

Name: _____

Student Number: _____

Signature: _____

The University Of New South Wales

Sample Exam - Written

SAMPLE

COMP3421 & COMP9415

Computer Graphics

Time allowed: **1 hours**

Total number of questions: **14**

Total number of marks: **28**

Number of pages: 4

Note: Actual exam will be 2 hours and worth 60 marks

Examination Materials: Rulers, Textbooks, print-outs and hand written notes **permitted**.

UNSW Approved Calculators **may** be used.

Questions are **NOT** worth equal marks.

Answer **all** questions.

This paper may **not** be retained by the candidate.

There are 3 parts. Part A, B and C. Answer each part in a separate booklet.

Answers must be written in ink. Except where they are expressly required, pencils may be used only for drawing, sketching or graphical work.

Examiner's Use Only:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total	

Part A:

Question 1

(5 marks)

The normal at a vertex $(0, 1, 2)$ on a surface is $(0, 4, 5)$. The light source is at $(0, 1, 4)$. The intensity of the light is $(0.9, 0, 0.2)$. The diffuse co-efficient of the surface is $(0.4, 1, 0)$. What will the RGB colour of the vertex be? Assume there is no specular, ambient or any other light reflected by the surface.

Question 2

(6 marks) Suppose you want a camera positioned at point $(3, 2, 1)$ in world co-ordinates looking towards point $(1, 0, -1)$ such that the x-axis of the camera's coordinate frame is parallel to the x-z plane. Assume no scaling has been applied to it.

- (a) What would the camera's local coordinate frame be (expressed as a matrix)? *(3 marks)*
- (b) What would the view matrix be for this camera? *(2 marks)*
- (c) Give the camera co-ordinates of a vertex with world co-ordinates of $(-1, 1, 3)$. *(1 mark)*

Part B: Short answer questions

Provide short 3-4 sentence answers to the following.

Question 3

(3 marks) What are BSP trees? Give one application for which they can be used? What problem do they solve in that application?

Question 4

(3 marks) What is the difference between a fragment shader and vertex shader? How do they relate?

Question 5

(3 marks) What is trilinear filtering?

Part C: Design problems

Provide one paragraph answers to the following.

Question 6

(4 marks) You are applying for a job as a computer graphics expert. In the technical interview they ask you what kind of modelling techniques you would use to model the shape and surface of a shiny metal teapot for a real-time game. Give reasons for your choices.

Question 7

(4 marks) You want to render a scene with soft shadows and realistic diffuse lighting. What technique/s would give the most realistic outcome? What are the pros and cons of this/these techniques?

— End of exam —