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B.E. (Computer Science Engineering) Fifth Semester (C.B.S.)

Computer Graphics

P. Pages : 2 **NRT/KS/19/3436**

Time : Three Hours * 0 1 4 2 * Max. Marks : 80

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Explain the architecture of vector scan display system. **7**

b) Differentiate between Raster and Random scan display. **6**

OR

2. a) Explain the graphics APIs in detail. **4**

b) What are the input devices for Operation Interaction? **4**

c) What do you mean by efficiency display and Hardcopy Technologies. **5**

3. a) Fill the polygon having vertices **6**
(1, 1), (11, 1), (11, 7), (8, 9), (8, 6), (5, 9), (5, 5), (1, 9) by using Fence fill algorithm.

b) Write short note on Halftoning techniques. **3**

c) Consider a line from (2, 5) and (10, 10). Apply Bresenhams line drawing algorithm and rasterize the line. **5**

OR

4. a) Fill the polygon defined by vertices (1, 1), (7, 1), (7, 6), (5, 4), (3, 4) and (1, 6) using. **10**
i) Edge fill algorithms
ii) Seed fill algorithm

b) What do you mean by aliasing? State and Explain different antialiasing methods. **4**

5. a) What is the use of OpenGL? **4**

b) Explain the operations in OpenGL. **5**

c) Give the importance of GL, GLU and GLUT package in OpenGL. **4**

OR

6. a) Write a program to draw a circle in OpenGL. **6**

b) What do you mean by 3D viewing pipeline and viewing matrix specifications. **7**

7. a) A polygon is defined by the vertices $V_1(4, 3)$, $V_2(7, 3)$, $V_3(9, 5)$, $V_4(7, 7)$, $V_5(4, 7)$ and $V_6(2, 5)$ respectively clip a line from (2, 3) to (9, 7) about the above polygonal window using Cyrus Beck algorithm. **9**

b) What do you mean by transformation? Explain the types of transformation. **5**

OR

8. a) Explain in detail Cohen-Sutherland algorithm with example. **6**

b) Reflect the diamond-shaped polygon whose vertices are $A(-1, 0)$, $B(0, -2)$ $C(1, 0)$ and $D(0, 2)$ about the. **8**

i) Horizontal line y = z
ii) Line y = x+z

9. a) Explain various algorithms for hidden surface removal with their advantages and disadvantages. **5**

b) Write short note on perspective and parallel projection. **6**

c) Write the concept of Normalized device coordinates. **2**

OR

10. a) Find the normalization 'N' which uses the rectangle defined by vertices $V_1(1, 1)$, $V_2(5, 3)$, $V_3(4, 5)$ and $V_4(0, 3)$ as a window and the normalized device screen as a viewport. **7**

b) Explain 3D transformation. **6**

11. a) State the basic properties of B-spline curve. **6**

b) Explain the basic ray tracing algorithm with diagram. **7**

OR

12. a) What are the basic applications of shading and shadows. **5**

b) Construct the Bezier curve of order 3 and with 4 polygon vertices A (1, 1), B (2, 3). **8**

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High expectations are the key to everything.

~ Sam Walton