B2.53-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.   (1x10)

1.1   Touch panels are _____ in nature.
A)   Electrical
B)   Optical
C)   Acoustic
D)   All of the above

1.2   An orthographic projection is
A)   a parallel projection
B)   a perspective projection
C)   either a parallel or perspective projection
D)   neither a parallel nor perspective projection

1.3   In the Cohen-Sutherland line clipping algorithm, "trivial reject" means
A)   that the intersection is trivial to compute
B)   that the process of rejection is always trivial
C)   that the boundaries on the visible side of the line are incomplete
D)   that the line is not visible when its endpoints are on the invisible side of a clipping boundary

1.4   Hypermedia
A)   Provides links between two media
B)   Is another media like graphics, text etc.
C)   Is a facility to permit two media to be played together
D)   Is another name for multimedia

1.5 The sizes of graphics files for use on the web are reduced using
A) Compression
B) Depression
C) Impression
D) Compilation

1.6 Suppose you have a collection of symbols representing a rotation matrix. How many symbols need to be moved to new locations to produce the inverse of the rotation matrix?
A) none
B) just one
C) exactly two
D) exactly four

1.7 The format for storing digital audio in multimedia applications is
A) JPEG
B) TIFF
C) WAV
D) BMP

1.8 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.

1.9 Translation operations can result in
A) panning
B) zooming
C) interlacing
D) viewing

1.10 The principal vanishing points for the standard perspective transformations are
A) three
B) two
C) one
D) none of the above

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.** **(1x10)**

2.1   A MIDI keyboard is a processor.
2.2   A mouse drag is one way to implement a stroke input device.
2.3   OpenGL provides separate commands for rendering three and four sided polygons.
2.4   JPEG files can be saved numerous times with no resulting loss in image quality.
2.5   Changing the frames with respect to time is animation.
2.6   The purpose of the display processor is to free the CPU from the burden of the graphics work.
2.7   Bresenham circle generation algorithm involves only integer additions, subtractions and multiplications.
2.8   GKS is a standardized method of developing graphics programs.
2.9   The 3D rotation about Z-axis is same as the 2D rotation in homogeneous coordinates.
2.10   Using Cohen-Sutherland line clipping, it is impossible for a vertex to be labeled 1111.

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.** **(1x10)**

X		Y	
3.1	Technique used to create the illusion of one object changing shape to another	**A.**	Bezier Curves
3.2	Lossless compression	**B.**	Digital Camera
3.3	There are curved lines and curved objects that are defined by mathematical formulae	**C.**	Morphing
3.4	Abbreviation for dots per inch, which indicates the resolution of images	**D.**	GIF format
3.5	The picture can be downloaded to a computer system and then manipulated with a graphics program and printed	**E.**	Tweening
3.6	File format in which the image is represented as a collection of geometrically defined objects	**F.**	RGB
3.7	The process of extracting a portion of a picture	**G.**	Filtering
3.8	The technique of splitting a raster-scan pattern into two separate patterns	**H.**	Raster Graphics
3.9	System used for representing colors on computer	**I.**	Interlacing
3.10	An artificial environment created with computer hardware and software	**J.**	Clipping
		K.	Vector Graphics
		L.	Virtual Reality
		M.	DPI

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.** (1x10)

A.	Perspective	**B.**	Refresh Rate	**C.**	Animation
D.	Keyboard	**E.**	Multimedia	**F.**	Tweening
G.	MPEG	**H.**	Mouse	**I.**	MIDI
J.	Morphing	**K.**	Persistence of Vision	**L.**	Cohen-Sutherland
M.	Bezier	**N.**	Mid-Point		

4.1 _____ is the process of filling in frames from one keyframe to another so that the motion appears fluid.

4.2 The physiological phenomenon that enables us to see images in motion (i.e., movies, TV, video and animation) is known as _____.

4.3 Output that is made up of pictures, sounds and video is called _____.

4.4 We can use the _____ video standard to define the format of the video data.

4.5 The _____ algorithm performs initial tests on a line to determine whether intersection calculations can be avoided.

4.6 A vanishing point is generated with a _____ view.

4.7 _____ curves start from a control point and end at a control point.

4.8 The number of times image is redrawn on a CRT is known as _____.

4.9 Playing instrumental music in the background of a text document on display is very easy with _____ files.

4.10 A _____ can not be used to input the location of a point on the screen.

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

5.
a) Explain any four of the following hardware peripherals in short
   i)   Track ball
   ii) Joystick
   iii) Touchscreen
   iv) Digital cameras
   v)   Digital tablet
   vi) Mouse
b) Describe the RGB color model for parameterization of colored light in computer graphics?

(8+7)

6.
a) Describe in detail, 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?
c) Two cubic Bezier curves, with control points P0; P1; P2; P3 and Q0; Q1; Q2; Q3 respectively, are joined together at P3=Q0. What must be true for them to meet with C1 continuity?

(5+5+5)

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.

(8+7)

8.
a) In Tweening technique of animation, what is the significance of key frames? What are "key frames" and "in-between frames" in computer assisted key frame animation?
b) Describe "Morphing technique" and its possible applications.
c) Why is compression necessary in multimedia? Explain.

(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

(3x5)