## **GUJARAT TECHNOLOGICAL UNIVERSITY BE - SEMESTER-V (NEW) - EXAMINATION - SUMMER 2016** Subject Code:2151603 Date:09/05/2016 **Subject Name: Computer Graphics** Time:02:30 PM to 05:00 PM **Total Marks: 70 Instructions:** 1. Attempt all questions. 2. Make suitable assumptions wherever necessary. 3. Figures to the right indicate full marks. **Q.1** What is aliasing? How to compensate the aliasing? Explain in detail. 07 (a) **(b)** 1. Explain Beam penetration method. 03 2. How long it would take to load a 640 x 400 frame buffer with 24 bits per pixel, 02 If $10^6$ bits can be transferred per second? 3. Define: 1. Aspect ratio 2. Persistence 02 07 **Q.2** (a) Explain Scanline polygon fill algorithm in detail. (b) Give advantages of Bresenham line drawing algorithm. Draw a line from 07 (20,10) to (30,18) using it. OR (b) Discuss midpoint circle algorithm with example. 07 Derive 2 X 2 transformation matrix for each of the following. Q.3 **(a)** 07 (a) Rotation about origin (b) Fixed point scaling. Clip the line using Liang Barsky algorithm against window with $(xw_{min}, yw_{min})$ = 07 **(b)** (0,0) and $(xw_{max}, yw_{max}) = (100,50)$ . Line end points are A(10, 10) and B(110, 40). OR **Q.3** A triangle is defined by P(2, 2), Q(4, 2) and R(5, 5). Find the transformed 07 **(a)** coordinates after 90 degree clockwise rotation followed by reflection about line $\mathbf{v} = -\mathbf{x}$ . (b) Explain Cohen Sutherland line clipping algorithm with example. 07 0.4 Explain the Bazier curves and surfaces. 07 **(a)** 1. Explain parallel and perspective projections. **(b)** 04 2. Explain non zero winding rule. 03 OR (a) What is window and view-port? Retrieve equation for the scaling factor to map 07 **O.4** the window to view-port in 2D viewing system. (b) Derive 3D Rotation matrix. 07 1. Define: Dominant frequency, Saturation, Luminance **Q.5** 03 **(a)** 2. Explain various light sources. 04 (b) Explain CIE diagram with its usefulness. 07 OR (a) Classify the visible surface detection algorithms. Explain Z buffer algorithm for 07 Q.5 hidden surface removal. (b) Explain RGB and XYZ color models. 07 \*\*\*\*\*

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