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M.Sc. (Third Semester)

EXAMINATION, Dec. - Jan., 2021-22

COMPUTER SCIENCE

Paper Fourth

(Computer Graphics)

Time : Three Hours *[Maximum Marks:100]*

Note : Attempt all sections as directed.

Section - A

(Objective/Multiple Choice Questions)

(1 Mark each)

Note: Attempt all questions.

Choose the correct answers:

1. Each screen point is referred to as.....
   (A) Resolution
   (B) Pixel
   (C) Persistence
   (D) Dot Pitch

2. In DVST, the electron beam from primary electron gun strikes on.....
   (A) Phosphor screen
   (B) Collector mesh
   (C) Storage mesh
   (D) Flood gun
3. On a monochromatic monitor, the frame buffer is known as.....
   (A) Display file
   (B) Pixmap
   (C) Bitmap
   (D) Refresh buffer
4. Refers to pixel spacing.
   (A) Pixmap
   (B) Resolution
   (C) Pixel Depth
   (D) Persistence
5. The shortest distance between any two dots of the same colour is called.....
   (A) Resolution
   (B) Dot Pitch
   (C) Pixel Depth
   (D) Ppi
6. The standard aspect ratio for PC is.....
   (A) 6:5
   (B) 4:3
   (C) 3:2
   (D) 5:3

7. In CRT, the electron intensity is adjusted using.....
   (A) Accelerating anode
   (B) Control grid
   (C) Electron gun
   (D) Focusing anode
8. Brightness of a display is controlled by varying the voltage on the.....
   (A) Focusing anode
   (B) Connection pins
   (C) Control grid
   (D) Power supply
9. Lower persistence phosphorus is used in -
   (A) Animation
   (B) Simple object
   (C) Complex object
   (D) All of these
10. Memory area holding the intensity information of an image is called.....
   (A) Refresh buffer
   (B) Font cache
   (C) Picture definition
   (D) Video controller
11. Intensity representation of an image is called.....
   (A) Frame buffer
   (B) Picture definition
   (C) Display list
   (D) Brightness

12. The purpose of refreshing a CRT is.....
   (A) To avoid flickering
   (B) To maintain steady picture
   (C) To avoid fading of pixels
   (D) All of the above
13. The fly-back of electron beams from one scanline to next is known as.....
   (A) Vertical Retrace
   (B) Horizontal Retrace
   (C) Raster scanning
   (D) Refreshing
14. In raster scan display, the frame buffer holds.....
   (A) Line drawing commands
   (B) Scanning instructions
   (C) Image Resolution
   (D) Intensity information
15. Identify the odd one out from the following.
   (A) Vector display
   (B) Raster scan display
   (C) Calligraphic display
   (D) Stroke - writing display
16. Interlaced refresh procedure is allowed in.....
   (A) LCD
   (B) DVST
   (C) Raster scan display
   (D) Random scan display

17. Vector display is well suited for.....
    (A) Animation
    (B) Line drawing applications
    (C) Cartoons
    (D) All of the above
18. Beam penetration method is usually used in.....
    (A) LCD
    (B) Raster Scan display
    (C) Random scan display
    (D) DVST
19. Identify the colours produced in beam penetration method.
    (A) Red, Green, Blue, White
    (B) Red, Orange, Yellow, Green
    (C) Red, Green, Blue
    (D) Green, Red, White, Orange
20. Identify the features of Vector display -
    (A) High resoluation, Jagged lines, Lack in colour depth
    (B) Smooth lines, Poor resolution, Black & White
    (C) High resolution, Lack in colour depth, Smooth
    (D) Inexpensive, monochromatic, smooth lines

Section - B

(Very short answer type questions)

(2 Marks each)

Note : Attempt all questions, using 2 - 3 sentences.

1. Define simple random scan display system?
2. Point out key features of Flat Panel Display?

3. Which are the steps involved in window to viewport coordinate transformation in 2D?
4. Magnify the triangle ABC with A (0,0) B (1,1) and C (5,2) to twice its size while keeping C (5, 2) fixed.
5. Show that the compostion of two successive rotations are additive i.e. $R(\theta 1).$

$$R(\theta 2) = R(\theta 1 + \theta 2)$$

6. Derive the linear equation for a 3D object and test whether the coordinates are inside or outside the plane.
7. Define the terms (i) Centre of projection (ii) Principal vanishing point.
8. Differentiate between the object space and image space method for the hidden surface removal of an image.
9. Highlight the basic concepts of sampling and quantization with a neat sketch.
10. Write any four differences between perspective projection and parallel projection.

Section - C

(Short Answer Type Questions)

(3 Marks each)

Note: Attempt all questions. Answer precisely using < 75 words.

1. What do you understand by the aspect ratio and resolution of a display screen in a raster scan display?
2. Write the flood fill algorithm for filling a polygon.
3. Write the methods used to plot a dashed line segment.
4. Given a triangle A (20,10) B (80,20) C (50,70). Find the co-ordinates of vertices after each of the following transformation.
    (a) Reflection about the line x = y
    (b) Rotation of the triangle ABC about vertex A in clock wise direction for an angle 90 degree.

5. Write the different tables used for representing polygon surfaces. IIlustrate with an example.
6. Describe the techniques that can be used to provide text clipping in a graphics package.
7. Explain about different types of parallel projections.
8. What do you understand by correlation and convolution operations in case of image processing?
9. Write the Z-buffer algorithm for hidden surface removal.
10. What do you understand by the following terms with respect to pixels? Neighbours, Adjacency, Connectivity.

Section - D

(Long Answer Type Questions)

(6 Marks each)

Note: Attempt any five questions. Answer precisely us ing150 words.

1. Expalin the working of a random scan display system with suitable diagram?
2. Explain Sutherland Hodgeman polygon clipping algorithm with illustrations.
3. Explain the window to viewport coordinate transformation and derive the scaling factors during the transformation.
4. What is a quadric surface? Explain about any one of the quadric surfaces?
5. Explain the merits and demerits of Plasma panel display.
6. What is mean by convolution? Give applications of 2D convolution in the field of image processing.
7. Describe in detail the depth buffer visible surface detection technique. Derive the equation to find the depth values for a surface positon (x, y)?