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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

MCA (Integrated)

SEM: VI - THEORY EXAMINATION (2024 - 2025)

Subject: Computer Graphics and Multimedia

Time: 3 Hours

Max. Marks: 100

General Instructions:

IMP: Verify that you have received the question paper with the correct course, code, branch etc.

1. This Question paper comprises of three Sections -A, B, & C. It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.

2. Maximum marks for each question are indicated on right -hand side of each question.

3. Illustrate your answers with neat sketches wherever necessary.

4. Assume suitable data if necessary.

5. Preferably, write the answers in sequential order.

6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION-A

20

1. Attempt all parts:-

- 1-a. What is the main purpose of computer graphics? [CO1] [K1] 1
- (a) Data compression
 - (b) Image processing
 - (c) Visual representation of data
 - (d) File management
- 1-b. Which algorithm is used for drawing a straight line in computer graphics? [CO1] [K3] 1
- (a) Midpoint Algorithm
 - (b) Dijkstra's Algorithm
 - (c) Bresenham's Algorithm
 - (d) Scan-Line Algorithm
- 1-c. Which step is first in the 2D viewing pipeline? [K2][CO2] 1
- (a) Modeling Transformation
 - (b) Clipping
 - (c) Display Mapping
 - (d) Projection
- 1-d. Shear transformation affects the object's [K1][CO2] 1
- (a) Color
 - (b) Shape

- (c) Texture
- (d) Size
- 1-e. What is the primary reason to use the Z-buffer technique? [CO3] [K1] 1
- (a) To store depth values
- (b) To store color values
- (c) To store texture information
- (d) To store polygon data
- 1-f. Classify the spline type that offers local control over curve shaping. [CO3] [K2] 1
- (a) Bezier
- (b) B-spline
- (c) Interpolation spline
- (d) Cubic Hermite spline
- 1-g. Which of the following is a standard video compression format? [CO4] [K1] 1
- (a) MPEG
- (b) MIDI
- (c) GIF
- (d) PNG
- 1-h. Evaluate the best format for streaming video online. [CO4] [K5] 1
- (a) MP4
- (b) BMP
- (c) DOCX
- (d) TIFF
- 1-i. What is the main goal of data compression?[CO5][K1] 1
- (a) Reduce storage space
- (b) Increase noise
- (c) Add redundancy
- (d) Encrypt data
- 1-j. Which type of coding is entropy coding?[CO5][K1] 1
- (a) Lossless
- (b) Lossy
- (c) Predictive
- (d) Transform
2. Attempt all parts:-
- 2.a. What is the function of a refresh buffer?[CO1][K2] 2
- 2.b. Define translation in 2D transformation. [CO2][K1] 2
- 2.c. B-splines are characterized by which main property? [CO3] [K2] 2
- 2.d. How does audio contribute to multimedia? [CO4] [K2] 2

2.e. What is the role of quantization in JPEG? [K2][CO5] 2

SECTION-B 30

3. Answer any five of the following:-

3-a. Describe the Digital Differential Analyzer (DDA) algorithm.[CO1][K3] 6

3-b. Explain the concept of scan conversion.[CO1][K2] 6

3-c. Explain the role of the viewing pipeline in 2D viewing. [CO2][K3] 6

3-d. Explain the mathematical representation of reflection transformation. [CO2][K3] 6

3.e. How do homogeneous coordinates help in 3D transformations? [CO3] [K2] 6

3.f. Describe the process of digitizing analog sound. [CO4] [K2] 6

3.g. Justify the use of MPEG for video compression. [CO5] [K5] 6

SECTION-C 50

4. Answer any one of the following:-

4-a. Discuss raster scan display and how it differs from vector scan display. [CO1] [K2] 10

4-b. Consider three different raster systems with resolutions of 640 x 480, 1280 x 1024 and 2560 x 2048. what size of frame buffer(in bytes) is needed for each of these systems to store 12 bits per pixel?? How much storage is required for each system if 24 bits per pixel are to be stored?[K2],[CO1] 10

5. Answer any one of the following:-

5-a. Justify the use of window-to-viewport mapping in the graphics rendering process. [CO2][K5] 10

5-b. Describe the Cohen-Sutherland line clipping algorithm and discuss its advantages. [CO2][K2] 10

6. Answer any one of the following:-

6-a. Explain how the scan-line algorithm works in visible surface detection, including its approach to processing horizontal lines and determining which surfaces are visible. [CO3] [K2] 10

6-b. Compare object-based and image-based methods for visible surface detection, explaining the advantages and disadvantages of each approach in terms of rendering efficiency. [CO3] [K2] 10

7. Answer any one of the following:-

7-a. Explain the concept of animation in multimedia and describe different types of animation methods such as traditional animation, 2D animation, and 3D animation. Discuss the tools and software used for creating each type of animation. [CO4] [K2] 10

7-b. Discuss the ethical considerations in multimedia design. Explain how designers can avoid misleading representations in digital images, videos, and animations. Address issues such as consent, privacy, and the responsibility of multimedia creators. [CO4] [K4] 10

8. Answer any one of the following:-

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| 8-a. | Describe the difference between lossless and lossy data compression techniques with suitable examples. [CO5] [K1] | 10 |
| 8-b. | What is Huffman coding? Explain the steps involved in constructing a Huffman tree with an example. [CO5] [K1] | 10 |

REG:JAN_JUN-2025