

# JK LAKSHMIPAT UNIVERSITY, JAIPUR

## INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Regular), April-May 2018

B. Tech (as applicable) in Computer Science & Engineering, Semester VI

Roll No.....

Foundation of Computer Graphics: CSE610

Time: 3 hours

Max. Marks: 100

---

### Instructions to students:

1. Do not write anything other than your roll number on question paper.
  2. Assume suitable data wherever required and mention it clearly.
  3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.
- 

Q.1A Objective type multiple choice questions (10 questions @ 1 mark)

10

- i. A dashed line could be displayed by generating\_\_\_\_\_.
  - a) Inter dash spacing
  - b) Very short dashes
  - c) Both a and b
  - d) A or B
- ii. We can adjust the shape of the line ends to give them a better appearance by using
  - a) Line spacing
  - b) More dots
  - c) Line caps
  - d) Round cap
- iii. A line drawn in the background color is
  - a) Visible
  - b) Invisible
  - c) Visible or Invisible
  - d) Only b
- iv. In color raster system, the number of color choices available depends on
  - a) colors in frame buffer
  - b) Amount of storage provided per pixel in frame buffer
  - c) RGB color
  - d) Neither a nor b
- v. Scaling of a polygon is done by computing
  - a) The product of (x, y) of each vertex
  - b) (x, y) of end points
  - c) Center coordinates
  - d) Only a
- vi. In 2D-translation, a point (x, y) can move to the new position (x', y') by using the equation
  - a)  $x' = x + dx$  and  $y' = y + dx$
  - b)  $x' = x + dx$  and  $y' = y + dy$
  - c)  $X' = x + dy$  and  $Y' = y + dx$
  - d)  $X' = x - dx$  and  $y' = y - dy$

- vii. The original coordinates of the point in polar coordinates are
  - a)  $X' = r \cos(\Phi + \Theta)$  and  $Y' = r \cos(\Phi + \Theta)$
  - b)  $X' = r \cos(\Phi + \Theta)$  and  $Y' = r \sin(\Phi + \Theta)$
  - c)  $X' = r \cos(\Phi - \Theta)$  and  $Y' = r \cos(\Phi - \Theta)$
  - d)  $X' = r \cos(\Phi + \Theta)$  and  $Y' = r \sin(\Phi - \Theta)$
- viii. Anti-aliasing by computing overlap areas is referred to as
  - a) Area-sampling
  - b) Super-sampling
  - c) Pixel phasing
  - d) Only b
- ix. Higher the number of pixels, \_\_\_\_\_ the image quality
  - a) Bad
  - b) Better
  - c) Smaller
  - d) None of above
- x. Several graphics image file formats that are used by most of graphics system are
  - a) GIF
  - b) JPEG
  - c) TIFF
  - d) All of these

Q.2 Short answer type questions (4 questions @ 2.5 marks)

10

- i. Differentiate between window and view port.
- ii. Explain scanline polygon algorithm.
- iii. Compute the Resolution Of 2\*2 inch image that has 512\*512 pixels
- iv. Discuss Eight Point Symmetry in Midpoint Circle Drawing Algorithm.

Q.3A Calculate the refresh rate for Raster screen of 1024 X 1024 pixels with average access time for each pixel as 300 nano seconds.

05

Q.3B How bit planes are used to get different color and B & W gray levels?

05

Q.4A Rasterize a line by using equation of line having end point coordinates as (5,2) & (6,7).

05

Q.4B Derive decision parameters in Bresenham's circle generation algorithm.

05

Q.5A Rotate the figure through an angle of  $45^\circ$  about an origin. The coordinates of triangle are A(1,1), B(5,1), and C(1,5).

05

Q.5B The coordinates of four control points related to the curve are given as

05

P1 = (1,1,0)

P2 = (1,2,0)

P3 = (2,2,0)

P4 = (2,1,0)

Write the equation of resultant Bezier curve. Also draw the curve by finding coordinates at  $u=0$ ,  $u=0.25$ ,  $u=0.5$ ,  $u=0.75$ , and  $u=1$ .

Q.6A Define resolution. If we want to resize a 1024 X 768 image to one that is 640 pixels wide with the same aspect ratio, what would be the height of the resized image?

05

- Q.6B Describe RGB and CMY color model. Mention five applications of animation in education sector. 05
- OR
- Q.6B Discuss Visible Surface Detection. Describe B-Spline curve in detail. 05
- Q.7A Discuss diffuse reflection with suitable example. Explain Gourand shading in detail. 05
- Q.7B Explain Z buffer algorithm for Hidden Surface Removal. How coherence is used to speed up the processing in this algorithm. 05
- OR
- Q.7B Is a simultaneous shearing the same as a shearing in one direction followed by a shearing in another direction? Why? 05
- Q.8A For the rectangular window boundaries given as  $x_{\min} = 2$ ,  $x_{\max} = 8$ ,  $y_{\min} = 2$  and  $y_{\max} = 8$ , check the visibility of the following segments using Cohen-Sutherland algorithm and if necessary, clip them against the appropriate window boundaries. Line EF: E(3,10) and F(6,12), Line GH: G(4,1) and H(10,6). 10
- Q.9A Derive and write DDA algorithm. Rasterize a line by using DDA algorithm having equation " $y=2x+6$ " 10
- Q.9B Name the algorithm dedicated for Polygon Clipping. Describe Sutherland-Hodgeman Polygon Clipping in detail by considering suitable example. 10
- OR
- Q.9B How Can a Graphics Card enhance the resolution of the display? Generate  $1/8^{\text{th}}$  circle using Mid-Point circle generation algorithm with center of circle (5,3) and radius 5. 10