Student Exam No. _____

GANPAT UNIVERSITY

B. Tech SEMESTER V COMPUTER ENGINEERING / INFORMATION TECHNOLOGY

REGULAR EXAMINATION OCT/NOV - 2011

CE/IT 503: COMPUTER GRAPHICS

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

Instructions:

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

Q.1

(A) Define following terms: **(04)**
1) Lambertian Reflectors 2) Rigid Body Transformation
3) Exterior clipping 4) Resolution

(B) Explain operation of an electron gun with an accelerating anode in Cathode-Ray Tubes. **(03)**

(C) State Digital Differential Analyzer Line Drawing algorithm and simulate for points (23,25) and (33,37) **(03)**

(D) Reflection with respect to origin is same as rotation with 180°.. YES/NO... give reason to your answer **(02)**

OR

Q.1

(A) State Bresenham's Line Drawing algorithm and simulate for points (22,30) and (33,37) **(04)**

(B) Explain loading of frame buffer. If (Xmin, Ymin) = (0, 0) and (Xmax, Ymax) = (1000,800) then calculate the address of (220,360). Assume uni-level buffer storage **(03)**

(C) Prove that the multiplication of transformation matrices of each of the following sequence of operations is cumulative **(03)**
- Two successive rotation
- Two successive scaling

(D) If scaling factor Sx = Sy = 4 then original object area will be $1/16^{th}$ of the area of scaled object..YES/NO...give reason to your answer **(02)**

Q.2

(A) State and simulate Mid point Circle algorithm for R = 9 and Center = (10,12) **(06)**

(B) Magnify the triangle with vertices A(5,5) B(6,10) and C(10,8) to twice its size while keeping C(10,8) is fixed. And then perform 45° rotation on scaled object about the line x=y. **(05)**

OR

Q.2

(A) State and simulate Mid point Ellipse algorithm for Rx = 7 and Ry = 9 with origin as center **(06)**

(B) Rotate a rectangular having left top co-ordinate (20, 40) and right bottom co-ordinate (60, 15) by 45° with pivot point (25, 25) **(05)**

Q.3

(A) Explain 3-D rotation of an object about an axis not parallel to one of the coordinate axis **(06)**

(B) Show that multiplication of two successive scaling operation of 3-D object is commutative but the same is not true for translation. **(03)**

(C) Explain Y-Shear in 3D. **(03)**

SECTION-II

Q.4

(A) Explain combined Diffuse and Specular Reflection with Multiple Light Sources and Derive necessary equation **(05)**

(B) Differentiate Set Element Pointer vs Offset Element Pointer **(03)**

(C) Explain Diffuse reflection in detail **(04)**

OR

Q.4

(A) What is aliasing? Explain any TWO Anti-aliasing techniques in detail **(05)**

(B) Explain fractal Dimensions **(03)**

(C) Discuss Editing Structure primitives with Example **(04)**

Q.5

(A) Explain Liang-Barsky line clipping algorithm and find clipped line (Interior) for given clip window and Input line **(06)**

Clip window

Left, Top → (8,55)

Right, Bottom → (40,20)

Input line

X_1, Y_1 → (5,27)

X_2, Y_2 → (40,57)

(B) What is Logical Classification of input devices? Explain any THREE in detail **(05)**

OR

Q.5

(A) Explain Cohen-Sutherland line clipping algorithm and find clipped line (Interior) clip for given window and Input line **(06)**

Clip window

Left, Bottom → (35,35)

Right, Top → (60,55)

Input line

X_1, Y_1 → (45, 25)

X_2, Y_2 → (65,65)

(B) Select some graphics application with which you are familiar and set up a user model that will serve as the basis for the design of a user interface for graphics applications in that area. **(05)**

Q.6

(A) Explain following 3-D viewing techniques **(06)**

- Perspective projection
- Parallel projection
- Depth cueing
- Stereoscopic view

(B) Explain Phong Specular Reflection model in detail **(06)**

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