



OFFICE OF TASMANIAN
ASSESSMENT, STANDARDS
& CERTIFICATION

PLACE YOUR CANDIDATE
LABEL HERE

COMPUTER GRAPHICS and DESIGN

(CGD315118)

Time allowed for this paper

- Working time: 2 hours
- Plus 15 minutes recommended reading time

Pages:	24
Questions:	26

Candidate Instructions

1. You **MUST** make sure that your responses to the questions in this examination paper will show your achievement in the criteria being assessed.
2. There are **FOUR** sections to this paper.
3. You must answer:
 - **FOUR** questions from **Section A**
 - **FOUR** questions from **Section B**
 - **ONE** question from **Section C**
 - **ONE** question from **Section D**
4. All answers must be written in the spaces provided on the examination paper.
5. The recommended time to be spent on a section is given in the instructions in that section.
6. Care should be taken with the presentation of answers. The answers should be comprehensive and to the point. Diagrams are encouraged but **NOT** to the exclusion of all written text.
7. All written responses must be in English.

On the basis of your performance in this examination, the examiners will provide results on each of the following criteria taken from the course statement:

Criterion 6 Analyse the impact of design in society.

Criterion 7 Describe and apply key features, applications and influences on contemporary computer graphics systems.

BLANK PAGE

SECTION A

Answer **FOUR** questions from this section.

All questions are of equal value.

It is recommended that you spend approximately **20 minutes** on this section.

This section assesses **Criterion 7**.

Question 1

A 3D modeller uses the lighting setup shown in Figure 1. After completing some test renders, the modeller relocates Light 1 to a new position as shown in Figure 2.

Describe what effect moving Light 1 will have on subsequent test renders.

For
Marker
Use
Only

3D Lighting Setup (overhead view)

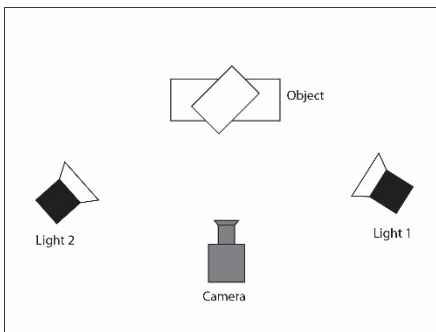


Figure 1

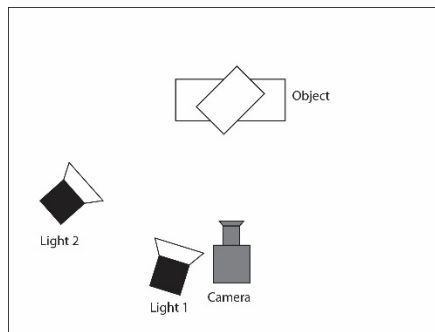


Figure 2

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Section A continues

Section A (continued)

**For
Marker
Use
Only**

Question 2

3D computer graphics software allows the user to save their work with open file types, such as .obj and .dxf, as well as the software's own proprietary file type.

What are the advantages and disadvantages of using open file types?

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Question 3

Identify the type of graphics software that has been used to produce Figure 3. Explain what is wrong with the image. Recommend a more appropriate choice of software and justify your choice.



Figure 3

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Section A continues

Section A (continued)

**For
Marker
Use
Only**

Question 4

Describe the process of 3D rendering as it applies to output files.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Question 5

3D software uses the same system to create effects like fire, explosions, smoke, moving water and sparks. Name and briefly describe the system and how it can be applied.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

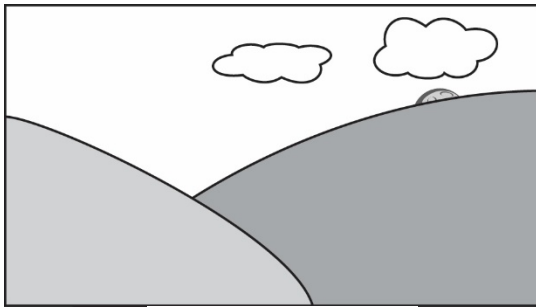
.....

Section A (continued)

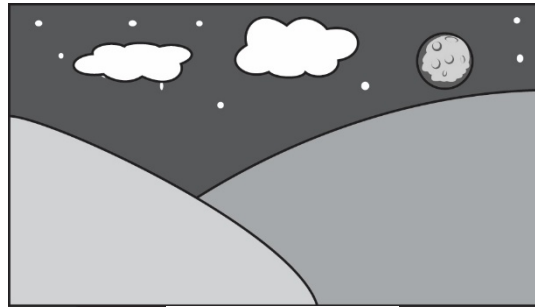
Question 6

Two frames in an animation (Frame 1 and Frame 50) are shown below. Describe what the animator would expect to see on the timeline, between the two frames, as they are undertaking the animation process.

**For
Marker
Use
Only**



Frame 1



Frame 50

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Section A continues

Section A (continued)

**For
Marker
Use
Only**

Question 7

Describe the CMYK colour system, including where and how it is used.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Question 8

Computer graphics designers rely heavily on output devices to display their work. Name **two** contemporary output devices and explain why they are important to the computer graphics designer.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

SECTION B

Answer **FOUR** questions from this section.

All questions are of equal value.

It is recommended that you spend approximately **20 minutes** on this section.

This section assesses **Criterion 6**.

Question 9

Repetitive use of smart phone and tablet devices may lead to sore thumbs and fingers. What considerations could app designers take into account when designing the user interface for such devices?

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

**For
Marker
Use
Only**

Section B continues

Section B (continued)

**For
Marker
Use
Only**

Question 10

Figure 4 shows the commonly used symbols for public toilets. Figure 5 shows symbols recently seen on toilets in a local restaurant. What would be the key considerations for a designer when moving away from a commonly accepted design such as the one shown in Figure 4?



Figure 4

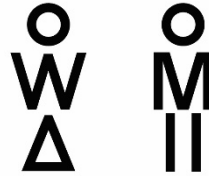


Figure 5

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Section B continues

Section B (continued)

**For
Marker
Use
Only**

Question 11

You have been asked by the local tourism association to produce a digital slide presentation to highlight local attractions. As you are short of time, you decide to use images from the Internet rather than produce your own. What are the key social issues involved in taking this approach?

.....

.....

.....

.....

.....

.....

.....

.....

.....

Question 12

The Tolix chair, shown in Figure 6, is often described as a ‘design classic’. First appearing in the 1930s, it is still manufactured in its original design today. The chair serves as a standard of its kind and remains up to date.

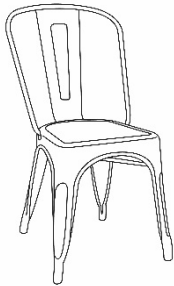


Figure 6

Identify and discuss one other object that you consider to be a ‘design classic’. Justify your choice.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Section B continues

Section B (continued)

**For
Marker
Use
Only**

Question 13

When it comes to design many argue that ease of use is more important than user desirability. When you are designing a new object, which do you think is the most important and why?

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Question 14

Smart phones now use apps that provide maps and travel directions. As phones should not be used when driving, what features should designers include to minimise the possibility of inappropriate use?

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Section B continues

Section B (continued)

**For
Marker
Use
Only**

Question 15

Many online shopping sites allow for online viewing and purchasing. How could web designers make the online shopping user experience more like an in-store experience?

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Question 16

List and analyse the advantages of researching historical design development when designing a new product.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

BLANK PAGE

SECTION C

Answer **ONE** question from this section.

It is recommended that you spend approximately **40 minutes** on this section.

This section assesses **Criterion 6**.

Question 17

A tactile version of noughts and crosses to help children with a vision impairment play the game is to be developed. The design brief requires playing pieces to be easily identified by touch.

- (a) Outline the design factors you would incorporate into your design brief. Use sketches and notes to support your response.
- (b) Discuss how your design meets society's expectations of designers in relation to supporting people with varying abilities.
- (c) What audience could you use to test the prototype? Analyse the appropriateness of the chosen audience to the design brief.

Question 18

Your local city council has decided to host a New Year's Eve event to celebrate the start of 2019. It wants to have a 3D logo that could be used to promote the event. You have decided to submit ideas for consideration.

- (a) List and describe the design considerations you would take into account when developing your ideas for the 2019 event logo.
- (b) Develop **two** alternative ideas for the logo for the New Year's Eve event.
- (c) Analyse how social and ethical factors have influenced the designs.

Section C continues

Section C (continued)

Question 19

With summer approaching, an online company has decided to sell a range of 3D object files that can be printed on home 3D printers and used outdoors. You have decided to submit models for consideration by the company.

- (a) List and describe the social considerations you would take into account when developing your 3D printable models.
- (b) Present **two** 3D sketches showing the design development for your object idea.
- (c) Analyse the external design factors that have influenced your ideas.

Question 20

Your local fire authority is concerned that not enough residents are installing or maintaining smoke alarms. They have organised your design team to create a two-minute 3D animated television advertisement to raise residents' awareness of the importance of having operational smoke alarms.

- (a) It is hoped that the advertisement could be used for several years. How could you ensure that it will remain relevant into the future?
- (b) How would you use the success or failure of other advertising campaigns to determine your final idea?
- (c) Sketch out a storyboard sequence of at least eight panels that will provide a detailed visual overview of the proposed 3D animated advertisement. Include text and planned music/audio/sound effects.

Section C continues

Section C (continued)

Complete sketches on this page

Question No:.....

**For
Marker
Use
Only**

Section C continues

SECTION D

Answer **ONE** question from this section.

Your answer should consist of an extended response.

Clearly indicate which question you are answering.

It is recommended that you spend approximately **40 minutes** on this section.

This section assesses **Criterion 7**.

Question 21

Augmented Reality is gaining acceptance. Define and describe Augmented Reality, including its various uses and discuss potential areas of development.

Question 22

Explain the process of solid modelling. In your response analyse how the process relates to a range of manufacturing techniques (minimum of three).

Question 23

Animators use both 2D and 3D animations in the gaming industry.

Using examples, briefly describe 2D and 3D animation. Discuss the differences in terms of: the associated design processes; the software used to create them; and the likely production times and costs.

What are the benefits of combining both 2D and 3D components within a sequence?

Question 24

Describe the function of a render farm. Discuss how it is used, the key computer hardware required, and why the render farm is important to the render process.

Question 25

Examples of techniques used in the process of animating 3D characters are: bones; inverse kinematics; and motion capture. Analyse the interrelationships between these techniques. Include discussion of other relevant techniques.

Question 26

Explain how collision objects and collision detection works. Analyse the use of these techniques in animating particle systems and solid objects.

For
Marker
Use
Only

Section D continues

BLANK PAGE

BLANK PAGE



OFFICE OF TASMANIAN
ASSESSMENT, STANDARDS
& CERTIFICATION

This question paper and any materials associated with this examination (including answer booklets, cover sheets, rough note paper, or information sheets) remain the property of the Office of Tasmanian Assessment, Standards and Certification.

CGD315118 Computer Graphics and Design 2018 – Sample Answers

Section A

1. A 3D animator uses the lighting setup shown in Figure 1. After completing some test renders it is decided to relocate Light 1 to a new position as shown in Figure 2.

Describe what you believe will be the effect on subsequent test renders.

- Potentially too much light on one side of the object
 - Adjustments would need to be made to the intensity of the two lights
 - Shadowing on the left side of the object
 - Left side of the object has no light source
 - Reflection from the front face of the object is now back towards the camera
2. Most 3D computer graphics software allows users to save their work with open file types such as .obj as well as the software's own proprietary file type. What are the advantages and disadvantages of each type?
 - Open file types
 - a geometry definition file format
 - easy transfer between different types of software ie can be exported and opened by various 3D image editing programs
 - different stake holders can have different systems
 - detail can be lost in transfer
 - because it is open files may still contain software specific information
 - Proprietary file types
 - Perfect for single software application use
 - No loss of detail or quality
 - Still work when software features are upgraded
 3. What type of graphics software would have been used to produce this image? Why has it not been successful? What would have been a better choice?
 - Created with raster graphics (bitmapped)
 - Software example – Paint, Photoshop
 - Not scalable as information is stored pixel by pixel. ie cannot be scaled up or down without the loss of detail
 - Has become pixelated because of scaling
 - Better choice is vector graphics
 - Vector graphics example – Adobe Illustrator
 - Information stored mathematically
 - Can be scaled up and down
 4. Describe the process of 3D rendering as it applies to output files.
 - Process of automatically converting 3D wire frame models into 2D images on a computer
 - May be photorealistic effects or non-photorealistic rendering.
 - Final process of creating the actual 2D image or animation from the prepared scene
 - Similar to taking a photo or filming the scene
 - Can be slow depending on the detail required

5. 3D software uses the same system to create effects like fire, explosions, smoke, moving water and sparks. Briefly describe the system and how it is used.
 - Particle systems
 - Controlled by a particle emitter
 - Particles used to represent the particular effect to be created
 - Particles are assigned different parameters to make them act in different ways

6. Two frames in an animation (Frame 1 and Frame 50) are shown above. Describe what the animator would expect to see on the time line as they are undertaking the animation process.
 - 4 objects or layers on the timeline – foreground, background, clouds, moon
 - Foreground and background layers key framed so that there is no movement during the 25 frames of the animation that we can see
 - Moon and cloud objects have motion assigned to them over the 25 frames
 - Background object is animated to change colour during the animation. This may be gradual over time or instantly at a particular key frame. There is not enough information to determine which.
 - Stars begin to glow. These may be animated to twinkle although there is not enough information to determine this.

7. Describe the CMYK colour system including where and how it is used.
 - CMYK stands for Cyan, Magenta, Yellow and Key (black)
 - These are the four colours of ink used in the traditional method of printing hardcopies of images
 - By overlapping these four ink colours in various concentrations, a huge number of other colours can be created
 - Sometimes called four colour printing or full colour printing
 - Is a subtractive colour system
 - Digital colour images need to be saved in the CMYK colour system to obtain reliable prints

8. Computer graphics designers rely heavily on output devices to display their work. Name **two** contemporary output devices and describe why they are important to the computer graphics designer.
 - Personal choice of output device – justification needed
 - 3D melted filament printer (prototyping)
 - Curved monitor (screen real estate, multi-tasking)
 - VR headset (if designing for VR worlds)

Section B

9. Many people suffer from sore thumbs and fingers from repetitive use of smart phone and tablet devices. What considerations could app designers take into account when designing the user interface for such devices?
- Social considerations
 - User expectations
 - Plan for overuse syndromes e.g. build pauses into games
 - In app suggestions e.g. vary keyboard
 - Limit characters in a single message
10. Figure 1 shows the universal symbol for public toilets. Figure 2 shows symbols recently seen on toilets in a local restaurant. What would be the key considerations for a designer when moving away from a universally accepted design such as the one shown here?
- Find a design solution that accommodates the needs of the population
 - Designers should explore design solutions that are inclusive e.g. designs that push boundaries without compromising integrity or quality
 - Where more than one option is available for a design feature, choose the more inclusive feature
 - Designers should investigate alternatives that provide equivalent experiences for users.
11. You have been asked by the local tourism association to produce a PowerPoint presentation to highlight local attractions. As you are short of time you decide to use images from the Internet rather than produce your own. What are the key social issues involved in taking this approach?
- Intellectual property discussion
 - Issue of copyright
 - Rights of owner
 - Seek permission for use
 - Recognition of source of images
12. The Tolix chair, shown at right, is often described as a 'design classic'. First appearing in the 1930s it is still manufactured in its original design today. It has a timeless aesthetic and functional value. It serves as a standard of its kind and remains up to date. Identify and discuss one object that you consider to be a 'design classic'. Justify your choice.
- Examples might be Zig Zag Chair, Coca Cola bottle, Swiss Army Knife, paper clip
 - Justification would be by personal choice but should address why the item is; timeless, functional, instantly recognisable, defines the genre
13. In design many argue that usability is more important than user desirability. When designing a new object which do you think is the most important and why?
- Discussion of form vs function
 - Shape or visual quality vs getting the job done
 - Idea that form follows function

14. Smart phones now use apps that provide maps and travel directions. As phones cannot be used when driving what considerations should designers take to minimise the possibility of inappropriate use?
- Social considerations
 - Societal expectations
 - Motion sensor to stop use while moving
 - Disable keypad – voice activated only
15. Many auction houses now allow for online viewing and bidding. How could designers make best advantage of technology to present items for sale so that bidders can get the best views before making a bid?
- Augmented reality
 - Virtual reality
 - Rotating views of auction items – buyer control rather than seller control
 - Live bidder interaction rather than phone bidding
16. List and describe four advantages of researching historical design development when designing a new product.
- allows a direct link from inspiration to design ideas
 - opportunity to explore aesthetic and functional design features
 - can explore strengths and weaknesses of historical and developing designs
 - can explore successes and failures
 - gives focus and direction

Section C

17. There is a need to develop a tactile version of noughts and crosses to help children with a vision impairment play the game. The design brief requires playing pieces to be easily identified by touch.
- Own Design
 - Own explanation
 - Audience
 - both vision impaired and fully sighted as the idea of such a game is to remove barrier to access.
 - Young and old – compare playability according to experiences
 - Those with other disabilities to ensure equality of access
18. Your local city council has decided to host a New Year's Eve celebration event to see in 2019. They are seeking a logo that could be used to promote the event. You have decided to submit ideas for consideration
- Examples – accessibility, branding, cohesion, colour, culture, engagement, visual appeal, scalability, shape/form
 - Own Design
 - Discuss influences to design
19. With summer approaching an online company has decided to sell a range of 3D object files that can be printed on home 3D printers and used in the great outdoors. You have decided to submit models for consideration by the company.
- Examples – intellectual property rights, branding, object safety when designer does not control the printing process, culture, visual appeal, shape/form
 - Own Design

- c) Own discussion of influences
20. Your local fire authority is concerned that not enough residents are installing or maintaining smoke alarms. They have organised your design team to create a two-minute television advertisement to raise residents' awareness of the importance of having operational smoke alarms.
- a) Own ideas and discussion
 - b) Own discussion of influences
 - c) Own Design

Section D

21. Augmented Reality is gaining acceptance. Define and describe Augmented Reality, including its various uses and discuss potential areas of development.
- Essay point would include
 - a. An interactive experience of a real-world environment
 - b. elements are "augmented" by computer-generated information
 - c. usually visual but may also involve other senses such as auditory
 - d. The overlaid sensory information is usually added to the natural environment, but may be used to mask other inputs
 - e. Information is interwoven with the physical world so that it is perceived as being part of the real environment.
 - f. Augmented reality alters the perception of a real world environment, whereas virtual reality completely replaces the real world
 - g. Brings components of the digital world into a person's perception of the real world
 - h. Integrates sensations so they are immersive
 - i. Commercial augmented reality experiences are used largely in the entertainment and gaming businesses
 - j. Augmented reality is also transforming education, where content may be accessed by scanning or viewing an image with a mobile device.
 - k. Could also be used in the building industry so that builders can display information about the building site
22. Many service industries such as retailing, tourism, health and education have changed considerably through the use of computers. Select one service industry and discuss the ways in which it has benefited from the use of computer graphics technology.
- Essay point could include
 - Many varied examples could be given
 - Any service business that advertises uses computer graphics to develop advertising products both fixed and animated
 - Retail uses imagery at cash registers for customer recognition
 - Use of CG in smart phone apps
23. There are two main types of computer animations in the entertainment industry. Animations are either 2D or 3D. Using examples, briefly describe the two types of animation and discuss their differences in terms of: the associated design processes; the software used to create them; and, the likely production times and costs. What would be the benefit of combining sequence with both 3D and 2D components?

- Essay point could include
 - a. 2D Animation
 - i. Focuses on creating characters, storyboards, and backgrounds in two-dimensional environments.
 - ii. Often thought of as traditional animation
 - iii. Figures can move up and down, left, and right.
 - iv. 2D animation uses bitmap and vector graphics to create and edit the animated images
 - v. Animations may be used in advertisements, films, television shows, computer games, or websites.
 - o 3D Animation
 - i. Animation work is carried out in a 3 dimensional environment
 - ii. Uses 3D models and a 3D stage
 - iii. Characters can move on X, Y and Z axis
 - iv. As well as animating characters, camera and lights can be animated
 - o
 - o Combining 2D and 3D animation is sometimes called hybrid animation
 - o
 - o Some assets are easier to produce and animate in 2D or 3D

24. What is a render farm? Describe how it is used and some of the key computer hardware.

- Essay point would include
 - a. High-performance cluster of computers
 - b. Designed and organised for the sole purpose of rendering
 - c. Each computer is called a node
 - d. A render farm distributes the process of rendering computer-generated imagery
 - e. Distribution of rendering work is controlled by a program called a queue manager
 - f. The computing that takes place is called parallel computing
 - g. During the render, a computer may be instructed to render a single image, a set of images, or a section of a single, complex, image.
 - h. Once a render node completes rendering, it is immediately assigned another task
 - i. Nodes are often thought of as dumb computers
 - j. A render farm can be scaled up at any time by adding more nodes
 - k. Can be on a local network or cloud based
 - l. Some advantages – saves times, possibility of use effects more widely due increased computing power, more time means opportunity to refine models and effects