

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

M.Sc. (MACS)

Term-End Examination

December, 2012

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 Sutherland Cohen algorithm fails to clip a line if it is vertical and partly lying within the window.
 - (b) A cubic Bezier curve cannot be drawn if the control points are located at the vertices of a rectangle.
 - (c) Two 2D rotations about the origin are not commutative.
 - (d) Mid point line generation algorithm requires to perform integer calculations only.
 - (e) A perspective projection preserves relative proportions.

2. (a) Find the amount of memory (in bytes) required by an 8 plane frame buffer for each of red, green and blue colour, having 1024×768 resolution. 2
- (b) Write steps to draw a circle at (5, 5) having a radius of 5 units using midpoint circle algorithm. 3
3. (a) Find the transformation matrix that transforms the square ABCD whose center is at (2, 2) to reduce it to half its size with center still remaining at (2, 2). The coordinates of square ABCD are A(0, 0), B (0, 4), C (4, 4) and D (4, 0). Find the coordinates of new square. 3
- (b) Distinguish between : 2
- (i) Shadow mask method and beam penetration method
- (ii) Active matrix LCD and Passive matrix LCD.
- Give at least two differences each.
4. Suppose R be the window which has its lower left corner at (-3, 1) and upper right corner at (2, 6). For each of the following line segment, state whether it is visible, invisible or partially visible. 5
- (a) (-4, 2) to (-1, 7)
- (b) (-1, 5) to (3, 8)

- (c) $(-2, 3)$ to $(1, 2)$
- (d) $(1, -2)$ to $(3, 3)$
- (e) $(-4, 7)$ to $(-2, 10)$

In case of partially visible find the points of intersection with window.

5. (a) Find out a window to viewport transformation that transforms a rectangular window with corners $(1, 1)$, $(3, 1)$, $(3, 2)$, $(1, 2)$ to another window with corners $(0, 0)$, $(2, 0)$, $(1, 1)$, $(3, 1)$. Also write a C-function that will perform this transformation using open GL transformation function. 3
- (b) Explain the two character generation methods. Given a character set, which method will you prefer in case you are asked to generate characters with ten different sizes? Justify your answer with appropriate reasons. 2
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