

MCA 3rd Semester Examination 2013
Paper - XII
(Computer Graphics)

Time : 3 Hrs.

Full Marks : 80

1. Answer any five questions from the following 2×5 = 10
- (a) What are the major application of computer graphics?
 - (b) What are the different resolution schemes that are used in video display devices?
 - (c) What do you mean by video compression?
 - (d) What are the redundancy that occurs in a digital video when same information is transmitted more than once?
 - (e) What do you mean by refreshing? What is refresh rate?
 - (f) What are the different types of video signals? Name them.
 - (g) What is liquid crystal made of?
2. Answer any three questions from the following 4×3 = 12
- (a) How does DDA algorithm differs from Bresenham's algorithm? Describe advantages and disadvantages of both.
 - (b) What are the different methods of area filling on a raster system? What are the attributes that control the fill area function?

- (c) Describe the bitmap based method for generating characters in computer screen.
- (d) What is aliasing? Why does it happen? How could we overcome the problem?
- (e) How the matrix representation of translation, scaling and rotation are presented?

3. Answer any three questions from the following

6×3 = 18

- (a) Why homogeneous coordinates is being introduced? How does it eliminate the problem of concatenation of different transformation about an arbitrary point?
- (b) Show that the composition of two rotations is additive by concatenating the matrix representations for $R(\theta_1)$ and $R(\theta_2)$ to obtain $R(\theta_1) \cdot R(\theta_2) = R(\theta_1 + \theta_2)$
- (c) What is reflection? Describe the basic principles of reflection transformation with the help of an example.
- (d) What is viewing pipeline? Describe the mechanisms that are involved in a viewing pipeline. How does window-to-viewport conversion is performed?
- (e) Define B-spline curve, uniform B-spline and open uniform B-spline.

4. Answer any four questions from the following

10×4 = 40

- (a) Write an algorithm for generating an ellipse.
- (b) Describe the Cohen-Sutherland line clipping algorithm with a rectangular clipping window.
- (c) Why the concept of illumination model is required to study the structure of an object. Describe the basic

illumination models applied on a scene based on standard lighting conditions.

- (d) Describe virtual environment display. Why it is being used? What are the three main phases that a virtual environment is passed through.
- (e) Magnify a triangle with vertices $A(0, 0)$, $B(1, 1)$ and $C(5, 2)$ to twice its size while keeping $C(5, 2)$ fixed.
- (f) Generate the complete transformation matrix and equation for a rotation about a line that is not parallel to one of the coordinate axes in a three dimensional plane.

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