

**2002 HSC Notes from  
the Marking Centre  
Design and Technology**

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Published by Board of Studies NSW  
GPO Box 5300  
Sydney 2001  
Australia

Tel: (02) 9367 8111

Fax: (02) 9367 8484

Internet: <http://www.boardofstudies.nsw.edu.au>

ISBN 1740995708

200319

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# 2002 HSC NOTES FROM THE MARKING CENTRE

## DESIGN AND TECHNOLOGY

### Introduction

This document has been produced for the teachers and candidates of the Stage 6 course in Design and Technology. It provides comments with regard to responses to the 2002 Higher School Certificate Examination, indicating the quality of candidate responses and highlighting the relative strengths and weaknesses of the candidature in each section and each question.

It is essential for this document to be read in conjunction with the relevant syllabus, the 2002 Higher School Certificate Examination, the Marking Guidelines and other support documents which have been developed by the Board of Studies to assist in the teaching and learning of Design and Technology.

### General Comments

In 2002, approximately 4860 candidates attempted the Design and Technology examination.

Teachers and candidates should be aware that examiners may ask questions that address the syllabus outcomes in a manner that requires candidates to respond by integrating their knowledge, understanding and skills developed through studying the course. This reflects the fact that the knowledge, understanding and skills developed through the study of discrete sections, should accumulate to a more comprehensive understanding than may be described in each section separately.

### Major Design Project

#### General Comments

Candidates successfully demonstrated the syllabus outcomes more easily assessed by the Major Design Project largely due to a clear understanding of the subject and a deeper understanding of the marking guidelines.

Areas of particular improvement include the comparison of the processes of design, development and production in industrial commercial settings. Candidates became aware that more than the processes of production are to be analysed.

More creativity and innovation was obvious overall in the MDPs. There was a greater variety of projects, and candidates were more creative in their designing.

Better projects conducted wide research to explore ideas and resources, and demonstrated expertise in using appropriate research methodologies. Candidates demonstrated a better understanding of design. They were better able to consider the practices of design and development in industrial/commercial settings, and emulate these where appropriate in their own designing.

A major concern, however, is that candidates continue to have difficulty communicating their design processes effectively. Candidates need to use effective communication techniques that can best communicate their design development. Design folios, whether they are written documents, video or digitised presentations, or oral presentations, should be succinct and provide real evidence of the results of research and experimentation, with summaries and applications of conclusions the focus. Better projects presented succinct folios, with appendices containing source material. Their MDPs were accompanied by prototypes, models and experimental evidence.

Those candidates who provided succinct less detailed portfolios but provided real evidence of their work in developing their solution to the identified needs, enabled markers to more easily assess that they had reached the subject outcomes.

Candidates and teachers are encouraged to use real evidence of development in model or prototyping form, to use photographic or brief video evidence where appropriate, and to summarise conclusions and place the source material within an appendix.

### **Component – Project Proposal and Project Management**

This component was generally well done, but candidates at the lower mark ranges tended to discuss what it is that they want to make rather than provide a thorough investigation of a problem, situation, want or need. Candidates who have individual needs are able to have success with Design and Technology but need to approach the project from a design process perspective.

#### **Assessment Criteria**

- Identification and exploration of the need

Most candidates identified a need, but the exploration of that need was not carried out by many candidates. More outstanding candidates managed to apply critical analysis skills to their investigation of the need and draw conclusions regarding their criteria for evaluation. The flow from need identification to the development of evaluative criteria, provided better candidates with focus and direction for the Product, System or Environment's (PSE) development.

- Areas of investigation

Many candidates simply produced a list of what they might investigate. Better candidates provided a detailed analysis of the range of things they could possibly research, and the methodologies to be used, to inform the development of the PSE.

- Criteria to evaluate success

Better candidates responded well to this concept by considering the project proposal and the needs that the product, system or environment should meet, in many cases creating an assessment tool for use in the final evaluation of the success or otherwise of the PSE. Better candidates link this work to an analysis of the functional and aesthetic aspects of design.

- Action, time and finance plans and their application

It was apparent that many candidates developed plans retrospectively, and simply recounted the activities they had undertaken. Better responses had clear project management strategies

applied, with quality Action Plans in place from the commencement of the project, and evaluated throughout its development.

The comments provided above were equally applicable to finance planning. Poorer responses were simply a collection of receipts after the event, where better responses demonstrated a genuine effort to develop a budget based on available financial resources and likely costs and expenses.

Aspects of development and realisation, investigation and experimentation, prototype development, production, implementation and evaluation should be built into the process of planning. Candidates should be advised that it is appropriate to develop a plan of action, provide this and then evaluate this document during the project development to show new directions that may arise. It is essential, however, that the original documentation, written at the commencement of the project, remains as evidence of its early development.

- Selection and use of ideas and resources

Some confusion was evident in candidates' responses. Many seem to use the marking guidelines to dictate a design process, however this is inappropriate. Candidates should follow design processes appropriate to their project. Resource management is an essential tool of project management, and candidates may need to consider this as a discrete activity/component of the design's development.

Better projects identified resources that may be available to be used for the project and its development, then EVALUATED these resources and SELECTED from the range. This selection of resources is part of project management, and was appropriately documented at this point. Many candidates used a table to succinctly communicate in this section. Candidates then used these resources to develop and produce their project, and the experimentation for appropriate use of these resources was described and justified throughout the project.

Candidates were better able to demonstrate their understanding and application of design processes when they communicated the development of their design project in its natural order, rather than artificially structuring it to fit a series of headings.

Poorer methods of articulating resource management were evident when candidates artificially separated the selection and use of ideas and resources from their identification and justification. The ongoing process of resource identification, evaluation, selection, justification and use should continue throughout the project, and does not need to be broken into sections. Candidates may be less confused if this aspect is explained as a whole rather than from two sections of the tool used to assess candidate performance.

Teachers need to focus less on the assessment tool and focus more on what is to be assessed.

## **Component - Project Development and Realisation**

In this section, the development and realisation of the Major Design Project (both the folio and product, system or environment) should be clearly evidenced, and explained. Application of the conclusions of research should be evident in the development, this is best shown by 3D models, where appropriate, photographic evidence or similar. Long-winded discussion within a portfolio

is not appropriate nor encouraged. The development and the results should be clear in the final PSE.

The use of appendices of the source data is appropriate.

### **Assessment Criteria**

- Evidence of creativity – ideas generation, degree of difference and exploration of existing ideas. This aspect of Design and Technology was well understood by candidates. Many demonstrated a thorough understanding of a definition of innovation versus invention, recognising that a degree of difference in the ideas, technology use and/or final product, system or environment was an acceptable indicator of these outcomes.
- Consideration of design factors relevant to the Major Design Project (as defined in the Design and Technology Stage 6 Syllabus, p 18).

Though explicitly listed in the syllabus, many candidates could not relate these factors directly to their project. Candidates tended to list these factors and write a description of them rather than relate this to the PSE they were developing.

- Documentation of research, experimentation and testing of design ideas, materials, tools and techniques.

Overall the testing of ‘design solutions’ was poorly carried out and reflected the focus upon portfolio work. Most candidates were able to include testing in some form, usually of appropriate materials. Some of this testing, however, lacked relevance to the intended function of the article, for example, flame testing of fabric for a formal gown, density of a range of timbers for a coffee table, ultimate tensile stress of a metal to be used in a piece of jewellery. Only excellent projects included tests that evaluated aesthetic aspects, such as feel, drape, colour appropriateness, suitability and honesty of materials.

Testing became superficial and many candidates could not see its relevance in the development of the whole project.

Candidates and teachers would be well advised to develop solutions to problems in concrete form if appropriate and evaluate the function and aesthetics of these ‘design ideas’ in a more formal way. Research that could be extracted from external and well respected sources should not be duplicated by candidates. Data that cannot be obtained any other way should be the focus of experimentation and testing.

- Application of conclusions

The development of a Major Design Project involves a long period of practical activity to improve the product, system, or environment. Those candidates who carried out a simple development process did very well in providing evidence of their application of conclusions to their product, system or environment. This generally involved modeling concepts or design ideas.



- Identification and justification of ideas and resources

The justification of the selection of the ideas and resources used remains a concept that is not well understood. This should be linked to the criteria to evaluate success from the project proposal.

- Evidence of the testing of design solutions and application of conclusions

During the development stage of the Major Design Project, many candidates failed to implement a process of model or mock-up development. Processes of development such as this enable candidates to demonstrate both the testing of solutions to design challenges that they meet as they progress, and the testing of whole concepts.

- Use of communication and presentation techniques

A broad range of technologies were used in the presentation of all aspects of product, systems and environment development. From the written word to multimedia presentations, excellent use of the Internet for research and communication person to person, candidates showed a growth in the range of techniques they could apply appropriately.

- Evidence and application of practical skills to produce a quality project

Successful candidates in Design and Technology continue to produce work at the highest technical level. This was evident in many products, systems and environments, and in a growing range of technologies. The quality of the Product, System or Environment, continues to be an essential component of success in Design and Technology.

- Consideration of the practices in industrial/commercial settings as they relate to the Major Design Project

Although clearly discussed by many teachers, this section of the Major Design Project was not well executed by candidates. Many focused on the implementation or manufacturing side of the product only. They did not discuss the process that would be used in the design development of similar products in an industrial and/or commercial setting. The syllabus reference (page 9), relates to consideration of the practices in industrial and commercial settings as they relate to the MDP. Teachers and candidates can include the whole process of design and development in their 'consideration of practices'. This criteria was better achieved by candidates than in previous years.

## **Component – Project Evaluation**

Candidates generally need to pay more attention to relating the evaluation to the project proposal. Many candidates only attempt evaluation as a 'final process', as if the syllabus list needed to be done in order rather than incorporating the evaluation process throughout the development and completion of the MDP. Better candidates applied constant evaluative processes throughout the development of their MDP and referred back to their criteria to evaluate success as a guide to this development. Candidates generally need to pay more attention to relating their evaluation, both ongoing and final, to their project proposal work.

The final evaluation of the PSE's impact on society and the environment continues to provide challenges for candidates. Teachers may like to strengthen the understanding of life cycle assessment/analysis used with candidates and the selection of materials tools and processes on environmental criteria, in addition to those already used. Social impact of PSE is a major syllabus component, as detailed in outcome H4.3. Candidates will also carry knowledge of the social impact of design from the preliminary course:

- personal values
- cultural beliefs
- sustainability
- safety and health
- community needs
- individual needs
- equity

and are able to use this in their major design project.

Evaluation of impact on Society remains an overall, weaker area. In this section, candidates were required to provide evidence of continual evaluation throughout the development and realisation of the Major Design Project. This also included linking back to the original criteria developed in the Project Proposal and Project Management section to evaluate the success of the project.

### **Assessment Criteria**

- Recording and application of evaluation procedures throughout the design project

As with other parts of the marking guidelines, many candidates used this as a heading for a section of their portfolio. This is unnecessary. A more appropriate response is to record evaluative comments and procedures as they occur.

The sample marking guidelines for the Major Design Project are not a series of headings, nor a design process to follow. This process will lead candidates to evaluate, reflect and respond by applying the results of evaluation to the development of the product, system or environment.

- Analysis and evaluation of functional and aesthetic aspects of design

Often this seemed to be carried out as an afterthought, rather than something that will inform the areas to be investigated and the criteria to evaluate success.

- Final evaluation with respect to the project proposal and the project's impact on society and the environment

Societal impact still proves to be an area of evaluation that is difficult for many candidates. Some work in the case study about societal impacts of designs, and design and production, may assist candidates in this area. Environmental issues are better addressed, but rarely extend to life cycle assessments of materials or of environmental impact of processes used. A number of candidates failed to relate the criteria to evaluate success from the Project Proposal to the final evaluation of the MDP.

- Relationship of the final product, system or environment to the project proposal

This aspect was well done by most candidates, many providing a brief personal reflection relating back to the criteria to evaluate success.

## Written Examination

### Section I

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

### Section II

#### Question 11

This question gave the candidates the opportunity to utilise the knowledge and skills gained from the development of their MDP and apply it to the situation presented regarding the playstation concept. Many candidates had difficulty, tending to overanalyse the question. Candidates responded best to part (c).

- (a) A small proportion of candidates were able to fully meet the requirements of this question. Better responses were able to identify more than one element of project management. They were able to outline in general terms the features of each element. Other responses generally identified elements of management. However, they were unable to indicate the main features of each of these elements. Many simply listed several aspects of management. Poor responses demonstrated a lack of recognition of the key elements of project management.
- (b) Generally this part of the question was poorly answered. For candidates to achieve the full range of marks in this question they needed to identify a number of the key elements of project management and explain how they were able to enhance product quality. Unfortunately many candidates were unable grasp the concept of explaining how good project management could enhance product quality.

Better responses were able to mention ongoing evaluation in relation to each of the elements discussed. Other responses were able to link product quality to more than one element of project management, while poorer responses often discussed aspects of project management, but failed to link these to product quality.

- (c) This part of the question was consistently well answered by many candidates. Most candidates were able to identify features for evaluation with many being able to extend their response by explaining the evaluation procedure relevant to the playstation concept.

Better responses were typically able to outline two features of the playstation project and explain in detail how these could be evaluated and further, related this to a set of evaluation criteria. Other candidates were able to identify two features of the playstation project and give a brief outline of how they could be evaluated. Whilst poorer responses typically identified one or two features of the playstation project but did not explain how these could be evaluated.

- (d) Overall, this part of the question was quite poorly answered. Again many candidates unfortunately displayed difficulty in understanding the concept of life cycle analysis and discussing ‘how’ it could be applied to the development of the playstation. Few candidates were able to provide the detail in the explanation, supported by specific examples, to score in the top mark range.

Good responses were able to provide a comprehensive explanation of the process of life cycle analysis that included most issues associated with manufacture, use and disposal. They were also able to link a number of issues established in the explanation through specific examples and comparisons to the playstation.

Average responses were able to give an explanation of life cycle analysis that included some issues associated with manufacture or use or disposal. Links to only one or two aspects that are likely to be important in the playstation were provided.

Poor responses frequently confused life cycle analysis with product analysis. Only some aspects of life cycle analysis were outlined and often the relationship to the playstation was not evident. In some responses the playstation was discussed with no reference to an explanation of life cycle analysis.

### **Section III**

Candidates are required to attempt ONE question from this section. They should read each question, spend more time critically analysing what is required in the question, and carefully choose the one they feel they can best answer. Better responses showed evidence of doing this. Poorer responses, however, resulted from an attempt to do all THREE questions. This is extremely poor examination technique, and is of no benefit to the candidate. Candidates should be strongly discouraged from doing this.

#### **Question 12**

This question gave the candidates an opportunity to express their knowledge of innovation and emerging technologies, gained through exploration and investigation of their own case study and other course activities. The vast majority of candidates were able to recall knowledge, but only a small proportion were able to apply it to the stimulus material.

- (a) The majority of candidates were able to name two methods of protecting innovations. Good responses exhibited the ability to describe one of the methods clearly by giving protective characteristics, however, very few candidates had the ability to describe (provide features and characteristics of) both methods of protecting innovations.

Very few candidates were able to identify methods other than a patent and copyright. Some candidates thought that intellectual property was a protective device.

- (b) Better responses demonstrated their knowledge about factors influencing success of innovations, and an understanding of how to relate similar factors to at least one other innovation. They successfully answered the question in the depth required, identifying at least two factors involved in the success (or otherwise) of their own case study, and explaining how these factors could impact similarly on the light chip innovation.

Average responses were able to identify at least TWO key factors involved in the success of their innovation but struggled to provide a direct link from these factors to their impact on the light chip.

Poorer candidates were only able to identify the features of their innovation, giving responses based on functional features and elements of design.

- (c) The vast majority of candidates were able to list some of the possible environmental, economical and social implications of the light chip innovation.

Better responses were able to explain in some detail the possible environmental, economical and social implications of the light chip innovation. They did this by making some analysis and judgement on one or two of the areas.

The most successful responses explained, with some analysis and assessment of the possible environmental, economic and social implications of the light chip. They clearly analysed and made judgement on the possible environmental, economic and social implications beyond just simple cause and effect, to including relevant future implications.

Most candidates correctly answered the question by relating their response to the light chip. A very small percentage answered the question in response to the innovation they had studied.

### **Question 13**

The better responses demonstrated an ability to give well-structured discussion in relation to the context of the question. They did not meander but kept the responses concise and to the point.

- (a) In this part a good response most commonly identified two technological developments, then went on to outline concisely how each changed the process of shopping, and then made a comparison of the ways people shopped before and after the introduction of these technologies.

A common response simply mentioned two forms of technology, but did not make a comparison between previous methods of shopping. They listed two technologies and did not expand on them.

The poorer response in part (a) only mentioned one technology or simply listed two technologies and did not expand on them. They failed to give a comparison of the process before and after the changed technology was introduced.

- (b) In this part, better responses identified a number of social and economic trends and explored those trends clearly. They explored how social and economic trends are intertwined, each affecting the other. By doing this and linking the trends with the examples the candidate's responses were very clear and well structured.

Some candidates did not relate to social and economic trends and their impact on the way people shopped.

Poorer responses endeavoured to identify social and economic trends but were unable to explain how they affected the **way** people shopped. The responses were only brief outlines and rarely linked the trends with social and economic outcomes. They often gave long explanations of why and how people shop but not the way they shop. There was often confusion by these candidates between parts (b) and (c) of the question.

- (c) Better responses showed a breadth of examples in their explanation and used a few examples which they dealt with in some depth and then made judgements and discussed impacts of cashless shopping. They gave advantages and disadvantages and made some evaluative statements about the net outcome. They were comfortable in identifying ethical and environmental advantages and disadvantages and were able to progress and make judgments about the importance of both.

Other responses gave good outlines and/or explanations. They were usually able to provide examples of advantages and disadvantages under the headings of ethics and environment.

Poorer responses in part (c) mostly linked one or two examples either of an ethical or an environmental aspect and/or one or two advantages and/or disadvantages but were unable to link the concepts together. Many candidates confused social/economic (part (a)) and ethical/environmental (part (b)) issues and gave no set differentiation between these. They listed in table form only and did not list/write actual ethical/environmental issues. These candidates also frequently attempted to answer more than one question in Section III of the paper.

#### **Question 14**

- (a) The majority of candidates successfully responded to this question part by outlining the main features of two relevant issues a designer would need to consider in relation to the text and graphics for a mobile phone display screen.
- (b) Most candidates could outline two features that would improve the safety of mobile phones: for example, personal by using hands free connection and environmental through the use of alternative materials and then give some other technology to support their answer.

Better responses chose technologies that were clearly linked to personal and environmental safety features to support their response, eg. microwave oven doors for personal protection and solar cells for environmental impact reduction.

Excellent responses developed the explanation of the safety features by discussing how they improved safety. The chosen examples supported these explanations.

Poorer responses briefly listed or outlined the safety features for one or both of personal and environmental safety issues and did not mention another technology to support their answer.

- (c) This section proved to be more challenging for candidates. Good responses were able to explain and describe how convergence has changed technologies, and referred to examples from mobile phones and at least one other product/system. Better responses were also able to critically assess the role of convergence of technologies, discussing the advantages and disadvantages and implications of this convergence.

Many candidates talked at length about the different technologies combined in mobile phones, but provided no examples where combining of technologies occurred elsewhere, thus only responding to one part of the question.

When poorer responses did give examples of other technologies to support their answer, they often made reference to historical, cultural, market success and use of the example, without making reference to the combination of technologies. This question required candidates to assess the role of the combining of technologies, such as improved efficiency or carrying fewer products because many technologies are combined into one. Candidates needed to draw conclusions, discuss advantages and disadvantages or arguments and implications of the combining of technologies.

Poorer responses often referred to mobile phones OR their innovation case study but did not mention both. Most students could outline examples of the convergence of technologies in mobile phones and one other innovation but did not give any critical assessment of the convergence. Only the better responses discussed both positive and negative aspects of the consequences of convergence.

# Design and Technology

## 2002 HSC Examination Mapping Grid

Question	Marks	Content	Syllabus outcomes
<b>Section I</b>			
1	1	Work of designers	H1.2
2	1	Communicating design ideas	H5.2
3	1	Successful innovation	H3.1, H6.2
4	1	Design factors	H1.1
5	1	Design development – design briefs	H4.1
6	1	Selecting resources – ethical issues	H4.2
7	1	Influence of trends in society – global issues	H2.1
8	1	Needs analysis – market research	H1.1, H4.1
9	1	Research methods – analysis	H4.1, H5.2
10	1	New technologies	H6.1, H6.2
<b>Section II</b>			
11 (a)	2	Project management	H5.1
11 (b)	3	Project management	H1.2, H5.1, H6.1
11 (c)	4	Project evaluation	H4.3
11 (d)	6	Factors affecting design – life cycle analysis	H1.1, H4.3
<b>Section III</b>			
12 (a)	2	Innovation; Emerging technologies	H2.2, H3.1, H3.2, H6.2
12 (b)	5	Innovation; Emerging technologies – Factors affecting success	H3.1, H6.2
12 (c)	8	Innovation; Emerging technologies – Impact on society and environment	H3.1, H3.2, H6.2
13 (a)	2	Influence of trends in society – Historical and cultural	H2.1, H2.2
13 (b)	5	Influence of trends in society – Historical and cultural	H2.1, H2.2
13 (c)	8	Impact of design and innovation on society – ethical environmental issues	H2.1, H2.2
14 (a)	2	Factors affecting design	H1.1, H4.2
14 (b)	5	Selects and uses resources safely; Design factors	H1.1, H4.2
14 (c)	8	Emerging technologies – factors affecting their development	H1.1, H6.2



## 2002 HSC Design and Technology Marking Guidelines

### Section II

#### Question 11 (a)

*Outcomes assessed: H5.1*

#### MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> <li>Gives the general features of at least TWO of the following: time/action plans; budget/finance plans; documentation; ongoing planned evaluation; resource management</li> </ul>	2
<ul style="list-style-type: none"> <li>Lists TWO of the following: time/action plans (planning); budget/finance plans; documentation; ongoing planned evaluation; resource management</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>Gives general features of ONE of the above</li> </ul>	1

#### Question 11 (b)

*Outcomes assessed: H1.2, H5.1, H6.1*

#### MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> <li>Shows that quality management (or total quality management) is ongoing in checking each stage with predetermined criteria (ie a wholistic view)</li> <li>Relates this by identifying how a number of management elements can facilitate this process</li> </ul>	3
<ul style="list-style-type: none"> <li>Outlines a direct link between more than one element of project management and quality</li> </ul>	2
<ul style="list-style-type: none"> <li>Outlines a direct link between one element of project management and quality eg managing ongoing evaluation and the design brief or performance criteria</li> </ul>	1

**Question 11 (c)***Outcomes assessed: H4.3***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
<ul style="list-style-type: none"><li>• Outlines two features of the project that could be evaluated and describes in detail how the evaluation could be done (objective testing; subjective user groups) and relates evaluation to the need of criteria</li></ul>	4
<ul style="list-style-type: none"><li>• Identifies two features of the project that could be evaluated and describes how each could be done eg comparative testing trial; describes how user group testing could be carried out for the console</li></ul>	3
<ul style="list-style-type: none"><li>• Briefly outlines two features of the project that could be evaluated – comparative testing of batteries (life, weight, shape); audio quality/range testing; aesthetics of console through user groups</li></ul>	2
<ul style="list-style-type: none"><li>• Briefly outlines one feature of the project that could be evaluated eg batteries could be tested</li></ul>	1

**Question 11 (d)***Outcomes assessed: H1.1, H4.3***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
<ul style="list-style-type: none"><li>• Gives a comprehensive explanation of life cycle analysis that includes most issues associated with manufacture, use and disposal. Links a number of issues established in the explanation through specific examples (especially comparisons) eg compares materials, compares energy sources, compares recycleability and obsolescence</li></ul>	5–6
<ul style="list-style-type: none"><li>• Gives an explanation of life cycle analysis that includes some issues associated with manufacture, use or disposal. Links life cycle analysis to one or two aspects (materials, purpose, energy sources etc) that are likely to be important in a playstation</li></ul>	3–4
<ul style="list-style-type: none"><li>• Simple definition of life cycle analysis (rather than explanation) eg cradle to grave analysis of materials. Describes the relationship of life cycle analysis to one or two issues in the development of the playstation</li></ul>	1–2

**Question 12 (a)**

*Outcomes assessed: H2.2, H3.1, H3.2, H6.2*

**MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none"> <li>Identifies TWO and provides characteristics and features of at least one method of protecting innovations (copyright, patent, design registration, logo, plant variety rights, circuit diagrams)</li> </ul>	2
<ul style="list-style-type: none"> <li>Lists two (or more) methods of protecting innovations (copyright, patent, design registration, logo, plant variety rights, circuit diagram)</li> </ul> OR <ul style="list-style-type: none"> <li>Gives characteristics of one method of protecting innovation</li> </ul>	1

**Question 12 (b)**

*Outcomes assessed: H3.1, H6.2*

**MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none"> <li>Identifies at least two key factors relevant to the student's own case study and in detail describes how the relationship between these factors and the given innovation (light chip) impacted on the success (or not)</li> </ul>	5
<ul style="list-style-type: none"> <li>Identifies at least two key factors relevant to the student's own case study and describes a link between these factors and the given innovation (light chip) and its success (or not)</li> </ul>	4
<ul style="list-style-type: none"> <li>Identifies at least two key factors relevant to the student's own case study and provides some link to the stated innovation (light chip)</li> </ul>	3
<ul style="list-style-type: none"> <li>Identifies one/two appropriate key factors related to student's own case study</li> </ul> OR <ul style="list-style-type: none"> <li>Identifies briefly one/two appropriate key factors for stated innovation (light chip)</li> </ul>	1–2

**Question 12 (c)**

*Outcomes assessed: H3.1, H3.2, H6.2*

**MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
<ul style="list-style-type: none"> <li>• Explains some analysis and assessment of the possible environmental, economic and social implications of the light chip and/or innovation</li> <li>• Makes some analysis and shows judgements on the possible environmental, economic and social implications, beyond just simple cause and effect, to looking at relevant 'knock on' implications</li> </ul>	7–8
<ul style="list-style-type: none"> <li>• Explains some of the possible environmental, economic and social implications of the light chip and/or innovation</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• Makes analysis and judgements on two of the areas</li> </ul>	5–6
<ul style="list-style-type: none"> <li>• Outlines some of the possible implications of the light chip and/or innovation. May only include one or two of environmental, economic or social implications</li> </ul>	3–4
<ul style="list-style-type: none"> <li>• Lists some possible implications of the light chip and/or innovation</li> </ul>	1–2

**Question 13 (a)**

*Outcomes assessed: H2.1, H2.2*

**MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
<ul style="list-style-type: none"> <li>• Outlines in general terms how two technologies pictured have changed shopping – need to compare the process before and after the changed technology in each case (examples could include transport, money, credit cards, marketplaces, computer/internet, telephone, TV)</li> </ul>	2
<ul style="list-style-type: none"> <li>• Lists two changes in technology that have changed shopping (examples could include transport, money, credit cards, marketplaces for bartering, computer/internet, telephone, TV)</li> </ul>	1

**Question 13 (b)**

*Outcomes assessed: H2.1, H2.2*

**MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none"> <li>Identifies a range of social and economic trends and provides a detailed explanation of the impact of each on shopping and/or another technology</li> </ul>	5
<ul style="list-style-type: none"> <li>Identifies at least one social and one economic trend and explains the way these trends have impacted on shopping and/or another technology</li> </ul>	4
<ul style="list-style-type: none"> <li>Identifies at least two trends and outlines briefly some impact on shopping and/or another technology</li> </ul>	3
<ul style="list-style-type: none"> <li>Outlines briefly one or two trends that can be identified as having impacted on shopping and/or another technology</li> </ul>	1–2

**Question 13 (c)**

*Outcomes assessed: H2.1, H2.2*

**MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none"> <li>Explains advantages and disadvantages in terms of ethics and the environment of cashless shopping. This can be done by showing a breadth of examples in their explanation or using a few examples dealt with at some depth and then making judgements and discussing impacts of the cashless society. Such an assessment would involve making judgements about the relative importance/impact of the different advantages and disadvantages and making some evaluative statements about the net outcome (ie weigh up the net advantage or disadvantage maybe with caveats eg an advantage if certain safeguards in place)</li> </ul>	7–8
<ul style="list-style-type: none"> <li>Explains advantages and disadvantages in terms of ethics and the environment of cashless shopping. This can be done by showing a breadth of examples in their explanation or using a few examples dealt with at some depth</li> </ul>	5–6
<ul style="list-style-type: none"> <li>Outlines some advantages and disadvantages of cashless shopping</li> </ul>	3–4
<ul style="list-style-type: none"> <li>Lists some advantages and disadvantages of cashless shopping</li> </ul>	1–2

**Question 14 (a)**

*Outcomes assessed: H1.1, H4.2*

**MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none"> <li>Indicates the main features of TWO appropriate issues</li> </ul>	2
<ul style="list-style-type: none"> <li>Lists TWO appropriate issues</li> </ul>	1

**Question 14 (b)**

*Outcomes assessed: H1.1, H4.2*

**MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none"> <li>Provides an explanation that shows how features from each safety area would improve the safety of mobile phones and supports this with similar examples from other technologies</li> </ul>	5
<ul style="list-style-type: none"> <li>Describes at least one feature from EACH safety area (ie personal and environment) that would improve the safety of mobile phones – and shows links using examples from other technologies</li> </ul>	4
<ul style="list-style-type: none"> <li>Outlines at least two features that could improve the safety of mobile phones. Gives an example from another technology</li> </ul>	3
<ul style="list-style-type: none"> <li>Lists one or two features that could improve the safety of mobile phones</li> </ul>	1–2

**Question 14 (c)**

*Outcomes assessed: H1.1, H6.2*

**MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none"> <li>Explanation and descriptions of how convergence has changed technologies. Example from mobile phones and one other product/system should be used. Some critical assessment (advantages and disadvantages or arguments and implications) of the ‘combining together’ of technologies is included</li> </ul>	7–8
<ul style="list-style-type: none"> <li>Explanation and descriptions of how convergence has changed technologies. Example from mobile phones and one other product/system should be used. Some assessment of the importance of combining together of technologies is included</li> </ul>	5–6
<ul style="list-style-type: none"> <li>Outlines some examples of the convergence of technologies in mobile phones and one other product or system</li> </ul>	3–4
<ul style="list-style-type: none"> <li>Lists some examples of the combining together (convergence) of technologies. If only deal with mobile phones using LCD and batteries, maximum of 1 mark, must use an example from one other technology to get 2 marks</li> </ul>	1–2