

Seat No. : _____

DE-126

December-2013

5 Years M.Sc. (CA & IT) Integrated (K.S.) 5th Sem. TY M.Sc.

Computer Graphics

Time : 3 Hours]

[Max. Marks : 100

Instruction : Draw figure wherever necessary.

1. Answer **all** : **20**

- (1) Write short note on color CRT.
- (2) Explain briefly charup direction. Also write the formula for determining Default step, True step, X-chrsp and Y-chrsp.
- (3) What do you mean by emissive and non-emissive displays ? Explain the working of any one non-emissive display device.
- (4) Answer in short :
 - (a) Define : Pixel
 - (b) How many colors are obtained in case of Beam Penetration Method ?
 - (c) Define : Aspect Ratio
 - (d) What is the minimum refresh rate required to avoid flicker in case of CRT ?
 - (e) What is the slope of second line if slope of first line is m_1 in case when 2 lines are perpendicular to each other ?

2. Answer **all** : **20**

- (1) Write the polygon absolute routine to draw polygons. Digitize how the algorithm will work for the following polygon.
 $n = 5$
 $ax = 0.1, 0.1, 0.5, 0.9, 0.9$
 $ay = 0.1, 0.6, 0.8, 0.6, 0.1$
- (2) Write down the filling routine for solid polygon filling & pattern filling.
- (3) Write the algorithm to insert text (character) instructions into display file and set the charup direction.
- (4) Answer in short :
 - (a) What is the range of opcodes for characters ?
 - (b) Write a routine to put instruction in the display file.
 - (c) What type of sort are use to sort polygon edges for filling polygon ?
 - (d) In even-odd test what does an even intersection mean ?
 - (e) What is the work of display file interpreter ?

3. Answer any **four** : 20
- (1) Explain 2D rotation applied to an object alongwith proper figure and mathematical representation.
 - (2) What is reflection ? Explain the steps for reflection about the line $y = mx + b$
 - (3) Write down the Cohen Sutherland algorithm for line clipping.
 - (4) Explain the working of Liang Barsky algorithm.
 - (5) Answer the following :
 - (a) Scale the x-direction by $\frac{1}{2}$, then rotate anticlockwise by $n/2$.
 - (b) Write down the transformation matrix for counterclockwise rotation by $5\pi /4$.
 - (c) Draw the block diagram of 2D transformation pipeline.
 - (d) Write the steps for Weiner Atherton clockwise polygon clipping.
 - (e) Write down the conditions for Point Clipping.
4. (A) Answer any **three** : 12
- (1) Write five points of difference between parallel projection & perspective projection.
 - (2) What is a segment ? Write the routine to delete any one segment.
 - (3) Write the routines to create a segment and close a segment.
 - (4) Answer in short :
 - (a) Draw 3-D transformation pipeline.
 - (b) Define : Shearing
 - (c) List the disadvantage of Cohen Sutherland algorithm.
 - (d) Write the reflection matrix for Y-axis reflection and line $Y = x$.
- (B) Write down the formula, general equation and transformation matrix for rotation about x-axis, y-axis and z-axis alongwith a proper figure. 8
5. Answer any **four** : 20
- (1) Write down the steps for rotation about any arbitrary axis not parallel to principal axis.
 - (2) What is parallel projection ? Explain the types of parallel projection.
 - (3) Explain briefly how will you perform 3-D clipping.
 - (4) Explain and derive the equation and transformation matrix for producing parallel projection on a viewing plane.
 - (5) Convert an unit square into a shifted parallelogram with $shy = \frac{1}{2}$. Create 2 set of results for $x \text{ ref} = -1$ and $x \text{ ref} = 0$.
A (0, 0) B (1, 0) C (1, 1) D (0, 1)