

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

M.Sc. (MACS)

Term-End Examination

June, 2015

00778

MMTE-004 : COMPUTER GRAPHICS

Time : $1\frac{1}{2}$ hours

Maximum Marks : 25

(Weightage : 50%)

*Note : Question no. 1 is compulsory. Attempt any three questions from questions no. 2 to 5. Use of calculator is **not** allowed.*

1. State whether the following statements are *true* or *false*. Justify your answer with the help of a short proof or a counter example. $5 \times 2 = 10$
- (a) Two successive reflections about an axis do not change the original object position.
 - (b) Persistence is the time it takes the emitted light from the screen to decay to one-tenth of its original intensity.
 - (c) A circle always remains a circle after perspective projection.

- (d) If the sequence of commands are :

`glColor3f(1, 1, 1)`

`glColor3f(0, 1, 0)`

`glVertex3f(1, 1, 1)`

`glVertex3f(2, 2, 2)`

then the Color of the Vertex(1, 1, 1) is a mixture of red, green and blue.

- (e) Resolution of CRT is dependent on its physical dimensions (height and width).

2. (a) Indicate which raster location would be chosen by DDA algorithm when scan is converting a line from pixel co-ordinate (0, 0) to pixel co-ordinate (4, 6). Do three iterations only. 3

- (b) Distinguish between the following : 2

(i) Seed fill algorithm and Boundary fill algorithm.

(ii) Active matrix LCD and Passive matrix LCD.

3. (a) Find a transformation matrix to scale the square ABCD, A(0, 0), B(3, 0), C(3, 3), D(0, 3), three units in x-direction and three units in y-direction. 2

- (b) Find a matrix for parallel projection onto the plane $3x + y + 4z + 1 = 0$ using an orthographic projection. 3

4. (a) A polygon is given with vertices in the order $(10, 0)$, $(20, 30)$, $(30, 0)$, $(40, 30)$, $(30, 60)$, $(0, 60)$. Prepare an initial sorted edge list for scan lines polygon fill method. Also write down the active edge list for the scan lines $y = 10$ and $y = 50$. 3
- (b) Using Liang Barsky line clipping algorithm, clip a line segment with end points $(3, 7)$, $(3, 10)$, against a clipping window having corners $(1, 2)$, $(9, 2)$, $(9, 8)$, $(1, 8)$. 2
5. Find the equation of the Bezier curve having the points $(0, 0)$ and $(-2, 1)$ as the end controlled points and points $(7, 5)$ and $(2, 0)$ as the intermediate controlled points. 5
-