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## TCS-702

### B. Tech. (CSE) (Seventh Semester) Mid Semester EXAMINATION, 2017

#### COMPUTER GRAPHICS

Time : 1:30 Hours ]

[ Maximum Marks : 50

Note : (i) This question paper contains two Sections.

(ii) Both Sections are compulsory.

#### Section—A

1. Fill in the blanks/True-False : (1×5=5 Marks)

(a) OpenGL is a ..... rendering API independent of windowing or underlying operating system.

(b) WebGL is an OpenGL implementation for .....  
.....

(c) Raster scan display has good resolution as compared to random scan display.

(True/False)

(d) VBO stores vertex data on video RAM.

(True/False)

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- (e) Homogeneous coordinates are a way to represent N-dimensional coordinates with N + 1 numbers. (True/False)

2. Attempt any *five* parts : (3×5=15 Marks)

- Glut is a library used with OpenGL implementations. Explain, why is it used.
- Differentiate between perspective and orthographic views in camera projections.
- Explain VBO and how is it created.
- Why is homogenous coordinates used in computer graphics instead of Cartesian coordinates ?
- How OpenGL API is used in mobiles (embedded systems) and web browser to render graphics ?
- GL\_LINES, GL\_LINE\_STRIP and GL\_LOOP are some of the geometry primitives in OpenGL. How can we differentiate between the three based on their utility in OpenGL ?

#### Section—B

3. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)

- Write a short note on input devices. Elucidate their importance in computer graphics.
- OpenGL is just a rendering API and it does not provide functions for drawing higher

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order curves, windowing etc. Which other libraries can we use to perform these functions ? Explain in detail.

- Give new vertices of triangle ABC with original vertices A(-2, 2), B(0, 0) and C(0, 4), when rotated 90 degrees clockwise about the origin of 2-D coordinate system.

4. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)

- What is Computer Graphics ? Give some applications of computer graphics in various fields.
- OpenGL is an API which behaves as a state machine. Write a simple program to show basic working of OpenGL functions.
- RGBA color model is extensively used in computer graphics with simulation and modeling tools. Explain in detail about the model and how is it used to render millions of shades of colors.

5. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)

- Derive translation vector equations and rotation matrix for a point in 2-D plane.

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- (b) What is composite transformation ? Explain its use in rotating a point  $p(x_1, y_1)$  about another point  $q(x, y)$ .
- (c) Differentiate between raster scan and random scan displays using clear diagrams.