**IS6E21**

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M S RAMAIAH INSTITUTE OF TECHNOLOGY**(AUTONOMOUS INSTITUTE, AFFILIATED TO VTU)****BANGALORE - 560 054****SEMESTER END EXAMINATIONS - MAY / JUNE 2014**

Course & Branch	: B.E. - INFORMATION SCIENCE & ENGG.	Semester	: VI
Subject	: Computer Graphics using OpenGL	Max. Marks	: 100
Subject Code	: IS6E21	Duration	: 3 Hrs

Instructions to the Candidates:

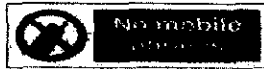
- Answer one full question from each unit.

UNIT - I

1.
 - a) Define Computer Graphics. List few applications of computer graphics. (06)
 - b) Explain the following polygon types in OpenGL. (06)
 - i) GL-POLYGON
 - ii) GL- TRIANGLES
 - iii) GL - QUADS
 - iv) GL - TRIANGLE STRIP
 - v) GL -TRIANGLE FAN
 - vi) GL - QUAD-STRIP
 - c) Write an OPENGL program to plot a triangle on a screen displaying 3 different colors. (08)
2.
 - a) Explain the construction and working principle of Cathode Ray Tube. (07)
 - b) Discuss how the shadow-mask graphics system works. (07)
 - c) Write an OPENGL program to plot a red colored square on the screen. (06)

UNIT - II

3.
 - a) Derive the Matrix representation required for 2D transformations for translation, scaling & rotation. With respect to origin. (06)
 - b) Perform a 45° rotation of a triangle A(0,0), B(1,1) & C(5,2) (08)
 - i. About the origin
 - ii. About P(-1,-1)
 - c) Derive the transformation matrix for a window to viewport transformation. (06)
4.
 - a) Discuss with the help of a diagram for Mid-point circle generation algorithm. (06)
 - b) Find the transformation that scales (w.r.t the origin) by (06)
 - i. a units in the X-direction,
 - ii. b units in the Y-direction
 - iii. simultaneously a units in the X-direction and b units in the Y-direction
 - c) Magnify the triangle with vertices A (0, 0), B (1, 1) and C (5, 2) to twice its size while keeping C (5, 2) fixed. (08)



UNIT - III

5. a) Derive the mathematical formulation required to generate Bezier curve & sketch the blending functions. (10)
b) Derive the mathematical formulation required to scale an object with respect to arbitrary axis in 3D space. (10)
6. a) Discuss the C_0 , C_1 , C_2 , continuity and G^0 , G^1 geometric constraints while representing curves. (07)
b) Write the mathematical formulation required to generate 3D surface using Hermite formulation. (07)
c) What is collision detection? Write the conditions to compute (using Normal of polygons) (06)

UNIT - IV

7. a) Discuss the role of Octrees in solid modeling. (10)
b) What is primitive instancing? Explain with the help of example. (10)
8. a) Explain the subtractive primaries and their mixtures in color model. (10)
b) Explain YIQ color model from the context of broad casting TV signal. (10)

UNIT - V

9. a) Explain the issues and solutions in priority algorithms (to eliminate hidden surfaces). (10)
b) With the help of neat sketches explain the Area subdivision algorithms. (10)
10. a) What is diffuse reflection? Explain with the help of neat sketches. (10)
b) Explain the Gouraud shading technique used in rendering. (10)
