



USN

13MCA34

Third Semester MCA Degree Examination, Dec.2019/Jan.2020
Computer Graphics

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

- 1 a. What is OpenGL? Describe OpenGL related libraries and header files. (05 Marks)
b. Explain OpenGL point and line functions with examples. (07 Marks)
c. Differentiate absolute and relative coordinate specification. (02 Marks)
d. Explain OpenGL functions to set display callback routine and to display initial graphics, to the display window. (06 Marks)
- 2 a. Explain briefly the procedure for DDA line drawing algorithm. (06 Marks)
b. Explain Midpoint circle algorithm deriving the decision parameter and given radius $r = 10$. (09 Marks)
c. Explain boundary-fill algorithm in brief. (05 Marks)
- 3 a. Explain 2D translation, rotation, reflection and scaling. (10 Marks)
b. What is composite transformation? Show that composition of 2 scaling is multiplicative. (05 Marks)
c. Explain Pivot-point Rotation with example. (05 Marks)
- 4 a. Explain OpenGL geometric transformation functions and Matrix operations in brief. (07 Marks)
b. Explain 3D Rotation about all axis. (05 Marks)
c. Write a program to create [without using built in function] a square by implementing shear algorithm along i) x-axis ii) y-axis. (08 Marks)
- 5 a. Explain Liang-Barsky line clipping algorithm. (10 Marks)
b. What is polygon clipping? Explain the algorithm for convex polygon fill area clipping with example. (10 Marks)
- 6 a. Explain 3D viewing pipeline. (05 Marks)
b. Explain depth curing, surface Rendering in 3-dimensional viewing. (05 Marks)
c. Derive the 3-dimensional transformation matrices from world to viewing coordinate. (10 Marks)
- 7 a. Derive Oblique parallel projection matrix. (10 Marks)
b. Derive perspective projection transformation matrix. (10 Marks)
- 8 a. What is Bezier spline curve? Derive its equation and explain its properties. (10 Marks)
b. Explain the following:
i) Design an animation sequence
ii) Traditional animation techniques. (10 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, $42+8 = 50$, will be treated as malpractice.