

2012

COMPUTER GRAPHICS

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

GROUP – A

(Multiple Choice Type Question)

1. Choose the correct alternatives for the following: 10 x 1 = 10
 - i) Raster means
 - a) series of parallel lines
 - b) series of parallel blocks
 - c) series of parallel medium
 - d) series of parallel sweeps.
 - ii) Physical Aspect Ratio is termed as
 - a) Ratio of width of the frame to its height
 - b) Ratio of width of pixel to its height
 - c) Ratio of width of block to its height
 - d) All of these.
 - iii) The maximum number of dots that can be displayed without overlap on a CRT is referred to as
 - a) Refresh Rate
 - b) Interlacing
 - c) Screen Resolution
 - d) None of these.

- iv) Achromatic light is
- a) Quantity of light b) Quantity of colour
c) Quantity of darkness d) Quantity of shading.
- v) How many channels are specified by MIDI standards?
- a) 16 b) 24
c) 32 d) 48.
- vi) The memory area which holds a set intensity values for all the screen points is
- a) frame buffer b) refresh RAM
c) video cache d) RAM.
- vii) Using odd parity rule, if the number of polygon edges crossed by a line, from a point is odd, then
- a) P is an exterior point
b) P is an interior point
c) P is on the edge point
d) odd parity-rule alone is not sufficient to judge.
- viii) If S_x and S_y are scaling factors applied in X and Y directions respectively, on $P(x, y)$, the output point coordinates after applying scaling operation is
- a) $x_1 = 1/x \cdot S_x, y = y \cdot S_y$
b) $x_1 = x + S_x, y = y + S_y$
c) $x_1 = x \cdot S_x, y = 1/y \cdot S_y$
d) $x_1 = x \cdot S_x, y = y \cdot S_y$.
- ix) Aliasing means
- a) rendering effect b) shading effect
c) staircase effect d) cueing effect.

- x) Perspective projection is characterized by the
- a) view plane alone
 - b) direction of projection and the view plane
 - c) centre of projection and the view plane
 - d) centre of projection alone.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 x 5 = 15

2. What are the differences between raster scan and vector scan technique?
3. Perform a 30° rotation of a triangle A(2, 2), B(3, 3), C(6, 5) about
 - a) the origin
 - b) a point P(-8, -5). 2 + 3
4. Derive mid-point line drawing algorithm.
5. Briefly explain the different types of file format used in image compression.
6.
 - a) What is resolution of an image?
 - b) Compute the size of a 640×480 image at 210 ppi.
 - c) What is the relation between RGB and CMYK colour model? 1 + 2 + 2
7. Describe how a 3D object is presented on the screen using perspective projection. Take a simple object from illustration.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

8. a) Why is a homogeneous co-ordinate system needed in transformation matrix? $3 + 5 + 6 + 2$
- b) Derive the transformation matrix for rotation about any axis.
- c) Explain the reflection of a 2D figure on $y = m x + c$. Derive its component matrix.
- d) What do you mean by shearing? $2 + 5 + 6 + 2$
9. a) Using mid-point circle drawing algorithm draw a circle with radius of 10 units.
- b) Derive the algorithm of Flood-fill.
- c) What do you mean by hidden surface removal? $7 + 5 + 3$
10. a) Explain the term 'control points'.
- b) What do you mean by hidden surface removal? Write down the z-buffer algorithm.
- c) Define morphing and masking. $3 + 7 + 5$
11. a) What is MIDI? Discuss the advantage of MIDI over digitization. $2 + 3$
- b) Describe the method of digitization. 6
- c) What is the difference between:
- i) lossy compression and lossless compression?
- ii) video and animation? 4

12. Write short notes on any *three* of the following:

3 x 5

- a) Virtual Reality
- b) MPEG
- c) Projection
- d) Z-buffer algorithm
- e) Painter algorithm
- f) Anti-aliasing.

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