The examination paper accurately reflected the diversity of the course, giving candidates ample opportunity to illustrate a body of knowledge in relation to both criteria, 2 and 7. This is true of the past papers as well.

Generally, this style of examination which has a combination of essay and short answer questions allows Candidates with varying levels of competence to have ample opportunity to answer questions from a wide choice of options/topic areas. Graphic communication skills are also paramount as the need to generate and communicate design ideas through concept drawings and storyboards etc. is naturally expected from candidates studying a design based subject. In general terms the level/standard of sketching which accompanied certain types of questions was not at a high a standard. The required standard of sketching was only seen in a low number of exams. The understanding of Orthographic projection was not illustrated well and in many instances a poor understanding was accompanied again by poor drawing skills. Isometric projection was asked of this year in the paper with only a few candidates attempting it and many of the attempts were not correct.

It is important to recognise the value of teaching the basic drawing systems of perspective, orthographic and isometric. These systems while only sketched in this subject equip a ‘candidate designer’ to be a competent communicator of ideas. Sketching is paramount in the development of ideas while brainstorming in the early stages of the design process.

Candidates working in a pre-tertiary Graphic Communication/Design based course would be expected to sketch at a high level incorporating orthographic and 3D perspective illustrations especially when dealing with object/product designs. Flowcharts, Sitemaps and in some cases storyboards etc are well suited to 2D techniques but the use of colour and shading techniques can enhance the communication of ideas across all sketching techniques more easily.

Within the project folios, many research/analysis essays improved over last year’s attempts. Some candidates produce a commentary on the process of producing the project, not an in depth study of an industry best relating to the candidates project. Referencing techniques have improved so too the frequency of referencing. Maintaining academic integrity is paramount. When referencing it is important to reference sources of information not utilities/search engines.

Changes are being made to the Project Guidelines in 2015 in an effort to clarify the industry analysis, academic integrity and appropriate content.

Many candidates struggle with formulating true and correct design briefs. Many examples where conceived after the project with no recognition of design requirements and limitations, or any indication of how the project was being managed. Many design briefs had no context or meaning and where just a simple statement saying what it was they produced.
A design brief should include:

- a scenario, situation or context (sometimes referred to as the design hook, purpose or reason)
- a statement of intent or problem to solve, eg, To design a......
- requirements and limitations
- timeline/project management
- an evaluation after the project in terms of achieving the intended outcomes and whether the terms of the brief where achieved. Include suggestions, items to commend, a reflection.

Authenticity of projects and evidence of progress is easily illustrated with screen captures but mean very little when poorly sequenced and annotated. Candidates should endeavour to eliminate any reason for doubt in terms of authentic candidate work. This was addressed in the project guidelines for 2014 and there is some development here but a detailed use of this technique is an advantage for the candidates.

Game engine driven presentations must have a clear distinction of original assets and content with descriptions and proof of authenticity. Watermarked 3D content seem mostly in game engine driven presentations shows assets are taken from elsewhere, where no recognition is given these assets are being presented as candidate’s work which is unacceptable. Any content not generated by the candidate must be acknowledged correctly in the references or bibliography. **Cases such as this will be referred to the TQA for consideration if a breach of academic integrity has occurred and the possible penalties, including cancellation of the project (folio) or the entire subject.**

A tutorial while valuable to the candidate should not be presented as a candidate’s extended design project. Tutorials are a valuable learning tool and should be referenced accordingly when used in the presentation of an extended design project.

Use of digital assets other than those created by the candidate must be clearly identified with no doubt of the authenticity being placed in the mind of the examiners (refer to paragraph above). Extended Design projects where digital assets/content created by others is assembled to form another product that of the candidate must be well considered. While an exercise like that applies design principles (Criterion 5) the assembly process requires lower level skill in assembly (Criterion 8).

Design projects must reflect the standards and conventions used in a closely related industry equivalent. In the case of an extended design project default settings and conditions in terms of software tools should be improved upon or modified to reflect the nature of an extended design project.

Post production of animated sequences is important with good editing reflecting a well-designed computer graphic product. Opening single application files is not appealing so all candidates are encouraged to present digital content in a complete ‘presentation’ of some form. In complete projects do not fulfil assessment criteria and are not assessed favourably.

Pure video based projects that have no CG content were deemed inappropriate for this subject and more suited to a media based course. Post production work through an editing program is an element of this subject but requires candidate created digital assets other than the footage from a camera.
WRITTEN EXAMINATION

Question 1

The majority of candidates attempted this question and most answered successfully with the higher level candidates being able to listing four or more advantages.

Common successful answers included greater size or ‘screen real estate’ making the image easier to work with Splitting the screen between research or sketches and the computer model having communications such as email or skype on one screen while working on the other arranging the tool bars on one screen and having a larger view windows on the other having presentation software on one screen to show clients while keeping the working model on the other screen having video tutorial on one screen while following the tutorial on the other writing code for a web page on one and showing a live update on the other.

Some candidates showed an understanding of the difference between an expanded desk top and a cloned view on the monitors.

Question 2

A basic answer involved the use of Booleans but with very little detail. A strong answer talked about polygon modelling and using copy, transformation and scaling tools. Texturing for colour change. Boolean operations can be used but when used with low poly models a very messy and unconventional mesh can be generated. Boolean operations work well with high poly models. In order to subtract cube from cube using Boolean the need for high polygon or segment count on each of the flat surfaces.

Question 3

Most candidates did well here. Use of advanced rendering methods like ray tracing and radiosity require complex calculations in terms of reflections, shadows and colour interoperability. Anti-aliasing the raster output is time consuming so too special effects use of caustics and up sampling the final gather for rendering. Render farms or networked multiple processors sped up rendering times for animated sequences so too high end hard ware. GPU power is great for rendering 3D in real time for display purposes like in game play so high end gaming cards work well here. Essentially rendering time is down to CPU speed in calculating the required light algorithms. Low poly models with high end use of textures also speeds up render time while keeping high quality output.

Question 4

This was a popular question and was well answered by many candidates who communicated understanding of how design elements are used in conjunction with design principles to convey meaning in visual based design. Higher level answers mentioned that the location, position, width and direction of lines is associated with different meaning, that shape is an integral aspect of conveying form and structure in design, that texture is associated with factors of tactility in design and that colour has
associations with mood and emotions. Particularly strong answers also mentioned that colour can have a culturally contextual meaning and message in design.

Question 5

Many of the candidates who attempted this question missed the key aspect of the question that the form of the boomerang is not symmetrical which meant that a deal of thought needed to be considered in constructing an accurate 3D model of a boomerang. Higher level answers described two options. The first was to construct polygon based geometry using extrudes, bevels, insets and chamfers from a based polygon shape to create sharper edge points before applying a subdivision surface modifier to create a smoothed form and the second was to create a series of cross sectional spline shape and then apply a patch surface over the splines to create the boomerang form.

Question 6

This question was attempted by a relatively small number of candidates. Generally, the standard of solutions ranged from poor to medium. Several candidates discussed the computer modelling process but failed to include a sketch. The absence of a sketch invariably led to a ‘D’ rating.

Many candidates produced sketches that did not conform to Isometric principles. It was common for the cylindrical spigot to be drawn as a square or rectangular prism. Stronger candidates wrote details of the modelling process in the context of software specific functions. Weaker candidates tended to simply identify a program that they would use to undertake this modelling task. Some candidates completed the sketch but failed to document the modelling process.

Question 7

This question was attempted by the majority of candidates and was generally well answered to a good standard. Typical responses discussed the ability to view the remote area without having to visit the location. Stronger answers included directions to the remote area, the ability to determine north for design consideration, the use of the street view to obtain terrain and aspect views to aid the architect in the design of the dwelling. The use of the measurement tool to calculate land size and dwelling location.

Question 8

This question was answered well by those candidates who had knowledge in the different methods used in motion capture technology. The most common response was the use of optical tracking technology where the tennis players arm was covered with targets and a digital camera digitises the arm movement. A few candidates discussed radio frequency transmitters.
Question 9

Very popular question and one all candidates should know when working with computer graphics. RGB an additive system red green blue colour light beams added at various levels of intensity, max levels of all colours make white, measured in levels of 0-255. RGB colours you see and CMYK subtractive system colours for can touch. CMYK for printing is a subtractive system, add colour takes away the white of the paper and results in black.

Question 10

A popular question and one where many candidates mentioned that social networks assist in collaboration and sharing of ideas and information and can be a valuable marketing tool for design based outputs. Higher level answers mentioned that cloud based storage provides additional enhancements for data security and backup, the ability to remotely collaborate and share data and to ensure that the cloud storage provider has multiple levels of built in system security for ensuring integrity of data storage. With respect to wireless technology solutions many candidates understood the benefits these technologies bring for improving productivity. Some candidates did not specifically make the link to a design based context. It is important to contextualise answers to the subject for higher level answers in responding to questions that may be seen as being of a more ‘general’ nature.

Question 11

A number of candidates who attempted this question did not really understand it was essentially a question of texturing and lighting optimisation. A number of candidates described how you could just move the apple to a better position. High level answers described how the material parameters of the apple and surrounding objects such as reflectance values could be adjusted along with refinement and positioning of light sources and adjustment of exposure values would assist in improving the realism of the scene.

Question 12

This was a popular question and well answered by many candidates. Hi Level answers referred to motion tweening in key framing. The use of camera paths and auto key framing, types of cameras used in the camera walkthrough process. Candidates who discussed rigging and bones did not differentiate between the two techniques and as a result was poorly answered.

Question 13

This question was attempted by a small number of candidates. Of those who did attempt the question, most had a sound understanding of the techniques used in setting up the environment effects in their chosen software.
Question 14

A small number of candidates attempted this question about Boolean operations and most were able to demonstrate some understanding of the process but few answered the question comprehensively. A number of candidates were confused between union and subtraction and gave the example of removing sections of a wall to place doors and windows which is an application of a Boolean subtraction. The better answers were accompanied by a sketch of the objects and the resultant shape at the end of the operation. Only a very few candidates were able to give practical examples of where these two techniques could be used.

Question 15

A good number of candidates answered this question and most produced satisfactory answers. The issue with line thickness and ‘jaggy’ or ‘stair stepped’ line when the image was zoomed was because the image was a raster file made up of pixels. Some candidates did explain that the raster file could have been a low resolution image and that if it was saved in a format that carried out lossy compression the image quality would be reduced.

Most candidates recommended that the file be saved in a vector format which is path based and described mathematically. When the image is zoomed the lines are recalculated and always remain sharp and of a hair line thickness.

Question 16

This question was generally answered well with candidates showing good understanding of issues such as file compression (eg. Jpeg), layered .png, and TIF formats. The third part on black and white technical drawings was generally not answered well with higher achieving candidates showing awareness of the benefits of scaling using vector based software such as .dxf as well as converting files to the PDF format.

Question 17

This was a very popular question. Success in this question depended significantly upon sketching ability, a detailed appreciation of the Design Process and a good understanding of sustainability concepts. Stronger solutions featured rendered 3D sketches while mid- range and lower standard attempts were generally 2 dimensional sketches. A very significant number of lower achieving candidates overlooked the requirement to produce two preliminary designs, with many interpreting the requirement as simply two views of the same design.

Very few candidates went into a detailed analysis of sustainability aspects, especially those pertaining to material choice. Many candidates failed to fully embrace the notion of re-cycled materials. Commonly, the simplistic view was that product ‘x’ could be re-used for another purpose rather than re-manufacturing the material in a way which provides guaranteed supply and a wider variety of production formats. There is a lot more to re-cycling than simply getting old bits of wood and metal and building tables and rubbish bins with them.
Question 18

Few candidates attempted this question and high quality well-constructed answers were rare. Most candidates did not recognise the required components of the question, which were a list of desirable features in the website, a site that highlighted a range of products, the benefits of cycling, and a site map showing linkages.

Features that could have been included in the site may have included links to social media, external links to cycling organisations, internal and external search facilities, information about the range of bikes and which bike suite which riders, a shopping cart, contact information and the ability to view the site on mobile devices.

When purchasing a bike a hierarchy of questions need to be answered. Is the bike for a male or female an adult or a child? What is the main use for the bike, urban, race, recitation, mountain biking BMX? What price point is the buyer is looking? This hierarchy could have been the basis of the site map for the web site. Unfortunately very few candidates included a site map with multiple pages which showed links between pages.

On the whole the presentation of the sketches was poor with few candidates making use of the principle and elements of design, particularly colour, to enhance their answer.

Question 19

This question was only undertaken by a few candidates. The majority misread the question as they discussed the consequence of not having a smoke alarm. The question clearly stated ‘to raise resident’s awareness of the importance of having operational smoke Alarms’ Stronger answers discussed the design process in order to outline the steps in producing the two minute advertisement. All storyboards were generally well annotated with timeframe allocations, appropriate text audio, voice overs and music.

Question 20

Strong answers had good floor plan layouts with a strong recognition of scale and proportion. Some candidates used keys to identify components together with annotations. Strong annotations had good rationale as to the design decisions. Many had empathy to the ailments of the elderly and grouped areas etc. sympathetically. Strong answers had 2 point perspective sketch showing an overview.

Question 21

Very few candidates answered this question and the responses were generally basic in content. The majority who did attempt this question reflected on the history of HIT and discussed the interaction of users and computers and how this had evolved. Candidates did not discuss where HIT is heading into the future or provide examples in relation to computer graphics.
Question 22

This question was attempted by the majority of candidates. Being a very open ended, generalized question there was no limit to the types of answers that were attempted. The overwhelming majority of responses to this question discussed the benefits of information technology in industries such as Education and Retail.

Most candidates remained in the ‘comfort zone’ of discussing things from their own experience such as word processing, email and web browsing rather than tackling details of more ‘high end’ applications such as those that might be used in medicine. This would have been a good question to talk about 3D printed prosthetic body parts based on scanned MRI data or the use of ‘smart pills’ with embedded cameras and transmission devices that can upload patient health related information to a computer for example. This would have been much more interesting than simply talking about how much nicer it is to be able to write one’s English assignment as a Word document instead of hand writing it.

Question 23

This question was well answered for the greater part by candidates who attempted it. Candidates were able to in the main clearly articulate the key differences of 2D and 3D animation production systems with respect to processes, production time and cost. They were also able to communicate items of commonality such as the need for scripts and storyboards and how contemporary digital based methodologies often employ common ideas of keyframes and tweens, layering and grouping in constructing digitally based animated sequences. Higher level answers were able to articulate how specialised custom tools in both contexts can be effectively employed to improve productivity and achieve specific visual effects in a more cost effective way.

Question 24

Many candidates wrote about additive and subtractive printing systems. This is incorrect as printing systems are additive and milling or cutting based systems subtract. Many candidates wrote about 3D printing but didn’t answer the explicit parts (a), (b) and (c).

Most spoke about heated filament (extruded) only a few wrote about laser cintering and less mentioned polymers set with light.

In medical terms printing biomaterial is still relatively new fully printable organs are still 50 years away but printed components that interact with bone and tissue are readily available now from breast prosthetics to titanium heels. Many commented on the recent media story on titanium heels.

The future implications where quite creative and many of those mentioned are developing now like extruded concrete for architecture and printing large plastic boats etc.
TASMANIAN QUALIFICATIONS AUTHORITY

CGD315113 Computer Graphics & Design

ASSESSMENT PANEL REPORT

Award Distribution

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