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**M.Sc. (MATHEMATICS WITH APPLICATIONS
IN COMPUTER SCIENCE)**

M.Sc. (MACS)

Term-End Examination

June, 2013

MMTE-004 : COMPUTER GRAPHICS

Time : 2 hours

Maximum Marks : 25

(Weightage : 50%)

Note : *Question No.1 is compulsory. Attempt any three questions out of 2 - 5. Use of calculator is not allowed*

1. State whether the following statements are *true* or *false*. Justify your answer. 2x5=10
- (a) The spatial resolution of image is the length of pixel in cm. or inch.
 - (b) The Data Controller simply reads each successive byte of data from the frame buffer.
 - (c) In perspective projection size varies directly with distance.
 - (d) Cohen -Sutherland algorithm for line clipping cannot be used both in 2D and 3D.

- (e) In open GL, graphical primitives are defined by vertices which are transformed by open GL, the sequence of operation is :
 Model view transformation \rightarrow Projection transformation.
 illumination \rightarrow Clipping \rightarrow view port transformation.
2. (a) Consider two raster systems with the resolutions of 640×480 and 1280×1024 respectively : 2
- (i) How many pixels could be accessed per second in each of these systems by a display controller that refreshes the screen at a rate of 60 frames per second ?
- (ii) What is the access time per pixel in each system ?
- (b) Find a normalization transformation N_T which uses the rectangle A (1, 1) , B (5, 3), C (4, 5) and D (0, 3) as window and normalized device coordinates as view port. 3
3. (a) Trace the DDA algorithm for drawing a line segment (2, 3) to (8, 7). 2
- (b) Suppose you have a camera located at (0, 1, 0) position , at the centre of an object with the centre located at (0, 0, 0) .The camera also has an up vector (1, 1, 0) . Drive the transformation matrix to transform a point in the world coordinate system to the camera coordinates specified. 3

4. (a) Use Bresenham 's algorithm for drawing a circle of radius 6. Compute the location for the first octant only. 3
- (b) Rotate a polygonal object defined by vertices A (0, 0), B (1, 0), C (1, 1) and D (0, 1) by 45° about the origin and obtain the transformed vertices. 2
5. (a) Find the equation of the Bezier curve which passes through (0, 0) and (-4, 2) and controlled through (14, 10) and (4, 0). 3
- (b) Obtain the modal view matrix generated after executing the following code segment : 2
- gl Matrix Mode (GL - MODEL VIEW)
gl Load Identity (),
gl Translate (0, 2, 0)
gl Scale of (1, 1, 3)
gl Rotate (ϕ , 0, 0, 1)
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