

C-6173

Sub. Code

82623

B.Sc. DEGREE EXAMINATION, APRIL 2022

Second Semester

Game Programming

ALGORITHMS AND DATA STRUCTURE

(2019 onwards)

Duration : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. Define Algorithm.
2. Define “Big oh”.
3. Define string.
4. What is sort?
5. What is array?
6. What is the maximum height of an AVL tree with p nodes?
7. What is Dynamic programming.
8. What is Binary?
9. Define subset sum.
10. Define the term “row mask”.

Part B

(5 × 5 = 25)

Answer **all** questions.

11. (a) Describe the fundamental steps to solve an algorithm.

Or

- (b) Explain about algorithm in computing.

12. (a) How would you differ between selection sort and Bubble sort? Explain in detail.

Or

- (b) Describe Quick sort.

13. (a) Illustrate the Decrease and conquer.

Or

- (b) Explain the functions of Insertion sort.

14. (a) How to Computing a Binomial coefficient? Explain in detail.

Or

- (b) Exemplify the Optimal Binary search trees.

15. (a) Describe the efficient backtracking approach using Bit masking.

Or

- (b) Explain the Assignments problems.

Part C

(3 × 10 = 30)

Answer **all** questions.

16. (a) Explain the Asymptotic notations and basic efficiency classes.

Or

- (b) Write detail about Algorithm Visualization.

17. (a) Explain detail about Transform and Conquer.

Or

- (b) Write the functions of AVL Tress.

18. (a) Write detail about Greedy Technique.

Or

- (b) Explain the functions of Insertion sort.

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82624

B.Sc. DEGREE EXAMINATION, APRIL 2022

Second Semester

Game Programming

GAME MATHS AND PHYSICS

(2019 onwards)

Duration : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What is Linear Algebra?
2. Define Matrices.
3. Define Rotation Matrices.
4. What is Vectors?
5. Define Rigid Body
6. What is Physics?
7. Define Deformable Bodies.
8. What are Mass spring systems?
9. Define Fluids and Gases.
10. What is Fluid Flow?

Part B

(5 × 5 = 25)

Answer **all** questions.

11. (a) Elaborate the Vector spaces.

Or

- (b) Write short note on Affine Algebra.

12. (a) Explain detail about Interpolation of Quaternions.

Or

- (b) Describe the classical approach.

13. (a) Write a short note on Rigid Body Kinematics.

Or

- (b) What is Newtonian Dynamics? Explain in detail.

14. (a) Describe Control point deformation.

Or

- (b) Explain the Free Form Deformation.

15. (a) Explain the Conservation laws.

Or

- (b) Describe Vector calculus.

Part C

(3 × 10 = 30)

Answer **all** questions.

16. (a) Write a brief note on Barycentric Coordinates.

Or

- (b) Write a brief note on Derivatives of Time-Varying quaternions.

17. (a) Explain detail about Lagrangian Dynamics.

Or

(b) Write a brief note on implicit surface deformation.

18. (a) Explain detail about Implementing the simplified 3D model.

Or

(b) Write a brief note on variations of the simplified Model.

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Sub. Code

82625

B.Sc. DEGREE EXAMINATION, APRIL 2022

Second Semester

Game Programming

2D GRAPHICS PROGRAMMING

(2019 onwards)

Duration : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. Define Vector Graphics.
2. What is Vertex?
3. Define vertex buffer.
4. What is color?
5. What is scale matrix?
6. Define virtual camera.
7. What it is 2D animation?
8. Define Sprite sheets.
9. What is photorealistic?
10. Define Texture.

Part B

(5 × 5 = 25)

Answer **all** questions.

11. (a) What is Graphics programming? Explain in detail.

Or

(b) Describe Drawing a Quad.

12. (a) Write about index buffer.

Or

(b) Describe vertex buffer.

13. (a) Write short note about Translate Matrix.

Or

(b) Describe the Scale Matrix.

14. (a) Explain the significant of UV coordinates.

Or

(b) Write a short note about Sprite animation.

15. (a) Describe rendering fonts.

Or

(b) Explain detail the Dynamics of Particle system.

Part C

(3 × 10 = 30)

Answer **all** questions.

16. (a) Write an essay about Graphics programming pipeline.

Or

- (b) Write detail note on Various API in graphics programming.

17. (a) Elaborate the different types of Buffers.

Or

- (b) Write detail note on rendering pipeline.

18. (a) Explain detail about the best practices of graphical renders in games.

Or

- (b) Explain the various camera operations in detail.
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82632

B.Sc. DEGREE EXAMINATION, APRIL 2022.

Third Semester

Game Programming

3D GRAPHICS PROGRAMMING

(2019 onwards)

Duration : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What is 3D model?
2. How to control the player movement in 3D model?
3. What is AABB?
4. Define bounding tree.
5. Give the basics of camera,
6. What is mouse picking?
7. What is the purpose of blend map?
8. What is Fog?
9. What is rendering?
10. What is shadow?

Part B

(5 × 5 = 25)

Answer **all** questions.

11. (a) Explain the application of 3D graphics.

Or

- (b) How to create a simple terrain with suitable example?

12. (a) Explain the bounding tree.

Or

- (b) Describe the occlusion detection in detail.

13. (a) Discuss the characteristics of camera.

Or

- (b) Write note on zoom and rotate operation in camera.

14. (a) Describe the lighting in detail.

Or

- (b) Explain the purpose of shader in graphic programming.

15. (a) What is anisotropic filtering? Explain in detail.

Or

- (b) Briefly explain the 3D particle effect.

Part C

(3 × 10 = 30)

Answer **all** questions.

16. (a) Write a program for rotating cube, with player movement.

Or

- (b) Explain 3D transformations with their matrix representations.

17. (a) Explain the concept of free camera of an imaging system. Also derive the expression for angle of view.

Or

- (b) Describe the phong lighting model. Also, indicate advantages and disadvantages.

18. (a) Explain the various methods of ray casting.

Or

- (b) With neat diagram, explain the components of 3D graphic system.
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82634

B.Sc. DEGREE EXAMINATION, APRIL 2022.

Third Semester

Game Programming

GAME ENGINE - I

(2019 onwards)

Duration : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. Compare 2D and 3D game.
2. What is 3D animation?
3. What is terrain design?
4. What is profiler window?
5. What is rendering?
6. What are the generic functions?
7. List the types of joints.
8. What is GUI?
9. How to optimize the memory?
10. What is spawning?

Part B

(5 × 5 = 25)

Answer **all** questions.

11. (a) Explain the various types of meshes.
Or
(b) Elaborate the 3D game development.
12. (a) Describe how to set up game environment.
Or
(b) Explain the collision detection.
13. (a) Explain the namespace.
Or
(b) Discuss the various colliders.
14. (a) Discuss the properties of flexible camera.
Or
(b) Explain the importance of lighting.
15. (a) Explain the basics of UI layout.
Or
(b) Highlight the network concept.

Part C

(3 × 10 = 30)

Answer **all** questions.

16. (a) Explain in detail the 3D game development concept with a suitable example.
Or
(b) Explain in detail the terrain design with example.

17. (a) Discuss the behavior of controlled game in detail.

Or

(b) Explain the importance of animation in game development.

18. (a) Explain the importance of camera and lighting in game.

Or

(b) Explain the various platform to build a game.

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Sub. Code

82642

B.Sc. DEGREE EXAMINATION, APRIL 2022.

Fourth Semester

Game Programming

WEB GAME PROGRAMMING

(2019 onwards)

Duration : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. Differentiate HTML 4 and HTML 5?
2. What is the use of cite tag in HTML5?
3. What is meant by callback function?
4. Explain one dimensional array with an example?
5. What is meant by JSON parsing?
6. What is meant by sprite?
7. Explain the usage of is Point in Path function?
8. Explain the types of gradient in canvas?
9. Explain asynchronous web page?
10. Explain the usage of timer function?

Part B

(5 × 5 = 25)

Answer **all** questions.

11. (a) Explain the audio and video tag with example script along with the controls.

Or

- (b) Write the syntax to draw a filled and stroke rectangle and explain the parameters used.

12. (a) Explain two dimensional array with an example.

Or

- (b) Explain polymorphism in JavaScript with proper example.

13. (a) Explain XML parsing with an example.

Or

- (b) Write the three methods for loading images and explain the parameters used in canvas with example.

14. (a) Explain circle collision detection with example.

Or

- (b) How to implement timer in games with an example?

15. (a) Explain request animation frame and its usage with example.

Or

- (b) Explain the predefined functions for box2d.

Part C

(3 × 10 = 30)

Answer **all** questions.

16. (a) Explain any five JavaScript frameworks in detail.

Or

- (b) Develop a block diagram of a sample web page which includes header, nav, article, section, aside and footer tags and explain each of them in detail.

17. (a) Explain circle and rectangle collision detection with example.

Or

- (b) Implement the mouse event (mousedown, mousemove and mouseout) for moving an image to inside the canvas with proper example.

18. (a) Explain sprite animation with proper example demonstrating the sprite moving from left to right and vice versa.

Or

- (b) Explain the player movement inside the canvas with proper example.

C-6183

Sub. Code

82655A

B.Sc. DEGREE EXAMINATION, APRIL 2022

Fifth Semester

Game Programming

SHADER PROGRAMMING

(2019 onwards)

Duration : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What is Gouraud Shading?
2. What is real-time rendering?
3. Define Uniform Variables
4. Define Camera space
5. Explain standard shader lighting model.
6. What is diffuse reflection?
7. Define Stencil.
8. Define mipmap.
9. How does gamma correction technique work?
10. What is Advanced High-Quality filtering?

Part B

(5 × 5 = 25)

Answer **all** questions.

11. (a) Write a note on GLSL.

Or

(b) Write an overview of GPU operation while handling shaders.

12. (a) Explain the Identity matrix and scaling matrices.

Or

(b) Write the step by step process to draw a colored cube.

13. (a) Explain how to create a custom diffuse lighting model.

Or

(b) What is Ambient Lighting?

14. (a) Explain View Frustum.

Or

(b) Explain the difference between eye space and texture space.

15. (a) What is the difference between a bump map and a normal map?

Or

(b) Explain reflection mapping and its types.

Part C

(3 × 10 = 30)

Answer **all** questions.

16. (a) Explain the changes that have happened in OpenGL since its inception.

Or

- (b) What are the differences between Shader models (HLSL) and shaders versions (GLSL)?

17. (a) Explain the following

- (i) The model matrix
- (ii) View matrix
- (iii) The projection matrix
- (iv) Depth buffering

Or

- (b) Write an essay on Phong specular lighting, used in many applications from games to movies.

18. (a) How to use cube mapping to create an environment? Explain.

Or

- (b) Explain the theoretical and practical implementation of bloom effect in games.

C-6184

Sub. Code

82655B

B.Sc. DEGREE EXAMINATION, APRIL 2022

Fifth Semester

Game Programming

GAME ENGINE ARCHITECTURE

(2019 onwards)

Duration : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What is cinematics?
2. What is called middleware?
3. What is the use of biomechanical character models in game development?
4. Define memory management.
5. Define the game's HUD.
6. Write about split-screen multiplayer games.
7. What is called surface luminance?
8. Explain the technique inverse kinematics.
9. Differentiate player and enemy behaviour.
10. What is called bucketed updates?

Part B

(5 × 5 = 25)

Answer **all** questions.

11. (a) How to handle exceptions/errors in a game?

Or

- (b) Write about background error correction.

12. (a) What is the role of the rendering engine?

Or

- (b) What is called event loops?

13. (a) Write about Intel's VTune.

Or

- (b) Write about Asset Conditioning Pipeline.

14. (a) What is called event-driven code?

Or

- (b) What is state in the context of stent?

15. (a) Explain manipulation rules of gameplay.

Or

- (b) Explain the flow states in game.

Part C

(3 × 10 = 30)

Answer **all** questions.

16. (a) Write an essay on massive multiplayer online games and its technology requirements.

Or

- (b) Give overview of multithreaded game engine architectures.

17. (a) Describe the essential use of maths used in 3D game engine programming.

Or

(b) Write an essay on Digital Content Creation tools (DDC).

18. (a) Explain the following

- (i) game object
- (ii) animation transitions
- (iii) state machine
- (iv) navigation and
- (v) play mode.

Or

(b) How to make a large open-world game using map streaming? Explain.

C-6185

Sub. Code

82655C

B.Sc. DEGREE EXAMINATION, APRIL 2022

Fifth Semester

Game Programming

EMERGING TRENDS

(2019 onwards)

Duration : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What are Three-dimensional rotation matrices?
2. Define monocular image.
3. What are the benefits of omnidirectional cameras?
4. Define triangulation.
5. What is called a preimage?
6. What does a quaternion represent?
7. Define optical filter.
8. Explain the optical illusion called beta movement.
9. What is the use of Head-mounted displays?
10. What is data management and analytics?

Part B

(5 × 5 = 25)

Answer **all** questions.

11. (a) What does yaw stand for? What symbol is used for? What does a Yaw rate sensor measure?

Or

- (b) Draw and explain a third-person perspective of a VR system.

12. (a) Write about augmented reality.

Or

- (b) How multiple viewports can be used to display different sections of a scene at different screen positions? Explain.

13. (a) How to identify a homogeneous transformation matrix? Explain.

Or

- (b) Write a note on Perspective-n-point.

14. (a) What is luminous intensity? How to measure it?

Or

- (b) What are the differences between large-scale location recognition and face matching techniques? Explain.

15. (a) Write a note on real-time hybrid tracking using edge and texture information.

Or

- (b) Write about the security issues on M2M communication.

Part C

(3 × 10 = 30)

Answer **all** questions.

16. (a) Explain how top-down control of sensory information is processed and distributed throughout the brain.

Or

- (b) Write an essay on Inertial Measurement Unit (IMU) originally designed for aircraft navigation which gives orientation stability in birds-eye view tracking hardware.
17. (a) Write about the process of removing the explicit orthogonality constraint in canonical views.

Or

- (b) Explain motion detection and tracking using the 3D-camera.
18. (a) ORB is an efficient alternative to SIFT or SURF - Justify.

Or

- (b) Write an essay on Smart Grid, Smart Energy: Benefits of IoT monitoring and regulation.

C-5664

Sub. Code

**16/17/23/25/
26/27/29**

**Common for All U.G. B.Sc./B.B.A. DEGREE
EXAMINATION, APRIL 2022**

First/Second Semester

ENVIRONMENTAL STUDIES

(2019/2020 onwards)

Duration : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** the questions.

1. ZSI.
2. WII.
3. What is renewable energy?
4. Food web.
5. Pyramid of numbers in aquatic ecosystem.
6. Red data book.
7. List out any five Endemic species of India.
8. List out marine pollutants.
9. *Ex Situ* Conservation.
10. Enlist Option Values of Biodiversity.

Part B

(5 × 5 = 25)

Answer **all** the questions.

11. (a) Write notes on definition, scope and importance of environmental studies.

Or

- (b) Write notes on soil erosion and desertification.

12. (a) Write notes on energy flow in the ecosystem.

Or

- (b) Write notes on threads to biodiversity.

13. (a) Write notes on Biodiversity at Global, National and Local levels.

Or

- (b) Write notes on various strategies of conservation of Biodiversity.

14. (a) Write notes on ecological pyramids.

Or

- (b) Write notes on air pollution.

15. (a) Write notes on noise pollution.

Or

- (b) Write notes on effects and control measures of nuclear hazards.

Part C

(3 × 10 = 30)

Answer **all** questions.

16. (a) Write an essay on the multidisciplinary nature of Environmental Studies.

Or

- (b) Write an essay on the following resources with special emphasis to how they are overexploited/utilized which in turn damage the environment, (i) Forest Resources and (ii) Food Resources.

17. (a) Write an essay on “India is a mega-diversity nation”.

Or

- (b) Write an essay on Biodiversity and their values.

18. (a) Write an essay on causes, effects and control measures of (i) Marine Pollution and (ii) Water Pollution.

Or

- (b) Write an essay on concept, structure and function of ecosystem.