

5. Attempt any **two** questions : (10×2=20)

- (a) Why do we need of hidden-surface algorithms ? How does the Z-buffer algorithm determine which surface are hidden ? Explain the advantages and disadvantages of Z-buffer algorithm.
- (b) Describe in detail various rendering models and various illumination methods.
- (c) A Cubic Bezier curve segment is described by control points  $P_0 (2,2)$ ,  $P_1 (4,8)$ ,  $P_2 (8,8)$  and  $P_3 (9,5)$ . Another curve segment is described by  $Q_0 (a,b)$ ,  $Q_1 (c,2)$ ,  $Q_2 (15,2)$  and  $Q_3 (18,2)$ . Determine the value of a, b and c so that the two curve segments join smoothly.

(Following Paper ID and Roll No. to be filled in your Answer Book)

**PAPER ID : 1073**

Roll No.

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**B.Tech.**

(SEM.V) ODD SEMESTER THEORY EXAMINATION

2010-11

**COMPUTER GRAPHICS**

Time : 3 Hours

Total Marks : 100

**Note : Attempt all questions.**

1. Attempt any **four** questions : (5×4=20)

- (a) What is Compute Graphics ? Explain briefly the various application areas of Computer Graphics ?
- (b) Explain what is meant by resolution of an image and what is an image aspect ratio ?
- (c) Suppose an RGB raster system is to be designed using an 8-inch by 10-inch screen with resolution of 100 pixels per inch in each direction. If we want to store 6-bits per pixel in the frame buffer, how much storage (in bytes) do we need for the frame buffer ?
- (d) Consider three different raster systems with resolutions of  $640 \times 480$ ,  $1280 \times 1024$  and  $2560 \times 2048$ . What size frame buffer (in bytes) is needed for each of these systems to store 12 bits per pixel ?

(e) Define graphics primitives. Mention some typical graphics primitives.

(f) Explain the basic concept of DDA algorithm.

2. Attempt any **four** questions : **(5×4=20)**

(a) Distinguish between seed filling and scan line-filling algorithm. Apply any of these algorithms to fill the polygon defined by (1, 1), (1, 5) and (5, 2). The seed pixel may be taken at any suitable location inside the polygon if required.

(b) Explain the Boundary fill algorithm. Also discuss the situations in which the Boundary fill algorithms do not work properly.

(c) What is an image transformation ? Discuss its various procedures.

(d) What is a segment table ? Discuss in brief about the contents of the segment table.

(e) Give the function for renaming and creating any segment.

(f) What is inside test ? What is the utility of an inside test ?

3. Attempt any **two** questions : **(10×2=20)**

(a) Deduce relations for the following 2-D transformation :

(i) Rotation about origin

(ii) Translation

(iii) Scaling

(iv) Rotation about any arbitrary point

(v) Reflection about any line.

(b) Explain what is clipping. What is the relationship between clipping and windowing ? Explain Cohen-Sutherland line clipping algorithm using proper examples.

(c) Derive a composite matrix which maps a rectangular window into a rectangular view port using the basic geometric transformation in 2-D. Discuss also various issues related to multiple windowing.

4. Attempt any **two** questions : **(10×2=20)**

(a) (i) Define parallel projection. Define the various type of parallel projection. Derive the parallel projection transformation matrix.

(ii) What is the significance of projection angle and projection distance in perspective projection ? Give the perspective projection transformation matrix.

(b) Explain the term "polling" related to input handling and discuss the handling of event queue with a special reference to repetitive events.

(c) Write short notes on any following of the **two** :

(i) Echoing

(ii) Interactive techniques

(iii) Light pen.