

GANPAT UNIVERSITY**B. Tech SEMESTER V INFORMATION TECHNOLOGY****REGULAR EXAMINATION NOV/DEC - 2012****2IT 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: (05)
 1) Resolution 2) Aspect Ratio
 3) Point Clipping 4) Vertical retrace 5) Stereoscopic view
- (B) State Digital Differential Analyzer Line Drawing algorithm and simulate for points (15,17) and (27,23) (03)
- (C) Explain Shadow mask method. (04)

OR**Q.1**

- (A) State Bresenham's Line Drawing algorithm and simulate for points (21,45) and (33,37) (04)
- (B) Explain loading of frame buffer. If $(X_{min}, Y_{min}) = (0, 0)$ and $(X_{max}, Y_{max}) = (500, 200)$ then calculate the address of (361,120). Assume uni-level buffer storage. (03)
- (C) Differentiate Raster scan display and Random scan display (03)
- (D) Reflection with respect to origin is same as rotation with 180° . YES/NO... give reason to your answer. (02)

Q.2

- (A) State and simulate midpoint circle algorithm for $R = 11$ with Center as origin. (06)
- (B) Prove the followings: (05)
 a) Two successive translation are additive.
 b) Two successive rotation are additive.
 c) Two successive scaling are multiplicative

OR**Q.2**

- (A) State and simulate midpoint ellipse algorithm for $R_x = 9$ and $R_y = 6$ with origin as center (06)
- (B) Magnify the triangle with vertices A(5,5) B(6,10) and c(12,8) to twice its size while keeping Center of triangle fixed. Perform 45° rotation. (05)

Q.3

- (A) Prove that $R(\theta) = T^{-1} \cdot R_x^{-1}(\alpha) \cdot R_y^{-1}(\beta) \cdot R_z(\theta) \cdot R_y(\beta) \cdot R_x(\alpha) \cdot T$ (06)
- (B) Explain flood-fill algorithm. How it is differ from boundary-fill algorithm? (03)
- (C) Explain Z-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 Element pointer vs Label (03)
- (C) Explain diffuse reflection in detail (04)

OR

Q.4

- (A) What is logical classification of input devices? Explain any TWO in detail. (05)
- (B) Explain fractal dimension. (02)
- (C) Write down steps to perform given editing operations on structure. (05)

XYZ structure

setLinetype (1)

setInteriorStyle (solid)

setPolylineColourIndex(1C1)

polyline1(4, points1)

setLinetype (3)

setInteriorStyle (hollow)

setPolylineColourIndex(2)

polyline2(3, points1)

- 1) Change Interior Style of polygon1 to "solid"
- 2) Change Line Color of Polygon2 to "4"
- 3) Change PolylineColour Index to 1d2.

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, Bottom $\rightarrow (35, 30)$

Right, Top $\rightarrow (70, 65)$

Input line

$X_1, Y_1 \rightarrow (20, 20)$

$X_2, Y_2 \rightarrow (75, 60)$

- (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)

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, Top $\rightarrow (110, 130)$

Right, Bottom $\rightarrow (150, 95)$

Input line

$X_1, Y_1 \rightarrow (130, 100)$

$X_2, Y_2 \rightarrow (160, 100)$

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

Q.6

- (A) What is aliasing? Explain any THREE anti-aliasing techniques in detail. (06)
- (B) Explain Phong Specular Reflection model in detail. (06)

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