HSC marking simulation videoconference: Design and Technology

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NEW SOUTH WALES DEPARTMENT OF EDUCATION AND TRAINING

NEALS

Curriculum K-12

Video Conference overview

- Development of HSC examination paper
- Marking process
- Questions/answers
- Standards package
- Resources

Development of HSC Examination Paper

- An examination committee made up of both teachers and academics is convened.
- The exam developed from the syllabus.
- Examination specification (p.7 of Assessment and Reporting in Design and Technology Stage 6) determines the format of the paper & the content of each section.

  http://www.boardofstudies.nsw.edu.au/syllabus_hsc/pdf_doc/design-technology-assessment-reporting.pdf
- The examination committee determines the specific content and level of difficulty of each question.
- The exam is assessed by teachers, the supervisors of marking , a syllabus validity assessor and various internal assessors prior to being accepted by the BOS and printed.

2010 Design & Technology HSC Examination Specifications

- Time Allowed : 1.5 Hours plus 5 minutes reading time
- The paper will consist of three sections.

Section I (10 marks)

- 10 objective response questions (multiple choice questions)
- 1 mark per question
- Allow about 15 minutes for this section
- Responses for Section I are computer marked

2010 Design & Technology HSC Examination Specifications

Section II (15 marks)

- Approximately 4 – 6 short-answer questions
- Questions may contain parts
- Questions may contain reference to stimulus material
- Students will be able to access a range of marks in this section with several questions in the 2 / 3 mark range and at least one worth 5 / 6 marks.
- Allow about 35 minutes for this section.

2010 Design & Technology HSC Examination Specifications

Section III (15 marks)

- In 2010 section III in the HSC exam has changed. There will be only ONE structured extended response in this section.
- Traditionally this question has been broken into two sections with a 6 and 9 mark breakdown.
- The expected length of responses in this section is around 4 pages or 600 words. (this is not a limit you can write more if you need to)
- Allow 40 minutes for this section.

Marking Guidelines

- The Examination Committee develops and writes the examination paper and the marking guidelines.

Question 11 (15 marks)

(a) (i) Outline a creative strategy used in a design process. **2**

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Question 11 (a) (i)

Outcomes assessed: H3.2

MARKING GUIDELINES

Criteria	Marks
• Sketches in general terms a creative strategy	2
• Identifies a creative strategy	1

Marking Guidelines

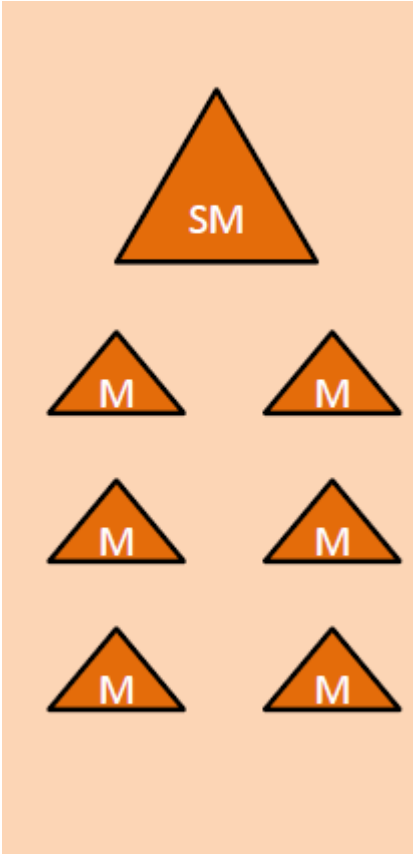
- Marking guidelines are used by the markers to help understand the intent of the Examination Committee and the allocation of marks.

MARKING GUIDELINES

Criteria	Marks
• Draws out and relates implications between technological change and its impact on the environment by making the relationship between technological change and its impact on the environment evident. Response well supported with examples.	9
• Explains how technological change can have an impact on the environment by making the relationship between technological change and its impact on the environment evident	7–8
• Discusses features of technological change and its impact on the environment	5–6
• Describes technological change and its impact on the environment	3–4
• Outlines a technological change OR • Outlines an impact on the environment	2
• Identifies a technological change OR • Identifies an impact on the environment	1

Pre- Marking Process

- The marking of the examination papers for each course is managed by a Supervisor of Marking (SOM).
- The Supervisor of Marking selects Senior Markers as team leaders who then train the markers in how to use and interpret the marking guidelines
- The markers are organised into marking groups or teams under the leadership of a Senior Marker.
- Each marking group is allocated a section to mark.



Pre-Marking Sessions

- During the early sessions of the marking operation, Senior Markers (SM's) read many student responses, check them against the marking guidelines and collect specific student responses that will be used to guide the markers.
- They check to see the marking guidelines will enable markers to reliably award marks to the full range of student responses and will obtain an appropriate level of discrimination.
- SM's annotate photocopied scripts which represent the range of marks available for each question. These are used by the markers for discussion and clarification about where marks have been allocated throughout a student's response.

Pilot Marking

- When the markers first attend the marking centre their Senior Marker helps them become familiar with the question they are to mark and the marking guidelines they are to apply.
- Each marking group discusses the question, marking guidelines and reviews the scripts selected by the SM's.
- The senior markers review these scripts with the marking groups and use their annotations a points for discussion.
- A random selection of scripts are marked.
- Marks are compared for each script, discrepancies (marks outside the acceptable range) discussed and consensus is developed amongst the group about where the candidates response lies within the marking guidelines.

Pilot Marking

- The pilot marking process continues until all markers are consistent in the application of the marking guidelines.
- If there is concern that the marking guidelines are not allowing candidates to access to full range of marks then the Senior Marker(s), Supervisor of Marking (SOM) and the representative from the Examination Committee review the problem and appropriate action is taken.
- Marking commences when the Senior Marker is confident that all Markers can apply the marking guidelines.

Marking Process

- A standards-referenced approach means that more marks are awarded to answer that better addresses the question.
- Answers are not ranked, they are marked on their quality.
- Markers positive mark, that is they award marks, they do not penalty mark.
- Quality Assurance is maintained throughout the marking process through the following measures:
  - check marking by the Senior Marker
  - common scripts are marked by each marker during every session of marking.
  - daily and cumulative marker statistic sheets

Tips for Success – Section 1

- All parts of the of the syllabus are covered in the multiple choice questions.
- Allow about 15 minutes or 1 ½ minutes per question.
- Do not rush through the multiple choice questions they are worth one quarter of the marks in your exam paper.
- Read each choice carefully, eliminate the wrong answers before identifying the most correct of best answer.

9 What must an industrial designer first consider when asked to generate ideas for a new product?

(A) Existing product designs

(B) Ergonomics of the product

(C) Appropriate marketing campaign

(D) Presentation of the ideas to the client

Tips for Success – Section 1

Generating ideas for a new product occurs at the initial stages of the design process

9 What must an industrial designer first consider when asked to generate ideas for a new product?

(A) Existing product designs

(B) Ergonomics of the product

(C) Appropriate marketing campaign

(D) Presentation of the ideas to the client

Options B, C & D all include elements that occur later in the design process.

Tips for Success – Section II

- Read the question carefully, underlining the main words and ideas.
- Use the allocated marks as a guide to answering the question.
- Do NOT repeat the question in your response. Get straight into answering the question.
- Write in the space provided, this is a guide as to how long your response should be.
- Know what is meant by each word in the Board's Glossary of Key Words

A Glossary of Key Words

- This glossary contains key terms that appear frequently in the Board of Studies syllabuses, performance descriptions and examinations. The purpose behind the glossary is to show that certain key words are used similarly in examination questions across many subjects they are studying.
- For a full list of the key words see:

  http://www.boardostudies.nsw.edu.au/syllabus_hsc/glossary_keywords.html

Examples from the Glossary Frequently Used In Design and Technology

- Analyse: identify components and the relationship between them; draw out and relate implications
- Compare: show how things are similar or different
- Describe: provide characteristics and features
- Discuss: Identify issues and provide points for and / or against
- Explain: relate cause and effect; make the relationships between things evident; provide why and / or how
- Outline: sketch in general terms; indicate the main features of

Tips for Success – Section II

- The following question has been taken from the 2009 HSC Section II, question 11 (a) ii.

(ii) Describe how a creative strategy, different to the one outlined in (a) (i), may be used in a design process. **3**

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- Prior to writing your response, look at the question more carefully and identify the key word as well as focus word(s) or phrase that needs to be addressed.

Tips for Success – Section II

- Highlight or underline the key word and the focus words for the question. This will assist you in keeping your response within the intent of the question.
- Review the definitions for each of these. This can be done mentally or you could make some simple notes or a mind map on your paper. (don't spend too much time on this)

Question 11 (a) (ii)
Describe how a creative strategy, different to the one outlined in (a) (i), may be used in a design process.

Provide characteristics and features
How the creative strategy is used
A part of the design process- at any stage of the process.

Tips for Success – Section II

- Write your response.

- Following are two responses for this question. Using the marking guidelines and the annotations check that each candidate has been awarded maximum marks available for their response.

Tips for Success – Section II

- 'Experimentation of joints for wood can be used to find out whether an idea will be successful early in the production of a design. This can lead to new ideas.'

Question 11 (a) (ii)

Outcomes assessed: H3.2

MARKING GUIDELINES

Criteria	Marks
• Provides characteristics and features of a creative strategy and shows how the strategy is used in the design process	3
• Identifies a creative strategy and links this strategy to the design process	2
• Identifies a different creative strategy	1

- Annotation: The creative strategy is identified (experimentation) and this is linked to the design process (successful production, new ideas).
- Mark awarded = 2

Tips for Success – Section II

- Another creative strategy used in the design process is brainstorming. This strategy can be used throughout the whole process as a way for the individual designer or collaborative team to generate new ideas such as function, aesthetics, materials and examining cultural issues and different perspectives of the design.

Question 11 (a) (ii)

Outcomes assessed: H3.2

MARKING GUIDELINES

Criteria	Marks
• Provides characteristics and features of a creative strategy and shows how the strategy is used in the design process	3
• Identifies a creative strategy and links this strategy to the design process	2
• Identifies a different creative strategy	1

Tips for Success – Section II

- Annotation: Identifies a creative strategy (brainstorming) and describes the strategy (designers and teams to generate new ideas such as function, aesthetics, cultural issues and different perspectives) used in the design process.
- Mark awarded = 3

Tips for Success – Section II

- Section II will have at least one question which requires candidates to demonstrate deeper knowledge.
- This question is traditionally worth 5 or 6 marks (this question equates to approximately 1/3 of the total marks available for section II)
- The method used throughout section II should not be altered for this response.
- The following question has been taken from the 2009 HSC Section II, question 11 (c).

Question 11 (continued)

(c) How do experimentation and testing influence creativity in the design process? **6**

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Tips for Success – Section II

- You may have already noticed that there is no HSC key word used within this question. The question asks 'How' which does not appear within the glossary list.
- Whenever the word 'How' or 'Why' are used it should be assumed that the intent of the question is for you to provide an explanation.
- Following the method discussed earlier identify the key word and the focus word(s) or phrase.

How do experimentation and testing influence creativity in the design process? 6 marks

How= explain how
"experimentation and testing" influence creativity in the design process

Tips for Success – Section II

- Write your response.

- Following are three responses for this question. Using the marking guidelines and the annotations check that each candidate has been awarded maximum marks available for their response.

Tips for Success – Section II

- Creativity may be influenced in the design process by limiting the materials to be used, suitability of materials through testing or if some processes will be too expensive.

Question 11 (c)

Outcomes assessed: H3.2, H4.1

MARKING GUIDELINES

Criteria	Marks
• Makes the relationship between experimentation and testing and creativity evident and describes how this influences creativity in the design process	5–6
• Describes how experimentation and testing influences creativity in the design process	3–4
• Outlines how experimentation and testing links to the design process	2
• Identifies a role of experimenting and testing in the design process	1

- Annotation: Outlines how experimentation and testing links to the design process (limit materials, material suitability, expense).
- Mark awarded = 2

Tips for Success – Section II

- Experimentation can help the designer ensure the idea is possible to prevent problems later. It can give time to reconsider ideas to improve and modify. The process may help the designer learn about design aspects and generate new and better ideas to achieve the best end result and make the project easy to use and effective. In the design folio it is useful to have evidence of experimentation.

Question 11 (c)

Outcomes assessed: H3.2, H4.1

MARKING GUIDELINES

Criteria	Marks
• Makes the relationship between experimentation and testing and creativity evident and describes how this influences creativity in the design process	5–6
• Describes how experimentation and testing influences creativity in the design process	3–4
• Outlines how experimentation and testing links to the design process	2
• Identifies a role of experimenting and testing in the design process	1

Tips for Success – Section II

- Annotation: Describes how experimentation and testing influences creativity in the design process (time to reconsider ideas and improve and modify, learn about design aspects, achieve the best end result, easy to use and effective).
- Mark awarded = 3 / 4

Tips for Success – Section II

- Experimentation may take many forms such as prototyping and testing. Testing and experimentation allows designers to establish errors in designs early so that problems can be rectified before the design and production progresses further. Adjustments and modifications can be made to the design. Testing determines the suitable and effective materials for a product. Materials may change as a result of testing. Prototyping allows a designer to visualise the outcome of the design and influences creativity by providing designers with alternate solutions, production methods, finishes and ideas. The main purpose of experimenting is to establish suitable materials, ensure that designs will function efficiently after production and address faults and complications. This will often lead to design changes and thus influences creativity.

Tips for Success – Section II

Question 11 (c)

Outcomes assessed: H3.2, H4.1

MARKING GUIDELINES

Criteria	Marks
• Makes the relationship between experimentation and testing and creativity evident and describes how this influences creativity in the design process	5–6
• Describes how experimentation and testing influences creativity in the design process	3–4
• Outlines how experimentation and testing links to the design process	2
• Identifies a role of experimenting and testing in the design process	1

The relationship between “experimentation and testing” and creativity is clearly evident (Prototyping allows a designer to visualise the outcome of the design and influences creativity by providing designers with alternate solutions, production methods, finishes and ideas; materials may change as a result of testing) and describes how this influences the design process (This will often lead to design changes and thus influences creativity; and modifications can be made to the design). Mark awarded = 6

Tips for Success – Section III

- As previously mentioned Section III in the 2010 HSC has undergone some changes.
- Traditionally there were three questions offered to candidates. Each question could be assessed on its merits with candidates only required to respond to one. This was known as the optional question.
- For the 2010 HSC the optional element of Section III has been removed. All candidates sitting the HSC in Design and Technology will be required to answer the same extended response question.
- Historically this question has been broken into two parts with a 6 and 9 mark breakdown.

Tips for Success – Section III

- As with the short answer responses in Section II the manner with which you approach this question should not change.
- Highlight or underline the key word and the focus words for the question. This will assist you in keeping your response within the intent of the question.
- Review the definitions for each of these. This can be done mentally or you could make some simple notes or a mind map on your paper. (don't spend too much time on this)
- Draw a mind map or make reference notes on the inside of the cover of the examination booklet. This will help structure your response, this will also be marked as part of your response.

Tips for Success – Section III

- The following question has been taken from the 2008 HSC, question 12 a.

Question 12 (15 marks)

Electricity can be generated from a variety of sources, such as:

- nuclear energy
- solar panels
- hydro electric power
- wind turbine
- biomass
- tidal movement
- wave generation
- clean coal technology

(a) Explain the environmental issues considered during the design and production of innovative methods of generating electricity using examples from the above list. **6**

Tips for Success – Section III

- Highlight or underline the key word and the focus words for the question. This will assist you in keeping your response within the intent of the question.
- Review the definitions for each of these. This can be done mentally or you could make some simple notes or a mind map on your paper. (don't spend too much time on this)

Explain the environmental issues considered during the design and production of innovative methods of generating electricity using examples from the above list.

Explain = Relate cause and effect; make the relationships between things evident; provide why and / or how.

Environmental issues considered: relevant environmental concerns (waste, quality of life, cost)

Design and production: planning and implementation stages. Cradle to grave or cradle to cradle analysis.

Tips for Success – Section III

Explain the environmental issues considered during the design and production of innovative methods of generating electricity using examples from the above list.

Explain = Relate cause and effect; make the relationships between things evident; provide why and / or how.
Environmental issues considered: relevant environmental concerns (waste, quality of life, cost)
Design and production: planning and implementation stages. Cradle to grave or cradle to cradle analysis.

Tips for Success – Section III

- Write your response.

- Following are three responses for this question. Using the marking guidelines and the annotations check that each candidate has been awarded maximum marks available for their response.

Tips for Success – Section III

The environment is a big consideration when designing and producing electricity. Factors such as the amount of land needed (hydro electric power), the waste (nuclear power) and the noise (wind turbine) have to be thought of when designing ways of making electricity. Nuclear power produces a lot of electricity but it has waste which is deadly and it lasts for a long time. How to store this waste is an important consideration for designers.

Tips for Success – Section III

Question 12 (a)

Outcomes assessed: H2.2, H6.2

MARKING GUIDELINES

Criteria	Marks
• Makes the relationship evident between environmental issues and the design and production of an innovation in electricity generation, with specific links to stimulus examples	5–6
• Describes environmental issues and links these to the design and/or production of an innovation in electricity generation, with reference to stimulus examples	3–4
• Outlines environmental issues in electricity generation OR • Outlines features of design or production of electricity generation	2
• Identifies an environmental issue OR • Identifies a feature of design or production, in electricity generation	1

- Annotation: *Outlines environmental factors such as the waste and noise that are produced by nuclear and wind turbine methods of production. Mark awarded = 2*

Tips for Success – Section III

Of all the methods listed, nuclear power is the most environmentally dangerous. Although it produces very clean electricity it has toxic waste that takes millions of years to breakdown.

Hydro electric systems also produce clean energy but they require areas which get lots of water as well as the elevation that gives the water enough energy to turn a turbine and create electricity. This part of the hydro electric scheme is environmentally friendly but the creation of huge dams that flood the land is not.

Wind turbines are a new concept in electricity generation. They use the energy contained in wind to turn blades connected to a turbine. A problem that has been discovered with this method is that it is very noisy.

Whatever the method used to create electricity there are impacts on the environment that have to be considered during the design and production phases.

Tips for Success – Section III

Question 12 (a)

Outcomes assessed: H2.2, H6.2

MARKING GUIDELINES

Criteria	Marks
• Makes the relationship evident between environmental issues and the design and production of an innovation in electricity generation, with specific links to stimulus examples	5–6
• Describes environmental issues and links these to the design and/or production of an innovation in electricity generation, with reference to stimulus examples	3–4
• Outlines environmental issues in electricity generation OR • Outlines features of design or production of electricity generation	2
• Identifies an environmental issue OR • Identifies a feature of design or production, in electricity generation	1

- Annotation : *Describes environmental issues that relate to nuclear, hydro electric and wind turbine methods of producing electricity. Issues raised include, toxic waste, the amount of land and t that are destroyed with hydro electric systems and the noise that is created by wind turbines.* *Mark Awarded = 3 / 4 marks*

Tips for Success – Section III

All forms of electricity generation have environmental issues related to them. Environmental issues can occur at all stages of the design and production process. For example, the energy required to produce the blades of a wind turbine or the power (diesel fuel) required for the trucks and excavators used to extract uranium from the earth. Each of which adds to the overall carbon footprint or environmental impact of the product. Although there may only be a small environmental footprint at the production stage there may be large environmental impacts before or after this process has occurred. An example of this can be found in nuclear energy. This form of energy production is extremely efficient and produces very limited emissions into the atmosphere. Pre production uranium has to be extracted from the ground, usually through the form of an open cut mine which has a huge effect on the local environment through the removal of vegetation and the creation of a massive hole in the ground. Not to mention the effects that the heavy machinery and their use of fossil fuels also has on the local environment.

Tips for Success – Section III

At the production phase it can produce huge amounts of power which can service large populations. As it is very efficient in creating electricity the benefits to the consumer is lower electricity costs.
Post production it does however, have a by-product in the form of nuclear waste which is extremely toxic and takes thousands of years to breakdown into a safe state. Additional energy is required to create safe storage for this toxic waste in order to prevent it from entering ecosystems and eventually the food chain where it will have devastating effects such as radiation poisoning.

Nuclear power also requires huge amounts of fresh, clean water to cool to core. Dams are required to store this water before and after the production phase and these can have their own environmental impacts due to the surrounding areas being flooded and other waterways further down the system having reduced water flow.

Tips for Success – Section III

Solar panels produce clean electricity by using the power contained in solar radiation which is generally readily available in large quantities each day (over cast days can result in reduced production). However a limiting factor to this method is the current production efficiency level which is about 30%. Meaning that a lot of panels are required, to produce enough energy to sustain a standard household or business. Further to this is the fact that the set up costs are around $10 000 for the standard home. It is estimated that the breakeven point for this method of electricity production is about 8 years. Meaning that for the investment households / businesses would not see any return for their investment for a considerable amount of time. Another factor that needs to be considered with this method is the aesthetic appeal of solar panels. The reflective nature of the glass and the standard black/grey colour of the solar panels may not suit the colour scheme of the house / business and thus creating an eyesore on the roof which will impact on the local environment by creating visual pollution.

Tips for Success – Section III

Increases in the efficiency levels of this method of power generation and the creation of more aesthetic panels through innovative design that compliments building design will result in this product becoming a more viable and sought after alternate energy solution.
Whatever the method of innovative electricity production there is always some level of environmental impact. As more efficient methods are developed through innovative design, and developments in engineering and technology, the more that these systems will become economically and socially viable and sustainable.

Tips for Success – Section III

Question 12 (a)

Outcomes assessed: H2.2, H6.2

MARKING GUIDELINES

Criteria	Marks
• Makes the relationship evident between environmental issues and the design and production of an innovation in electricity generation, with specific links to stimulus examples	5–6
• Describes environmental issues and links these to the design and/or production of an innovation in electricity generation, with reference to stimulus examples	3–4
• Outlines environmental issues in electricity generation OR • Outlines features of design or production of electricity generation	2
• Identifies an environmental issue OR • Identifies a feature of design or production, in electricity generation	1

- Annotation: *Relationship between the design and production of electricity and the use of innovative methods are identified. Elements of pre and post production are examined through stimulus examples (nuclear and solar). Issues such as material extraction, waste disposal and aesthetic qualities are explored.*

  Mark awarded = 5 / 6 marks

Tips for Success – Section III

- In your answer you will be assessed on how well you:

  - demonstrate knowledge and understanding relevant to the question.

  - communicate ideas and information using appropriate terminology and relevant examples.

  - present a logical and cohesive response.

  - address the requirements of the key word used within the question.

    Explain: relate cause and effect; make the relationships between things evident; provide why and / or how

    Analyse: identify components and the relationship between them; draw out and relate implications

Tips for Success – Section III

- Read and respond to the question(s) rather than try to adapt a pre-determined response.
- Write as much as you think you need. (The BOS recommends that you write 4 pages or 600 words). You will NOT be penalised if you write more.
- Don't forget that you are a designer. You have used the design process in the development of your MDP. You can refer to this in your written exam.
- Make sure that you elaborate your sentences. Don't use more than one 'and' in a sentence. Using more 'ands' is not elaborating it is just presenting more facts.

Tips for Success – Section III

- When you are presented with a question that asks you to ‘explain’ or asks ‘how’ or ‘why’ (explanations) then you need to structure into your response a sentence that includes a linking phrase such as ‘because of’, ‘due to’, ‘as a result of’. Using these linking words your response has to become an explanation as these words are the gateway to effective sentence elaboration.
- When you are presented with an analyse question, you need to follow the advice listed above for explanations by providing the linking phrases. After this you also need to provide a ‘therefore’ statement which provides the gateway to an implication statement.

Resources

NSW Board of Studies http://www.boardofstudies.nsw.edu.au/

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Curriculum K-12

Resources

HSC online www.hsc.csu.edu.au

Questions and answers