Department of Computer Science and Software Engineering

SEMESTER 1, 2018 EXAMINATIONS

CITS3003
Graphics and Animation

FAMILY NAME:_____   GIVEN NAMES: _____

STUDENT ID: ☐☐☐☐☐☐☐☐   SIGNATURE: _____

This Paper Contains: **4** pages **(including title page)**
Time allowed: **2:00 hours**

INSTRUCTIONS:

There are 15 questions in total. Answer all questions on the provided answer sheets and return the question paper along with your answer sheets. Write your names and student numbers on the question paper and any answer sheets you use.

Calculators, notes and books are not allowed.

Total marks are 70.

PLEASE NOTE

Supervisors Only – Student left at:

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Q 1. [6 marks]
Explain the pipeline architecture of OpenGL, include a diagram that relates the different components of the pipeline.

Q 2. [2 marks]
How can we ensure that the aspect ratio of objects is preserved in the display window in OpenGL when the window is resized?

Q 3. [2 marks]
What are the differences between _uniform _variables and _in_ variables in a vertex shader?

Q 4. [3 marks]
Explain what each function call does in the following.

```
glutReshapeFunc(myreshape);
glutMotionFunc(mymotion);
glutMainLoop();
```

Q 5. [3 marks]
Explain how the following function works in OpenGL.

```
gluLookAt(eyeX,eyeY,eyeZ,centerX,centerY,centerZ,upX,upY,upZ)
```

Q 6. [4 marks]
Name four types of transformations that can be applied to points and vectors.

Q 7. [4 marks]
Input devices for a computer program can be categorized as "physical devices" and "logical devices". Differentiate between the two types and give two examples of each.

Q 8. [6 marks]
Explain with the help of a diagram, how you would define a perspective view volume in OpenGL and name two functions that can be used to achieve perspective view.

Q 9.   [6 marks]
Explain the main differences between Gourard Shading and Phong Shading.

Q 10.   [6 marks]
Explain the z-buffer algorithm and the painter's algorithm and give an example where the painter's algorithm fails.

Q 11.   [5 marks]
Name and briefly describe five types of colour/material properties that can be adjusted to change the appearance of an object in OpenGL?

Q 12.   [6 marks]
Explain any three types of parameters that determine how texture is applied in OpenGL.

Q 13.   [6 marks]
Name and briefly explain the three types of mapping techniques in OpenGL. Give an example where each mapping type can be applied.

Q 14.   [5 marks]
What is the Catmull-Clark subdivision surface technique used for and what are its three desirable properties.

Q 15.   [6 marks]
Briefly explain what rigging and skinning mean in graphics programming.

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