

**PDFZilla – Unregistered**

**PDFZilla - Unregistered**

**PDFZilla - Unregistered**

Total No. of printed pages = 6

**CS 131503**

Roll No. of candidate

--	--	--	--	--	--	--	--	--	--	--

**2017**

**B.Tech. 5th Semester End-Term Examination**

**Computer Science Engineering**

**COMPUTER GRAPHICS**

Full Marks – 100

Time – Three hours

---

The figures in the margin indicate full marks  
for the questions.

Answer question No. 1 and any *six* from the rest.

1. Answer *all* the questions : (10 × 1 = 10)

(a) Raster is a synonym for the term :

- (i) Array
- (ii) Matrix
- (iii) Model
- (iv) All of the above

(b) A pixel can be arranged in a regular

- (i) 1D grid
- (ii) 2D grid
- (iii) 3D grid
- (iv) None of the above

**[Turn over**

---

- (c) Higher the number of pixels, \_\_\_\_\_ is the image quality
- Bad
  - Smaller
  - Better
  - None of the above
- (d) The center of the display screen is computed as:
- $X_{\max}, Y_{\max}$
  - $X_{\max}/2, Y_{\max}/2$
  - $X_{\max}/3, Y_{\max}/3$
  - None of the above
- (e) Oblique projection with an angle of  $45^\circ$  to the horizontal plane is called as :
- Cabinet projection
  - Isometric projection
  - Cavalier projection
  - None of these
- (f) The sub-categories of axonometric viewing are :
- Cavalier, cabinet, isometric
  - Cavalier, cabinet
  - Isometric diametric, trimetric
  - Isometric, cavalier, trimetric

- (g) What rotation does the transformation matrix

$$\begin{pmatrix} \cos \theta & 0 & \sin \theta & 0 \\ 0 & 1 & 0 & 0 \\ -\sin \theta & 0 & \cos \theta & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix} \text{ represent?}$$

- A rotation through  $\theta$  about the x-axis.
  - A rotation through  $\theta$  about the y-axis
  - A rotation through  $\theta$  about the z-axis
  - None of the above
- (h) The process of determining the suitable pixels for representing image .
- Animation
  - Rasterization
  - Scan Conversion
  - Quantization
- (i) How much memory is taken by a pixel of black and white image?
- 1 bit
  - 2 bit
  - 1 byte
  - 1 nibble

- (j) A polygon is defined by a sequence of \_\_\_\_\_ and edges.
- (i) Ending lines
  - (ii) Points
  - (iii) Vertices
  - (iv) None of the above
2. (a) Define aspect ratio with an example.
- (b) How much time is spent scanning across each row of pixels during screen refresh on a raster system with resolution of  $1280 \times 1024$  and a refresh rate of 60 frames per second?
- (c) What are the differences between physical and synthetic images? (5 + 5 + 5 = 15)
3. (a) Give the differences between CPU and GPU.
- (b) Explain the OpenGL architecture.
- (c) Explain the significance of double buffering. (5 + 5 + 5 = 15)
4. (a) What is the significance of homogeneous coordinates in transformation of objects?
- (b) Describe about OpenGL culling.
- (c) Explain events, callbacks and picking in OpenGL. (5 + 5 + 5 = 15)

5. (a) Prove that two 2-D rotations above the origin is commutative. i.e.  $R1.R2 = R2.R1$ .
- (b) A triangle is located at P (10, 40), Q (40, 40), R (40, 30). Find the coordinates of the triangle when :
- (i) Triangle is rotated by  $90^\circ$  about the point Q
  - (ii) Triangle is rotated by  $45^\circ$  about an arbitrary point X (20, 30) (5 + 10 = 15)
6. (a) Find the transformation matrix that converts a square with diagonal vertices A(0,3) and (-3,6) into a unit square at the origin.
- (b) What is viewing? Explain the different types of viewing. (5 + 10 = 15)
7. (a) Give the differences between object space and image space viewing.
- (b) Explain Bresenham's line drawing algorithm. Use Bresenham's line drawing algorithm to draw the line from (-3,0) to (4,4). (5 + 10 = 15)
8. (a) What is a light source? Explain the different types of light sources.
- (b) Given a clipping window whose lower left corner is (-3,1) and upper right corner is at (2,6). Using any line clipping algorithm determine the visible portion of the lines whose end points are given as :
- (i) A (-4, 2) and B (-1, 7)
  - (ii) C (-1, 5) and D (3,8)
  - (iii) E (-2,3) and F (1,2). (5 + 10 = 15)