

### A10.3-R3: COMPUTER GRAPHICS

**NOTE:**

1. There are **TWO PARTS** in this Module/Paper. **PART ONE** contains **FOUR** questions and **PART TWO** contains **FIVE** questions.
2. **PART ONE** is to be answered in the **TEAR-OFF ANSWER SHEET** only, attached to the question paper, as per the instructions contained therein. **PART ONE** is **NOT** to be answered in the answer book.
3. Maximum time allotted for **PART ONE** is **ONE HOUR**. Answer book for **PART TWO** will be supplied at the table when the answer sheet for **PART ONE** is returned. However, candidates, who complete **PART ONE** earlier than one hour, can collect the answer book for **PART TWO** immediately after handing over the answer sheet for **PART ONE**.

**TOTAL TIME: 3 HOURS**

**TOTAL MARKS: 100**  
**(PART ONE – 40; PART TWO – 60)**

**PART ONE**  
**(Answer all the questions)**

1. **Each question below gives a multiple choice of answers. Choose the most appropriate one and enter in the “tear-off” answer sheet attached to the question paper, following instructions therein. (1 x 10)**
  - 1.1 The use of lookup tables in display monitor is to:
    - A) increase the resolution of the picture on the screen
    - B) increase the range of colour shades
    - C) provide a variety of colour palettes but number of available colours remain same
    - D) store the colour information of the picture
  - 1.2 The format for storing digital audio in multimedia applications is:
    - A) JPEG
    - B) TIFF
    - C) WAV
    - D) BMP
  - 1.3 Pick out the correct statement for Bezier curves.
    - A) Best curves are drawn when starting and end slope of the curves are same.
    - B) A curve is proper only if the cubic polynomials for x and y are identical.
    - C) The control points may lie anywhere on the screen.
    - D) The control points should be so placed that values of x coordinate are in the increasing order.
  - 1.4 Translation operations can result in -
    - A) panning
    - B) zooming
    - C) interlacing
    - D) viewing
  - 1.5 One of the following applications is not directly linked with multimedia:
    - A) advertising
    - B) games development
    - C) CBT (computer based teaching)
    - D) accounting

- 1.6 In order to determine the visibility of the line against a rectangular window using endpoint codes, it is found that the codes for the line are 0101 and 0001. The line would be:
- A) totally visible
  - B) totally invisible
  - C) partially visible
  - D) lying along one of the edges of the window
- 1.7 The perspective projection of the point (1,2,2,) on the  $Z=0$  plane with the eye being placed at (0,0, -2) is:
- A) (0.5,1)
  - B) (1, 1.5)
  - C) 1.5, 2)
  - D) None of the above
- 1.8 The principal vanishing points for the standard perspective transformations are:
- A) three
  - B) two
  - C) one
  - D) none
- 1.9 A cube placed at the origin is rotated about the X-axis in clockwise direction. A viewer located on Z-axis at distance 10 from origin at any time would be able to see:
- A) just one side of the cube
  - B) always two sides of the cube
  - C) maximum of two sides of the cube
  - D) maximum of 3 sides of the cube
- 1.10 For carrying out animation you would:
- A) blank out the screen before making the next changes in object position.
  - B) prefer to draw the object in new position and then delete the old one.
  - C) prefer to draw the object at current position in background colour and then redraw it at new position.
  - D) adjust the rate of refreshing.

**2. Each statement below is either TRUE or FALSE. Choose the most appropriate one and ENTER in the “tear-off” sheet attached to the question paper, following instructions therein. (1 x 10)**

- 2.1 MIDI files occupy less space than WAV files.
- 2.2 The resolution of a mouse must be compatible with that of the monitor.
- 2.3 A mirror reflection of a figure can be obtained by a combination of translation and scaling transformations.
- 2.4 A cubic Bezier curve cannot be drawn if the control points are located at the vertices of a rectangle.
- 2.5 The Sutherland Cohen algorithm fails to clip a line if it is vertical and partly lying within the window.
- 2.6 In computer animation, each frame in the sequence is called Key-frame.
- 2.7 The purpose of the display processor is to free the CPU from the burden of the graphics work.
- 2.8 Bresenham circle generation algorithm involves only integer additions, subtractions and multiplications.
- 2.9 GKS is a standardized method of developing graphics programs.
- 2.10 The 3D rotation about Z-axis is same as the 2D rotation in homogeneous coordinates.

**3. Match words and phrases in column X with the closest related meaning/ word(s)/phrase(s) in column Y. Enter your selection in the “tear-off” answer sheet attached to the question paper, following instructions therein. (1 x 10)**

X	Y
3.1 The coordinates system we normally use to locate points is	<b>A.</b> Frame buffer
3.2 A special area of memory dedicated to graphics only is called	<b>B.</b> 10:1
3.3 Data compression for run length encoded pictures is about	<b>C.</b> Scaling
3.4 The geometric transformations, in which the dimensions of an object are expanded or compressed	<b>D.</b> Right handed Cartesian system
3.5 The property that the adjacent pixels except at boundary edges, are likely to have the same characteristics	<b>E.</b> Filtering
3.6 The process of extracting a portion of a database/a picture	<b>F.</b> $(X_{max} - X_{min}) / (Y_{max} - Y_{min})$
3.7 The aspect ratio of a rectangular window or view port is	<b>G.</b> Clipping
3.8 The principle used in Seed-fill algorithms using stack	<b>H.</b> Cyrus Beck Algorithm
3.9 Depth sort or priority algorithm is also called	<b>I.</b> Oblique
3.10 The clipping algorithm which uses the normal vector for determining whether a point on a line is inside or outside the window	<b>J.</b> FILO
	<b>K.</b> Sutherland Hodgeman
	<b>L.</b> View plane
	<b>M.</b> Painters Algorithm
	<b>N.</b> Spatial Coherence

4. Each statement below has a blank space to fit one of the word(s) or phrase(s) in the list below. Enter your choice in the “tear-off” answer sheet attached to the question paper, following instructions therein. (1 x 10)

<b>A.</b>	Morphing	<b>B.</b>	MIDI	<b>C.</b>	Refresh rate
<b>D.</b>	Linktext	<b>E.</b>	Stroke method	<b>F.</b>	Mid point subdivision
<b>G.</b>	Blending Function	<b>H.</b>	Greater than	<b>I.</b>	16 bit
<b>J.</b>	Less than	<b>K.</b>	32 bit	<b>L.</b>	Rubber Banding
<b>M.</b>	Integer	<b>N.</b>	DDA		

- 4.1 \_\_\_\_\_ is an operation by which a cursor can be moved to any position while the line/curve is drawn.
- 4.2. The number of times images is redrawn on CRT is known as \_\_\_\_\_.
- 4.3. A(n) \_\_\_\_\_ refers to a text document that has been linked.
- 4.4. The \_\_\_\_\_ algorithm is used for generating line segments.
- 4.5. Transformation of object shapes from one form to another is called \_\_\_\_\_.
- 4.6. The \_\_\_\_\_ for character generation lends itself to changes of scale.
- 4.7. The \_\_\_\_\_ interpolate the curve between the sampled points.
- 4.8. The \_\_\_\_\_ line-clipping algorithm can be easily implemented in hardware.
- 4.9. \_\_\_\_\_ 44khz would represent high quality sound.
- 4.10 The voltage required to drive the picture tube of a graphics monitor is \_\_\_\_\_ the supply voltage.

**PART TWO**  
(Answer any **FOUR** questions)

- 5.**
- a) Describe the salient features of GKS.
  - b) Briefly explain working of a tablet.
  - c) How are top and side views generated on the screen?
- (5+5+5)**
- 6.**
- a) Describe in detail the video conferencing and media entertainment indicating the software and peripheral required for the same.
  - b) Explain geometric continuities and parametric continuities. What is the condition for smoothly joining curve segments?
- (8+7)**
- 7.**
- a) For a medium resolution display of 640 pixels by 480 lines refreshing 60 times per second, the video controller fetches 16 bits in one memory cycle. RAM memory chips have cycle times around 200ns. How many memory cycles will be needed for displaying 16 one-bit pixels?
  - b) Explain briefly Cohen-Sutherland line clipping algorithm. Outline the algorithmic steps for extending Cohen-Sutherland line clipping algorithm to three-dimensional case.
- (7+8)**
- 8.**
- a) Differentiate between video compression standards and multimedia video compression standards.
  - b) Describe three base types of encoded output frames.
  - c) Discuss the compression standards used for continuous one still images.
- (5+5+5)**
- 9.** Write short notes on any **three** of the following: -
- i) Tweeking and Morphing
  - ii) Graphic standards
  - iii) MIDI Hardware, Messages and files
  - iv) Stack based and queue based seed fill algorithms
- (5x3)**