8. a) What is the need of compression? Compare various types of compression and decompression algorithms. 7

   b) Write the four different types of DBMS that support multimedia systems. Also explain MPEG algorithm with neat diagram. 7

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Roll No .....

MCTA - 105

M.E./M.Tech., I Semester

Examination, June 2016

Computer Graphics And Multimedia

Time : Three Hours

Maximum Marks : 70

Note : i) Attempt any five questions.
ii) All questions carry equal marks.
iii) Write your assumptions, if any. Answer should be to the point.

1. a) What is the random scan display? Differentiate it with raster scan display and also give some advantages of it? 7

   b) Consider three different raster systems with resolutions of 640×480, 1280×1024 and 2560×2048.

      i) What size is frame buffer (in bytes) for each of these systems to store 12 bits per pixels.

      ii) How much storage (in bytes) is required for each system if 24 bits per pixel are to be stored? 7

2. a) Suppose RGB raster system is to be designed using on 8inch×10inch screen with a 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 frame buffer? 7

   b) Why do interlaced monitors tend to produce more flicker? 7

3. a) What do you mean by scan conversion? What are the side effects of scan conversion? What techniques are adopted to remove these effects? 7

b) The screen of a display is addressed in device space with the range $0 \le u \le 4095$, $0 \le v \le 4095$ where the origin is at the bottom left the top one-fourth of the screen is addressed but not displayed. The window selected has world co-ordinates of (0, 0) at the bottom left and (130,100) at the top right. Determine the transformation from screen co-ordinates (u, v) to world co-ordinates (x, y) in the form of $x = Au + B$ and $y = Cv + D$. 7

4. a) Consider a clipping plane at $x = -z$ perpendicular to the x-axis. Compute the location of two points, P_0 (–3, 1) and P_1 (3, 1) with respect to the clipping plane for Sutherland-Hodgman algorithm. 7

b) Compute the new transformed point, if a point P(2, 3) is rotated by $\frac{\pi}{6}$ radians in counter clockwise direction. 7

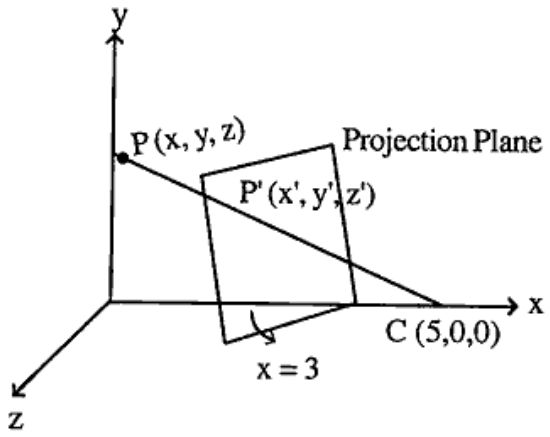
5. a) Rotate a triangle A(0, 0), B(2, 2), C(4, 2) about the origin and about P(–2, –2) by and angle of 45°. 7

b) Prove that two successive rotations are additive: $R(\alpha).R(\theta) = R(\alpha + \theta)$? 7

6. a) Rotate the object described by the points matrix by an angle of 60° around an axis from the origin to the point (0, 3, 4). 7

$$\begin{bmatrix} 0 & 1 & 0 & 1 \\ 2 & 1 & 0 & 1 \\ 2 & 2 & 0 & 1 \\ 1 & 2 & 0 & 1 \\ 1 & 1 & 1 & 1 \\ 2 & 1 & 1 & 1 \\ 2 & 2 & 1 & 1 \\ 1 & 2 & 1 & 1 \end{bmatrix}$$

b) Obtain a transformation matrix for perspective projection for a given object onto x = 3 plane with COP at (5, 0, 0) as shown in figure. 7



7. a) Prove that the Bezier curve always lies within the convex hull of the control points. 7

b) A Bezier curve is defined by the control points [P_0 (20,20), P_1 (5, 20), P_2 (30, 30), P_3 (30, 0)] compute the coordinates of the points on the curve for the parameter V = 0.2, 0.4. 7

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