BOSTES | BOARD OF STUDIES TEACHING & EDUCATIONAL STANDARDS NSW

2016 HSC Design and Technology Marking Guidelines

Section I

Multiple-choice Answer Key

Question	Answer
1	B
2	C
3	A
4	A
5	B
6	C
7	D
8	C
9	A
10	D

Section II

Question 11

Criteria	Marks
• Shows a detailed understanding of how design factors have been applied to BOTH chairs with examples	4
• Outlines how design factors have been applied to BOTH chairs with at least ONE example	3
• Outlines how a design factor is applied to ONE of the chairs	2
• Identifies a design factor of ONE chair	1

Sample answer:

The design factors specific to the use of the two chairs shown could include the ergonomic and anthropometric factors relevant to their use.

Both chairs require the user to sit, however it is normally expected the office chair would be used for a more extended period of time. Therefore, its adjustment capabilities for height and comfort (back support) are more obvious. Both the chair and stool would be located in areas where aesthetics would be of importance; however, the barstool may have greater aesthetic impact than specific function.

Both chairs are stable in their design; however, the office chair allows for movement with its castors whereas the use of the barstool is less likely to require it to be moved often.

Answers could include:

In comparing the design features specific to the office chair and the kitchen barstool, design factors relating to function, ergonomics and aesthetics are important in both cases.

Both the chair and the stool still need to be ergonomically designed to ensure the appropriate height is obtained while sitting and a suitable backrest has been incorporated, although both are different.

In looking at the differences in both the chair and stool, the designer has considered the function of each. With the kitchen stool, sitting may only be a short period of time while in comparison the office chair needs to be designed to allow sitting for extended periods of time and have movability and adjustment capabilities.

Factors such as style and material choice have also been considered in relation to their intended purposes as styling in a kitchen chair is general neutral and is designed for easiness to clean, as opposed to the office chair which is styled for a professional and supportive look.

Question 12 (a)

Criteria	Marks
• Demonstrates why ongoing evaluation is important to a designer	2
• Identifies an aspect of evaluation	1

Sample answer:

Evaluation is the process of gathering information to inform the client as to certain aspects of the product and allow them to make judgements. Ongoing evaluation does this for the purpose of ensuring the information is current and relevant throughout the development of the project.

Answers could include:

Ongoing evaluation is used for the purpose of ensuring that all elements of the design are continually monitored throughout the design process, which in turn provides an avenue for adjustments to take place to ensure that not only are the needs met but a quality and safe product can be released to the market.

Ongoing evaluation can result in:
• better use of materials
• a safer end product
• a product that meets the intended target market needs
• does not exceed the planned marketing objectives
• will meet targeted durability requirements.

Question 12 (b)

Criteria	Marks
• Provides points for and/or against the use of technology to conduct evaluation of a product	4
• Describes the use of technology to conduct evaluation of a product	3
• Outlines the use of technology to conduct evaluation of a product	2
• Identifies a use of technology to conduct evaluation	1

Sample answer:

The use of technology has provided a variety of means that can be used to conduct evaluation.

Currently the technology available enables this process to occur efficiently and accurately with consumers' access to online technology and social media. Surveys can be sent to consumers via email and social media for immediate response. The response data can be collected and both qualitative and quantitative information collated, evaluated and subsequently addressed. The fact that this information is immediate and ongoing means that issues identified can be addressed at any stage during the development process.

Question 13

Criteria	Marks
• Provides why AND/OR how the development of innovative products contributes to the quality of life, showing clear relationship between the two	5
• Describes how the development of innovative products contributes to the quality of life	4
• Outlines how the development of innovative products contributes to the quality of life	3
• Shows some understanding of innovative products and the quality of life	2
• Shows a basic understanding of innovative products or the quality of life	1

Sample answer:

Current design practices seek to address or satisfy a 'need'. Improving the quality of life is possible by developing innovative products.

Items such as computer-aided technologies have made everyday activities much faster, easier and less labour-intensive. Automatic devices/timers and electronic gadgetry allow for lights, blinds, airconditioning to be remotely controlled, improving the quality of one's own environment making our living environment more comfortable, safer and more enjoyable. Entertainment with the family is more enjoyable and easier.

Innovative products have been installed in automobiles to improve the quality and capabilities of travel, improving quality of life and safety. Devices such as GPS technology, installation of driving cameras, Bluetooth technology, braking, steering and suspension systems have all been engineered to enhance the quality of life and safety and have made families safer and improved security. Hence, possibly more family holidays and family leisure time.

Answers could include:

• Technological advancement in medical innovations has aided the speed of recovery, ease of recovery and prolonged life.

• Technological advancement in using innovative fabrics (Kevlar), drones, weaponry in the armed forces has allowed for greater protection, surveillance and defence capability.

Section III

Question 14

Criteria	Marks
• Shows a comprehensive understanding of the potential impact of emerging technologies on society • Draws out and relates implications of the potential impact • Communicates using relevant examples • Responds in a sustained, logical and cohesive manner	13–15
• Explains the potential impact of emerging technologies on society • Communicates using relevant examples • Responds in a logical manner	10–12
• Describes the potential impact of emerging technologies on society • May include a relevant example	7–9
• Outlines the potential impact of emerging technologies including a link to society	4–6
• Shows a limited understanding of emerging technologies	1–3

Sample answer:

The continued development, expansion and acceptance of emerging technologies will continue to change and improve the quality of the life for all consumers.

The examples of emerging technologies provided in the examination paper have been developed on the basis of need.

For example, the prosthetic leg which has utilised the capabilities of 3D printing has not only produced a more aesthetically pleasing medical replacement but it has also improved the mobility of the individual for which the prosthetic leg has been designed. In turn improving an individual's self esteem, awareness and capabilities.

Biometrics has taken on many forms with the image provided being an example demonstrating the use of emerging technologies that are being developed to vastly improve security. A need that is fast becoming increasingly more important to protect resources and limit access. Continued developments in biometrics will occur to help produce a safer world with the capabilities of using characteristics of individuals. Other developments will include the expansion and refinement of the use of fingerprints, DNA, eyeball readings and voice activation to ensure the right or correct individual is identified.

The example of nanotechnology given has been developed out of the need to improve the quality of people's health and lives. The capabilities of providing real-time data reporting to individuals immediately will continue to have a huge impact on the way individuals behave and in this case provide instant recognition of one's achievements. Advancements in this field will continue to improve the quality of one's health and their knowledge about their knowledge about the improvements.

Smart Card capabilities are another example of a developing technology that will dramatically improve the ease of travel payment and record of expenses. It's also an example of an emerging technology that assists in the shift to a cashless society. Maintaining personal security over the Smart Card will become an ever increasing problem in terms of developing

ways to protect the information of funds available on the Smart Card. This could prove to be a problem for older people with limited knowledge or access to technology and cause issues for remote rural people with very limited use of public transport.

In summary, emerging technologies will continue to be developed in an array of different fields. Its acceptance will continue to grow, as a result of need and necessity but will in the end improve the quality of life, making things easier, quicker, more convenient and possible.

Answers could include:

- The use of 3D printing enables the fast and efficient development of innovative designs, such as prosthetic limbs. The reduction of concept to market time impacts positively on society through the end user being able to benefit from a more customised design that can be used and tested within a very short lead time. This in turn increases the potential for increased mobility and independence of those members of society that are recipients of this product, enabling them to partake in both work/life activities in equity with others and in a shorter time frame than traditional modes of prosthetic development.

- 3D printing – The items could be made more lightweight, provide greater protection for the sportsperson and enable the sportsperson to train more efficiently and effectively, hence improving the performance and entertainment levels of sport.

- Biometrics technologies can increase the levels of security within society and hence decrease some aspects of human anxiety surrounding domestic and commercial security. This in turn can lead to society/end user feeling more relaxed and comfortable with life (increased personal safety).

- Biometrics technology has been a contributing factor that has led towards a decrease in identity theft and the loss of both personal data and/or bank accounts being infiltrated.

- Nano technology enables more complex, multifunctioning products to be released on the market with improved battery life. The use of nanotechnology has led to improved products within the growing market of smart watches. The use of GPS technologies, together with nanotechnology within these products has led to opportunities for society to monitor their own fitness levels and track their personal fitness programs inclusive of improving on past performances. As a consequence of this we are seeing the opportunity for society to become more health conscious and responsible for their own health and wellbeing, leading to an increase in the use of other associated health products

- Smart Card technologies being utilised in the recently introduced Opal Card has led to a more efficient and less time consuming process for the purchase of public transport tickets. The key benefits for society have been seen as:
  – less time lining up for the purchase of tickets, leading to more efficient use of personal time
  – reducing the need for society/end user needing to carry cash for ticket purchases, consequently reducing some stress for those who have arrived at the train station without money for a ticket
  – the quick and convenient ability to top up available funds provides society/end user with a more positive experience than traditional modes of ticket purchase
  – state transport would also be able to analyse travel data that is acquired through the Smart Card system to determine future planning needs and infrastructure to cater for the growing population, consequently contributing to a better public transport system for all.

Other emerging technologies could consist of:
- Smart card technology
- Nanotechnology

- Biometrics
- CAD/CAM
- Drones
- Laser cutting and use of MultiCAM's and routers
- Smart phone technologies, ie wireless charging, Google glass and touch screens
- Biomimicry
- Sustainable technologies
- Security systems, ie people's safety
- Medical advancement, ie surgery improving living
- War and warfare technologies such as self loading guns and protection vests
- Sanitation devices for improving developing countries health.

2016 HSC Design and Technology Mapping Grid

Section I

Question	Marks	Content	Syllabus outcomes
1	1	Needs	H1.1
2	1	Communication	H5.2
3	1	Work of designers	H1.1, H1.2, H4.1
4	1	Evaluation	H3.2, H4.3
5	1	Long-term environmental consequences	H1.1, H2.2
6	1	Ethical design	H2.2, H4.2
7	1	Collaborative work of designers	H1.2, H2.2, H6.1
8	1	Life cycle analysis	H1.1
9	1	Built in obsolescence	H1.1
10	1	Sustainable design	H2.1, H2.2

Section II

Question	Marks	Content	Syllabus outcomes
11	4	Design factors	H1.1
12 (a)	2	Ongoing evaluation	H4.3
12 (b)	4	Using technology to conduct evaluation	H4.3
13	5	Creative and innovative design practice	H3.1, H3.2

Section III

Question	Marks	Content	Syllabus outcomes
14		Impact on society of emerging technologies	H3.1, H6.2