OFFICE OF TASMANIAN ASSESSMENT, STANDARDS & CERTIFICATION

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External Assessment 2021

COMPUTER GRAPHICS AND DESIGN

CDG315118

Pages	24
Questions	26

Reading time: 15 minutes – writing may begin during this time

Suggested working time: 2 hours

Instructions

- There are **four (4)** sections to this exam paper:
  - **Section A** – answer **four (4)** questions.
  - **Section B** – answer **four (4)** questions.
  - **Section C** – answer **one (1)** question.
  - **Section D** – answer **one (1)** question.
- Write your answers in the spaces provided in this exam paper.
- The suggested time to spend on a section is given in the instructions for that section.
- 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.
- All answers must be written in **English.**
- You **must** make sure your answers address:
  - Criterion 6 analyse the impact of design in society.
  - Criterion 7 describe and apply key features, applications and influences on contemporary computer graphics systems.

Marker use	
C6	
C7	

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Guide to Exam Structure

		Questions available	How many questions to answer	Suggested working time	Marks available
Section	A	8	4	20 minutes	All criteria are assessed using extended ratings of A+ to z
Section	B	8	4	20 minutes	
Section	C	4	1	40 minutes	
Section	D	6	1	40 minutes	
	Total	**26**	**10**	**120 minutes (2 hours)**	

Section A

- Answer **four (4)** questions from this section.
- All questions in this section are of **equal** value.
- It is suggested that you spend approximately **20 minutes** on this section.
- This section assesses **Criterion 7**.

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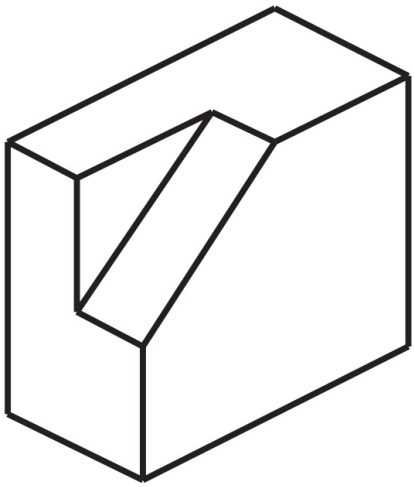
Question 1

"Perspective" and "orthographic (multi-view)" drawing systems are common methods designers use to represent objects in a realistic way on a flat surface. This can be a computer screen or a piece of paper. Sketch an orthographic representation and a one-point (parallel) perspective representation of the simple isometric block shown below to demonstrate your understanding of these visual communication systems.



Section A continues

Marker use

Question 2

Raster and vector graphic systems are two methods to produce 2D computer graphic content. Describe how these two systems differ in the way they represent such content.

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Question 3

Choosing the correct file raster (bitmap) graphic format is important to obtain the best compromise between image data size and image quality. Name **two (2)** different raster file formats and briefly explain the types of images and applications they are best suited for.

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Section A continues

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Question 4

The idea of good mesh topology is an important factor to create effective 3D objects. Explain why this is so and why a modeller should aim to ensure 3D objects are best created with quad (four sided) polygons.

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Question 5

HDRI files are used in 3D-based computer graphic production to create an image based lighting (IBL) solution. What do the letters HDRI stand for and what are the advantages of using an HDRI file to light a scene?

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Question 6

Rotoscoping and motion capture are two systems that can be used to develop animation. Describe the key ideas of these two systems in supporting the production of animated content.

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Question 7

In the branch of computer graphics called CAD (Computer Aided Design) there are two types of modelling systems used, solid modelling and surface modelling. Explain the differences between these two modelling systems for the creation of objects.

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Marker use

Question 8

What are Boolean operations? Explain using words and sketches how each type of Boolean operation can be used to create 3D objects.

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Section B

- Answer **four (4)** questions from this section.
- All questions in this section are of equal value.
- It is suggested that you spend approximately **20 minutes** on this section.
- This section assesses **Criterion 6**.

Marker use

Question 9

The design process includes several recognised stages, one of which is research. What would be some of the important social, ethical, and environmental issues that need to be considered at this stage before designing a drink container for a teenage target market?

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Question 10

What are the intellectual property rights (copyright) implications of using free 3D models, texture maps, and other visual content downloaded from the internet from the perspective of the content creator and the end user?

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Section B continues

Marker use

Question 11

Renowned 20th Century German industrial designer Dieter Rams described 10 principles of good design that have become a model set of principles for many designers. Rams described one of those principles as being “good design is long lasting”. Why would Rams propose this as a principle of good design?

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Question 12

Designers will often look at, and reference, historical ideas in the development of new design solutions. What are some of the reasons that designers would do so?

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Question 13

Sustainable design is an increasingly important consideration for designers working across a diverse range of design disciplines. What are some of the key principles to consider in the context of sustainable design?

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Question 14

Design elements such as line, shape, texture and colour help to communicate a message to a viewer regardless of language.

Using words and a sketch describe how a designer might use **two (2)** of the above elements to convey a message that warns of an environmental hazard.

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Marker use

Question 15

With the rise of affordable and increasingly functional 3D type printers there is a potential for large amounts of plastic waste to be generated in the prototyping and testing of ideas. What might be some strategies or processes that could be implemented in a design studio to minimise the production of waste plastic material in this context?

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Question 16

In interactive design an important design consideration is the idea of usability as a component of user experience (UX) design. Why is usability an important design consideration?

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Section C

- Answer **one (1)** question from this section.
- All questions in this section are of equal value.
- Answers must consist of **written notes accompanied by sketches with annotations** explaining important features of the design.
- It is suggested that you spend approximately **40 minutes** on this section.
- This section assesses **Criterion 6**.
- Section C carries double the weight of Section B.

Question 17

Effective branding is important for any new business. A food company has produced a new snack product called 'LOCURA' which is aimed at an 18–25 age market. The company requires a visual identity (logo) for their stands in stores, product packaging, and marketing materials. The marketing focus is that the snack product is energy-rich, healthy, and tasty.

a) Describe the social, ethical, and environmental factors to be considered in designing a snack brand and product for such a target market.

b) Describe the processes you would need to consider in developing a logo for effective branding from the brief until the finalisation of the design.

c) Provide sketches of **three (3)** logo ideas that the company could select from. Annotate the three logo designs considering the application of specific design elements and principles in each idea.

OR

Question 18

A large city has won the right to host a new international sporting event called "The World Urban Games". The Games will feature sports that have traditionally been regarded as street sports. You have been asked to submit a design for the event's mascot to the organising committee. A representation of the mascot needs to be useable as a 2D logo. The mascot will be made into a toy souvenir for promotional sales.

a) Discuss the design decisions that you would need to make before designing the toy character (design considerations) considering the principles of sustainability, minimal environmental impact, and social appeal.

b) Sketch **at least two (2)** preliminary designs, one of the mascot showing a front and side view representation, and one of the logo. Include annotations describing the design principles and elements that have been used.

c) Discuss the design process that you will use in developing the 3D toy from the 2D logo.

OR

Section C continues

Question 19

A Senior Secondary College has identified the need for more seating in the student common area that is comfortable for students, yet resistant to damage and wear. They are considering the option of an interlocking geometric seating system that can be configured to interconnect or be used on their own.

You and your design team are approached to design, prototype and build the seating system, which you hope will also be marketed to other schools.

a) Describe in detail the sort of decisions and consultation that you would need to make prior to production of the seating. Consideration should be made of the need for the application of sustainable design thinking in terms of the design and choice of materials for manufacture.

b) Sketch **at least two (2)** preliminary designs with notes clearly showing what is required for the seating to interconnect, be comfortable to use and to be resistant to damage and wear.

OR

Question 20

Urban areas of Tasmania are experiencing a rise in traffic congestion, especially during the morning and afternoon peak hour periods. As a result, the Tasmanian Government wants to develop an advertising campaign to promote the use of public transport as a part of a traffic congestion reduction strategy.

Your design team has been asked to design and develop a 30–second advertisement incorporating both animation and live footage as a central part of the advertising campaign that will be shown on free to air television and a range of social media platforms.

a) Describe the design process for developing the advertisement before production can begin and outline the key social and environmental messages that you will need to communicate.

b) Sketch a storyboard of **at least six (6)** image boards with supporting annotation clearly outlining the different shots for the advertisement.

Section C continues

Marker use

- Complete sketches for Questions 17, 18, 19, **or** 20 on this page.

I have chosen to answer Question ☐

Marker use

- Complete sketches for Questions 17, 18, 19, **or** 20 on this page.

Section C continues

Marker use

Notes for Question

Section D

- Answer **one (1)** question from this section.
- All questions in this section are of equal value.
- Answers must consist of an **extended response**.
- It is suggested that you spend approximately **40 minutes** on this section.
- This section assesses **Criterion 7**.
- Section D carries double the weight of Section A.

Question 21 – 3D Modelling

Traditionally, polygon-based 3D modelling was the method used to produce 3D–based characters in computer graphics. Nowadays, digital sculpting is an increasingly preferred method. Compare and contrast the production methods of polygon based modelling, and digital sculpting for 3D–based character development.

OR

Question 22 – Video and Motion Graphics

In visual effects, match moving is a technique that allows the insertion of computer graphics into live-action footage. It is also known as motion tracking or camera solving. Discuss the techniques and processes of match moving and provide examples of where match moving has been successfully implemented for a seamless integration of computer graphics and live-action footage.

OR

Question 23 | Solid Modelling and 3D Digital Fabrication

Solid modelling is used for conducting finite element analysis (FEA). Describe what is FEA, why solid modelling is used for FEA, and provide **at least two (2)** practical examples of where this system may be used.

OR

Question 24 – Animation

Disney's twelve basic principles of animation were introduced by the Disney animators Ollie Johnston and Frank Thomas in their 1981 book *The Illusion of Life: Disney Animation*. The book is regarded by many animators as the "bible of animation". Discuss the purpose of animation principles, and provide a description at least **six (6)** of the principles with a practical example of how each principle can be applied by an animator.

OR

Section D continues

Marker use

Question 25 – Asset development, game design and production

As computer technology continues to evolve, game developers can increasingly move towards near photorealism in games. However, the capacity to maintain high frame rates for smooth gameplay is always a challenge in such a context. Discuss production techniques that game developers can use to simulate a higher level of detail in game assets while keeping the underlying polygon count of these assets as low as possible.

OR

Question 26 – Interactive Design

Photorealistic visualisations have become an integral part of the work of contemporary architectural design practice. Increasingly, clients are demanding the capacity to be able to interact with the visualisation rather than passively watch a walkthrough. What are the advantages of interaction from the client's perspective and what are the technical challenges posed in the development of photorealistic interactive visualisation for the designer?

Section D continues

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End of Exam

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