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337677(37)

B. E. (Sixth Semester) Examination, 2020

(New Scheme)

(Mech. Engg. Branch)

(Specialization : Mechanical)

COMPUTER GRAPHICS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Attempt for 16 marks from each question. Draw neat and labelled diagrams wherever necessary.*

Unit-I

1. (a) Define Pixel. 2

   (b) Write short notes on : 7

(i) Direct View Storage Tube (DVST)

(ii) Dot-matrix printer

(c) Explain the working of cathode ray tube (CRT) with diagram. 7

(d) List the working of various types of touch panels. 7

Unit-II

2. (a) Write any two difference in between DDA and Bresenham's algorithm. 2

(b) Write and explain the Bresenham's circle drawing algorithm. 7

(c) Explain boundary fill algorithm and flood fill algorithm. 7

(d) Find out the pixel position for the line passing through points (1, 1) to (8, 5) using Bresenham's method. 7

Unit-III

3. (a) Define Convex Hull. 2

(b) Bring out the differences between a Bezier curve and cubic splines. 7

(c) Write the general expression for 'n' control points of a Bezier curve and hence write the parametric equation for $n = 5$ control points of a Bezier curve. 7

(d) Find the euqation of a Bezier curve which is defined by the four points as P_0 (2, 2, 0), P_1 (2, 3, 0), P_2 (3, 3, 0) and P_3 (3, 2, 0) and also find the points on the curve for

$$U = 0, \frac{1}{4}, \frac{1}{2}, \frac{3}{4}, 1$$ 7

Unit-IV

4. (a) Define Projection. 2

(b) Derive the transformation matrix for rotation transformation. 7

(c) State and derive window-viewport viewing transformation equation. 7

(d) A square having end points A (1, 1), B (6, 1), C (6, 6) and D (1, 6) is rotated by 50° in clockwise direction keeping point (6, 1) fixed. Find the final coordinates. 7

Unit-V

5. (a) What do you mean by Clipping? 2

(b) Find the complete viewing transformation of a triangle with vertices A (2, 2), B (4, 2) and C (3, 6) that maps from window in world co-ordinates with x-context 1 to 5 and y-context 1 to 10 onto viewport :

(i) Normalized viewport

(ii) Onto viewport whose opposite corners are at (1, 1) and (4, 4) 14

(c) Explain and write Cohen-Sutherland line drawing clipping algorithm. 14