GANPAT UNIVERSITY
B. TECH. SEMESTER V (INFORMATION TECHNOLOGY)
REGULAR EXAMINATION NOV-DEC 2015
2IT503: COMPUTER GRAPHICS

Time: 3 Hours   **Total Marks: 70**

Instruction: 1. Figures to the right indicate full marks
                          2. Each section should be written in a separate answer book
                          3. Be precise and to the point in your answer

Section I

Que-1   12

A   Discuss the beam penetration and shadow mask method for display techniques.   4

B   Derive the necessary equations for Bresenham's line drawing algorithm.   4

C   Translate the square of position A(1,1),B(1,5),C(5,5) and D(5,1) with $T_x = 5$ and $T_y = 5$ and make its size twice that of original size.   4

OR

Que-1   12

A   Explain Raster scan display.   4

B   Simulate the points for a circle having radius R= 15 and centre point is (0, 0) using mid-point circle algorithm.   5

C   Magnify the triangle with vertices A(5,5), B(6,10) and c(12,8) to twice its size while keeping c(12,8) is fixed.   3

Que-2   11

A   What is modeling, world and viewing and normalized viewing coordinate? Show the transformation from modeling coordinates to the device coordinates.   4

B   Prove the followings:
     i.   Two successive rotation are additive.
     ii. Two successive scaling are multiplicative.

C   Perform a 45° rotation of rectangle about an arbitrary point p(10,2) with left top corner coordinate (10, 50) and right bottom corner coordinate (50, 15).   3

OR

Que-2   11

A   Derive the Matrix Representation for Reflection of an object with respect to the line y=x.   5

B   Explain Cohen-Sutherland line clipping algorithm. Clip the input line with end points (130,100) and (160,100). The top-left and bottom-right coordinates of the clip window are (100,130) and (150,95) respectively.   6

Que-3   12

A   Define the following terms: 6
     1. Refresh Buffer   3. interlacing   5. Bitmap
     2. Persistence   4. Pixmap   6. Vertical retrace

B   Consider three different raster systems with resolutions of 640 x 480, 1280 x 1024, and 2560 x 2048. What is the size of frame buffer (in bytes) for each of these systems to store 24 bits per pixel?   3

C   Discuss various applications of computer graphics.   3

Section II

Que-4   **12**

   A   What is Text clipping? Discuss various text clipping techniques.   4

   B   Discuss depth cuing and surface rendering.   4

   C   Show that reflection of the object with respect to origin is same as rotation of the object   4
with $\theta = 180$.

OR

Que-4   **12**

   A   What is pixel phasing? What is advantage of it?   4

   B   Discuss exterior clipping in detail. State the applications of it.   4

   C   Derive the DDA line drawing algorithm for lines with negative slope.   4

Que-5   **11**

   A   What do you mean by color of any object? Discuss any additive color model in detail.   5

   B   Discuss followings: 6
      1. 3D scaling with reference to fixed point (x_f, y_f, z_f)
      2. 3D reflection about XY and YZ plane

OR

Que-5   **11**

   A   Can you produce pure black color using CMY color model? Discuss any subtractive color   5
model in detail.

   B   What is 3D rotation? Discuss 3D rotations with respect to X-axis and Y-axis. Derive the   6
matrix representation for the same.

Que-6   **12**

   A   What is anti-aliasing? Discuss super-sampling technique.   3

   B   Discuss Initiator and Generator in the context of fractal geometry.   3

   C   State and explain 4-connected flood-fill algorithm to fill the inside region of any object.   3

   D   Give the difference between parallel and perspective projection.   3

END OF PAPER