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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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