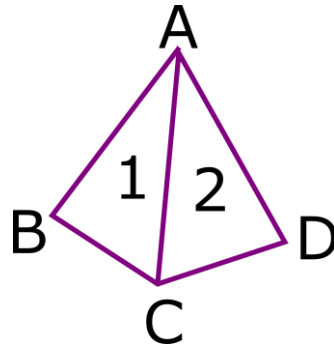| Name:<br><br>Enrolment No: | |
|---|---|

**UPES**
**End Semester Examination, May 2023**
**Course:   Web Programming for Graphics and Gaming(HTML5&WebGL)**
**Semester    : VI**
**Program:  BTech CSE in GG**                                    **Time        : 03 hrs.**
**Course Code: CSGG3012**                                    **Max. Marks: 100**

**Instructions: Code specification has to be used according to WebGL2.0**

| SECTION A<br>(5Qx4M=20Marks) | | | |
|---|---|---|---|
| **S. No.** | | **Marks** | **CO** |
| Q1 | Draw neatly the 3D viewing frustum. | **4** | **CO1** |
| Q2 | Explain the purpose of a Rasterizer in graphics programming. | **4** | **CO2** |
| Q3 | Describe how data is passed to the fragment shader from the VBO. | **4** | **CO2** |
| Q4 | Write the two lines of code in WebGL to clear the background to blue color and alpha = 0.7. | **4** | **CO1** |
| Q5 | Draw the default coordinate system in WebGL. | **4** | **CO2** |
| SECTION B<br>(4Qx10M= 40 Marks) | | | |
| Q6 | Describe the mat4.lookAt() method. Take 3 different types of values for the method and draw the corresponding outputs. | **10** | **CO3** |
| Q7 | Write the vertex shader code for displaying a 3D geometry on a web page with WebGL. Please also write about the purpose of the matrices used in vertex shader. | **10** | **CO3** |
| Q8 | Write the HTML code to add two input fields and a 'submit' button. Also write the JS code to fetch the value from the two fields once the user presses the button. | **10** | **CO4** |
| Q9 | Take any three coordinates, use gl.drawElements() method with appropriate arguments in order to draw three points, 2 lines, one triangle. Also draw neatly the coordinates used.<br>OR<br>Describe the 7 steps which are required to prepare a texture object in WebGL. | **10** | **CO2** |
| SECTION-C<br>(2Qx20M=40 Marks) | | | |
| Q10 | For the geometry given below<br>    i)      Draw the required coordinates | **20** | **CO4** |

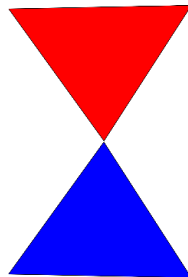| | | | |
|---|---|---|---|
| | ii)        Mention the JS array<br>iii)      Write the Vertex Shader code<br>iv)      Mention the fragment shader code<br>v)       drawElements() method call<br><br>Please note the color of the geometry is purple.<br><br> | | |
| Q11 | For the triangle geometry given below<br>i) Specifying the JS array for vertex information<br>ii) vertex shader code<br>iii) fragment shader code<br>iv) vertexAttribPointer() method call for coordinate and colour information<br><br>Please note the color of one triangle is red and for the other is blue.<br><br><br><br>OR<br>Write the WebGL code (only major 5 steps) to map below image over a triangle geometry.<br><br> | **20** | **CO3** |