

B245 55

SVKM's NMIMS
MUKESH PATEL SCHOOL OF TECHNOLOGY MANAGEMENT & ENGINEERING

Programme: B.Tech (Computer)

Year: III Semester: V

Academic Year: 2019-20

Subject: Computer Graphics

Date: 07 November 2019

Marks: 70

Time: 10.00 am - 1.00 pm

Durations: 3 (hrs)

No. of Pages: 02

Final Examination (2019-20)/ Re-Examination (2017-18/ 2018-19)

Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

- 1) Question No. 1 is compulsory.
- 2) Out of remaining questions, attempt any 4 questions.
- 3) **In all 5 questions to be attempted.**
- 4) All questions carry equal marks.
- 5) **Answer to each new question to be started on a fresh page.**
- 6) **Figures in brackets on the right hand side indicate full marks.**
- 7) Assume suitable data if necessary.

- Q.1 A) Derive Window to Viewport transformation matrices. (03)
- B) Describe working and architecture of Raster Scan Display Device. (04)
- C) State the difference between parallel and perspective projection. (03)
- D) Illustrate Inside-Outside test to determine whether the point is inside or outside of polygon. (04)
- Q.2 A) Write and explain the Depth-Buffer algorithm for detecting visible surfaces. (07)
- B) Derive the mathematical calculation for Midpoint Circle generation algorithm. (07)
- Q.3 A) Find out the coordinate of figure bounded by (0, 0), (1, 5), (6, 3) (-3, -4) when reflected along the line whose equation is $y = 2x + 4$ and sheared by 2 units in x direction and 2 units in y direction. (07)
- B) Differentiate between Image Space and Object space Methods. Explain Warnock's method of hidden surface elimination. (07)

- Q.4 A) Explain scan line fill algorithm with suitable example. (07)
- B) Explain Liang Barsky line clipping algorithm. Apply the algorithm to the line with coordinates (20, 20) and (80, 110) against the window $(X_{min}, Y_{min}) = (40, 40)$ and $(X_{max}, Y_{max}) = (100, 90)$. (07)
- Q.5 A) Explain 2D shearing and reflection with examples. (07)
- B) State the mathematical equation of Bezier Curve. Explain the various properties of a Bezier curve. (07)
- Q.6 A) Write algorithm to perform polygon clipping using Sutherland-Hodgeman polygon clipping algorithm. What are the limitations of Sutherland and Hodgeman? How it is overcome by Weiler and Atherton? (07)
- B) Derive the steps required to perform 3D rotation about arbitrary axis. (07)
- Q.7 A) Write a note on Color CRT monitors. (04)
- B) Write 3-D Transformation Matrices for (04)
1. Translation
 2. Scaling
 3. Rotation about co-ordinate axis.
- C) Write a note on Half toning. (03)
- D) Write a note on Phong Shading. (03)
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