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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 (2025 - 2026)

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:-

(1.1) What is the primary goal of computer graphics. (CO1, K1)

1

- (a) Perform calculations
- (b) Display visual information
- (c) Store data
- (d) Manage networks

(1.2) Raster scan displays refresh rate is. (CO1, K1)

1

- (a) 60 Hz
- (b) 30 Hz
- (c) 10 Hz
- (d) 120 Hz

(1.3) Identify homogeneous coordinate of (x,y). (CO2,K2)

1

- (a) (x,y)
- (b) (1,x,y)
- (c) (x,y,0)
- (d) (x,y,1)

(1.4) Apply viewport mapping from (0-5) to (0-10). (CO2,K3)

1

- (a) 1
- (b) 2
- (c) 5
- (d) 10

(1.5) What does the plane equation $Ax + By + Cz + D = 0$ represent in 3D space.

1

(CO3,K2)

- (a) A line
- (b) A point
- (c) A plane in 3D
- (d) A curve

- (1.6) Select the property of B-spline curves allows local modification without affecting entire curve. (CO3,K4) 1
- (a) Global control
 - (b) Rigid control
 - (c) Local control
 - (d) No control
- (1.7) Select the software is essential for editing video content. (CO4,K1) 1
- (a) Compiler
 - (b) Assembler
 - (c) Video editing software
 - (d) Database
- (1.8) Select the technique reduces bandwidth usage in video streaming. (CO4,K3) 1
- (a) Compression
 - (b) Encryption
 - (c) Formatting
 - (d) Expansion
- (1.9) Entropy is highest when data is: (CO5,K4) 1
- (a) Repeated
 - (b) Predictable
 - (c) Constant
 - (d) Completely random
- (1.10) Select the method reduces temporal redundancy in video. (CO5,K4) 1
- (a) MPEG
 - (b) Huffman
 - (c) Run-length
 - (d) JPEG

2. Attempt all parts:-

- (2.1) State the purpose of interactive graphics systems. (CO1, K1) 2
- (2.2) Analyze the difference between scaling and shear transformations. (CO2,K4) 2
- (2.3) Define 3-D transformation. (CO3,K1) 2
- (2.4) Define multimedia devices and state one example. (CO4,K1) 2
- (2.5) Describe lossless JPEG mode and analyze its applications. (CO5,K4) 2

SECTION-B

30

Answer any one of the following:-

- (3.1) Analyze the differences between CRT and LCD monitors in terms of performance 6

	and efficiency. (CO1, K4)	
(3.2)	Apply DDA algorithm to draw a line from (0, 0) to (6, 4) showing all steps. (CO1, K3)	6
Answer any one of the following:-		
(3.3)	Apply Cohen-Sutherland algorithm to determine visibility of line segment within window. (CO2,K3)	6
(3.4)	Explain homogeneous coordinate system and its advantages. (CO2,K2)	6
Answer any one of the following:-		
(3.5)	Analyze the advantages and limitations of polygon surface representation in complex modeling. (CO3,K4)	6
(3.6)	Explain spline representation and illustrate its significance in curve modeling. (CO3,K2)	6
Answer any one of the following:-		
(3.7)	Explain five multimedia devices that are commonly used in everyday real-life situations (CO4,K2)	6
(3.8)	Classify different animation techniques and demonstrate their applications. (CO4,K3)	6
Answer any one of the following:-		
(3.9)	Analyze techniques used to minimize storage requirements in image and video data. (CO5,K4)	6
(3.10)	Explain JPEG image preparation steps and analyze their significance. (CO5,K4)	6
SECTION-C		50
4. Answer any <u>one</u> of the following:-		
(4.1)	Explain the concepts and major applications of computer graphics in different domains with suitable examples. (CO1, K2)	10
(4.2)	Explain random scan display system with working principle and limitations. (CO1, K2)	10
5. Answer any <u>one</u> of the following:-		
(5.1)	Analyze reflection and shear transformations with respect to shape distortion and orientation. (CO2,K4)	10
(5.2)	Apply Cohen-Sutherland algorithm to determine clipping result of a given line segment. (CO2,K3)	10
6. Answer any <u>one</u> of the following:-		
(6.1)	Demonstrate the effect of control point manipulation on Bezier curve shape and analyze its design flexibility. (CO3,K4)	10
(6.2)	Explain 3D transformations (translation, scaling, rotation) using matrix formulation and apply them to transform a 3D object. (CO3,K3)	10
7. Answer any <u>one</u> of the following:-		
(7.1)	Explain multimedia devices and analyze their role in capturing, processing, and presenting multimedia data. (CO4,K4)	10
(7.2)	Analyze the role of keyframes and in-between frames in producing smooth animation. (CO4,K4)	10

8. Answer any one of the following:-

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| (8.1) | Explain storage space requirements in multimedia systems and analyze techniques used to reduce data size. (CO5,K4) | 10 |
| (8.2) | Describe lossy sequential DCT-based JPEG mode and demonstrate each stage of the compression process. (CO5,K3) | 10 |

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