge

(c) An enemy AI behavior

(d) A visual effect

9. Which tool is used to decorate game levels with assets?

(a) Transform Tools

(b) Foliage Editor

(c) Content Browser

(d) Structural Meshes

10. What is an Ability Popup Message used for in a game?

(a) To save the game

(b) To inform the player about new abilities

(c) To create enemy behaviors

(d) To adjust game settings

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Brief about different the role of the Content Browser in managing assets.

Or

(b) Explain in detail about BSP Surfaces and Static Meshes.

12. (a) Discuss in detail about the Foliage Editor and its functionalities.

Or

(b) Pen down in detail about Decals and Opacity Masks.

13. (a) Discuss in detail about the process of setting up AI behaviors using Blueprints.

Or

(b) Briefly explain about the importance of a Main Menu in a game.

14. (a) Explain about the mechanics of a Side Scroller game.

Or

(b) Explain in detail about the process of creating special abilities like Speed Boost or Slow Motion in a game.

15. (a) Discuss in detail about the role of Structural Meshes in level design.

Or

(b) Explain in detail about the purpose of Popup Messages in a game.

Part C $(5 \times 8 = 40)$

Answer **all** questions, choosing either (a) or (b).

16. (a) Explain in detail about the importance of Primitive Geometry and Geometry Editing in the early stages of game development.

Or

(b) Discuss in detail about the functionality of the Content Browser in a game engine.

17. (a) Elaborate on the functionalities of the Foliage Editor and how it enhances environmental storytelling.

Or

(b) Discuss in detail about the applications and benefits of Decals and Opacity Masks in game development.

18. (a) Explain in detail about the methods for setting up complex AI behaviors using Blueprints.

Or

(b) Infer the broad view about the steps to create a fully functional Main Menu and Pause Menu in a game.

19. (a) Explain in detail about the mechanics of a Side Scroller game, focusing on player controls, level design

Or

(b) Pen down in detail about the creation and balancing of special abilities like Speed Boost, Gravity Boost.

20. (a) Discuss in detail about the use of Structural Meshes in creating detailed and immersive game levels.

Or

(b) Explain in detail about the implementation of ability popup messages and animated UI elements.

———————

C–4594	Sub. Code
	82644

B.Sc. DEGREE EXAMINATION, APRIL 2025

Fourth Semester

Game Programming

WEB GAME DEVELOPMENT

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A $(10 \times 1 = 10)$

Answer **all** questions.

1. The main difference between SVG and Canvas in HTML5 is

   (a) VG is pixel-based, Canvas is vector-based

   (b) SVG retains quality on scaling, Canvas does not

   (c) Canvas uses XML, SVG does not

   (d) Canvas is resolution-independent, SVG is not

2. Which of the following is the correct HTML5 doctype declaration?

   (a) <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01//EN">

   (b) <!DOCTYPE html>

   (c) <!DOCTYPE HTML5>

   (d) <!DOCTYPE HTML SYSTEM "about:legacycompat">

3. Which of the following is a JavaScript framework?

(a) HTML (b) CSS

(c) Angular (d) SQL

4. What event is triggered when a user submits a form in HTML?

(a) onsubmit (b) onchange

(c) onclick (d) onload

5. In canvas game development, what is used to handle sprite animations?

(a) SS Animations

(b) Sprite Sheets

(c) DOM Manipulations

(d) JSON Objects

6. Which method is used to draw a rectangle on a canvas in HTML5?

(a) canvas.drawRect( )

(b) context.drawRect( )

(c) context.fillRect( )

(d) canvas.flllRect( )

7. What is used to keep track of player health in a game?

(a) Game Timer (b) Scoreboard

(c) HUD Elements (d) Event Listeners

8. What is the primary purpose of collision detection in games?

(a) To update the game score

(b) To detect when game objects intersect

(c) To render graphics

(d) To handle user input

9. What is the purpose of asynchronous web page updates in a game?

(a) To pause the game

(b) To update the game state without reloading the page

(c) To load new game levels

(d) To handle player input

10. Which JavaScript library is used for 2D physics simulations in web games?

(a) jQuery (b) D3.js

(c) Box2D (d) React.js

Part B $(5 \times 5 = 25)$

Answer **all** questions, choosing either (a) or (b).

11. (a) Brief about different the features and attributes of the <video> tag in HTML5.

Or

(b) Compare and contrast SVG and Canvas in HTML5.

12. (a) Discuss in detail about he process of form validation using JavaScript.

Or

(b) Pen down in detail about the overview of JavaScript frameworks.

13. (a) Discuss in detail about the role of event handling in interactive web pages.

Or

(b) Briefly explain about the concept of sprite animations in Canvas game development.

14. (a) Explain about the implementation of player movement in a web-based game.

Or

(b) Explain in detail about the techniques used for collision detection in games.

15. (a) Discuss in detail about the Debug Draw feature in Box2D and its significance.

Or

(b) Explain in detail about the concept of asynchronous web page updates.

Part C (5 × 8 = 40)

Answer **all** questions, choosing either (a) or (b).

16. (a) Explain in detail about the HTML5 Canvas element and its significance in modem web development.

Or

(b) Discuss in detail about the properties and usage of the <video> and <audio> tags in HTML5.

17. (a) Elaborate on the Document Object Model (DOM) and its importance in web development.

Or

(b) Discuss in detail about the concept of asynchronous programming in JavaScript, focusing on callback functions.

18. (a) Explain in detail about the process of JSON parsing and data manipulation in JavaScript.

Or

(b) Infer the broad view about the concept of sprite animadons in Canvas-based game development.

19. (a) Explain in detail about the mechanics of player movement in a 2D web-based game.

Or

(b) Pen down in detail about various collision detection techniques used in game development.

20. (a) Discuss in detail about the Debug Draw feature in Box2D and its importance for game development and debugging.

Or

(b) Explain in detail about the concept of asynchronous web page updates in the context of web games.

———————

C–4595

Sub. Code
82646

B.Sc. DEGREE EXAMINATION, APRIL 2025

Fourth Semester

Game Programming

MOBILE GAME DEVELOPMENT

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A $(10 \times 1 = 10)$

Answer **all** questions.

1. Which of the following is not a primitive data type in Java?
   (a) int (b) float
   (c) string (d) char

2. Which keyword is used to refer to the current object within an instance method or a constructor?
   (a) this (b) super
   (c) current (d) self

3. Which method is used to start a thread in Java?
   (a) run() (b) execute()
   (c) start() (d) begin()

4. What is the main purpose of synchronization in Java?
   (a) To ensure a method runs faster
   (b) To prevent memory leaks
   (c) To control the access of multiple threads to shared resources
   (d) To simplify the thread implementation

5. Which tool is typically used to run applications in a simulated environment during development?

(a) Emulator (b) Compiler

(c) Assembler (d) Debugger

6. In Android development, what is an Activity?

(a) A background process that can run indefinitely

(b) A single screen with a user interface

(c) A component that manages data storage

(d) A tool for parsing external files

7. Which of the following is used to handle touch input in a game?

(a) Gesture Listener (b) Input Processor

(c) Spritebatch (d) Viewport

8. What does a Texture Atlas do in game development?

(a) Manages game levels

(b) Combines multiple images into a single image to optimize rendering

(c) Handles sound effects

(d) Manages game physics

9. What is a Particle Effect used for in games?

(a) To handle user input

(b) To simulate visual effects like explosions, smoke, or fire

(c) To manage game levels

(d) To control the game camera

10. Which class would you use to detect and respond to touch events in a game?

(a) Touch Processor (b) Input Manager

(c) Gesture Listener (d) Event Handler

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Brief about different the different types of arrays in Java

Or

(b) Explain in detail about the purpose of wrapper classes in Java.

12. (a) Discuss in detail about the concept of synchronization in multithreading.

Or

(b) Pen down in detail about the exception handling mechanism in Jav.

13. (a) Discuss in detail about the importance of views and layouts in mobile application development.

Or

(b) Briefly explain about the build tools in mobile development.

14. (a) Explain about the Texture Atlas.

Or

(b) Explain in detail about the importance of handling input in game development.

15. (a) Discuss in detail about the concept of particle effects in game development.

Or

(b) Explain in detail about the steps involved in developing a complete game.

Part C (5 × 8 = 40)

Answer **all** questions, choosing either (a) or (b).

16. (a) Explain in detail about the concept of type casting in Java.

Or

(b) Discuss in detail about the different types of constructors with examples.

17. (a) Elaborate on the differences between extending the Thread class and implementing the Runnable interface for creating threads in Java.

Or

(b) Discuss in detail about how synchronization is achieved using synchronized methods and blocks.

18. (a) Explain in detail about the process of running and testing mobile applications using emulators.

Or

(b) Infer the broad view about the importance of views and layouts in mobile application development.

19. (a) Explain in detail about the purpose of a camera in game development.

Or

(b) Pen down in detail about the process of handling input in game development.

20. (a) Discuss in detail about the integration of a physics engine into a game.

Or

(b) Explain in detail about the comprehensive process of developing a complete game.