

**2003 HSC Notes from  
the Marking Centre  
Metal and Engineering**

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# 2003 HSC NOTES FROM THE MARKING CENTRE METAL AND ENGINEERING

## Introduction

This document has been produced for the teachers and candidates of the Stage 6 course Metal and Engineering (Curriculum Framework). It provides comments with regard to responses to the 2003 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 2003 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 Metal and Engineering (Curriculum Framework).

## Section I

There are 15 multiple-choice questions in this paper.

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

Question	Correct Response
9	B
10	D
11	D
12	A
13	C
14	C
15	D

## Section II

35 Marks Compulsory Questions.

### Question 16

This question asked the candidates for details about a selected graduated device.

- Most candidates identified the graduated device as a micrometer.
- This question proved difficult. Many candidates failed to recognise that the micrometer shown measures to two decimal places and is accurate to within 0.01 mm.
- The responses indicated that most candidates were competent in reading a micrometer. Most candidates read the micrometer correctly as 6.32 mm.

- d. Competency in using graduated devices is more than knowing how to read the tool. It also involves using industry-specific terminology to describe the tool. Many responses indicated a distinct lack of knowledge relating to the parts of a micrometer.

### Question 17

In this question candidates were asked to refer to Drawing 2003 - 1, Sheet 1 of 22, Trammel Assembly on Page 17 and interpret details from the drawing.

- a. Many candidates could not identify fundamental drawing types. Those candidates who did, identified an assembly drawing.
- b. Well answered. Most candidates indicated their ability to read details from the drawing and correctly identified nine items.
- c. While Part b presented little difficulty, some candidates failed to calculate the sixteen parts required.

### Question 18

In this question candidates were asked to answer a series of questions relating to Drawing 2003 - 1, Sheet 2 of 2, Trammel Details on Page 18.

- a. Nearly all candidates interpreted NTS as 'not to scale'.
- b. The responses from candidates indicated that most were able to recognise the AS1100 drawing practice.
- c. This type of question was poorly answered, with candidates again being unable to identify fundamental drawing type – detail drawing.
- d. Many candidates correctly interpreted the lines as section or cross-hatching lines.
- e. In this part many candidates failed to carefully read the question, or were unfamiliar with the requirements of the question:- 'circling the answer on the stimulus'. Those candidates who answered correctly circled option B.
- f. Candidates interpreted the machined surface as a fine knurl and correctly outlined its purpose:- to provide grip for aiding adjustment.
- g. While candidates' responses varied considerably the better answers used industry-specific terminology to logically describe why a 'break' was used. Many candidates recognised Item 1, the Beam would not fit onto the drawing sheet if drawn to scale, that there was no variation in details along its length and the details of each end was shown.

### Question 19

Candidates were asked to refer to Drawing 2003 - 1, Sheet 2 of 2, Trammel Details on Page 18, and calculate tolerances and clearances for the Adjusting Nut, Item 7 and the Adjusting Block, Item 8.

- a. Most candidates were able to correctly calculate the widths required.
- b. While the individual calculations required in Part (a) were effectively responded to, the application of the two sets of numbers in Part (b) was not well answered. Many candidates made simple substitution errors into a formula.
- c. The application and use of a feeler gauge to measure clearances was not understood by many candidates.

### **Question 20**

This question provided candidates with the opportunity to apply their skills of hand tools to the theoretical aspects relating to cutting internal and external screw threads.

- a. Many candidates were able to calculate the correct drill size of 2.5 mm using information provided in the question. Good responses indicated knowledge of OD - Pitch, and completed the computation without error. Poor responses resorted to guessing.
- b. This question was poorly answered with many candidates selecting the technically incorrect item – the Adjusting Screw. Sound responses recognised that the Adjusting Nut would be manufactured first and that the Adjusting Screw could be adjusted to fit the nut through ‘tweaking’ the die.  
Very few candidates could adequately support their choice of item.
- c. Many candidates could outline or list a logical sequence of steps that if followed could produce some or all of the Adjusting Screw. Good responses mentioned tools, equipment and protection of the thread.

### **Section III**

#### **Question 21**

Candidates were asked to analyse the content and benefits of industry induction programs for new employees in the metal and engineering industry.

Responses varied in terms of the issues addressed and the depth to which benefits of these factors were discussed. Most candidates understood the general place of induction programs in industry and many candidates commented on the benefits of an induction program in general terms.

The benefits candidates included in their responses ranged from some benefits for employees, to more detailed and broader benefits for all parties and the industry in general. Weaker responses concentrated most commonly on the benefits for one party only, usually the employee. Better responses identified the benefits in a range of areas for all parties concerned: employers, employees and potential workplace visitors. The best responses spoke of insurance workcover premiums and benefits to the organisation of increasing safety through the induction program.

The aspects of safety and OHS in an induction program were generally addressed well by all candidates but better responses related them more fully to benefits. Better responses also included such things as communication with OHS committee representatives and an explanation of OHS legislation.

Candidates readily identified the straightforward benefits of presentation in the workplace, fewer students related the use of PPE or specialised equipment to presentation.

The area of communications provided some challenge and discriminated between the higher and lower responses. Higher order responses related good communication to a safer, more productive and more efficient workplace.

The ability to communicate using precise industry terminology was limited.

## **Question 22**

Candidates were asked to propose procedures that an employer should implement to discuss workplace safety with employees.

Most candidates were able to state the importance of Occupational Health and Safety (OHS) in the workplace and that it is the employer's role to provide a safe and healthy working environment.

The weaker responses stated how the employer could make the workplace safer but did not meet the question requirements by proposing procedures to generate discussion between employers and employees about workplace safety.

Some candidates used Question 21 and mentioned that an industry induction program was an ideal situation for employers to discuss workplace safety with employees. Many candidates were able to write about regular meetings where employers and employees got together to discuss hazards but failed to link them to an Occupational Health and Safety (OHS) committee.

The best responses included several procedures employers could adopt to discuss safety with employees and mentioned the formation of an Occupational Health and Safety (OHS) committee, its structure and role in the workplace. Nonverbal methods of communication such as noticeboards, newsletters, suggestion boxes and signage were also included but emphasised the significance of two-way communication.

The ability to communicate using precise industry terminology was limited.

## **Question 23**

Candidates were asked to plan a series of steps in the manufacture of the G clamp jaw and the assembly of the whole unit.

The quality of the responses varied, mostly dependent on how well the candidates read the question.

Generally most candidates could plan basic steps for the manufacture and assembly, but few included the combination of detailed and correct steps with detailed quality assurance procedures.

In the weaker responses it was evident that many candidates had not read the question properly. They detailed steps to manufacture the whole unit, not just the jaw. A few lower level responses were either very brief, or it was evident that the candidate did not know the correct procedures – for the manufacture of the jaw, or the assembly of the unit. Many of the weaker responses failed to mention any quality assurance procedures.



The higher level responses clearly outlined the steps required to manufacture the jaw including all relevant quality assurance procedures. They then detailed a logical sequence for the assembly of the G clamp, referring to quality assurance throughout.

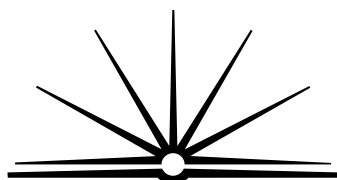
The ability to communicate using precise industry terminology was limited.

# Metal and Engineering

## 2003 HSC Examination Mapping Grid

Question	Marks	Unit of competency
<b>Section I</b>		
1	1	MEM18.2AA
2	1	MEM18.2AA
3	1	MEM18.1AA
4	1	MEM18.1AA
5	1	MEM18.1AA
6	1	MEM2.5C
7	1	Industry induction
8	1	Industry induction
9	1	MEM1.2FA
10	1	MEM1.2FA
11	1	MEM2.8C
12	1	MEM2.8C
13	1	MEM2.8C
14	1	MEM1.1FA
15	1	MEM1.1FA
<b>Section II</b>		
16 (a)	1	MEM2.5C11
16 (b)	1	MEM2.5C11
16 (c)	2	MEM1.3FA
16 (d)	3	MEM2.5C11
17 (a)	1	MEM9.2A
17 (b)	1	MEM9.2A
17 (c)	1	MEM2.8C10A
18 (a)	1	MEM9.2A
18 (b)	1	MEM9.2A
18 (c)	1	MEM9.2A
18 (d)	1	MEM9.2A

<b>Question</b>	<b>Marks</b>	<b>Unit of competency</b>
18 (e)	1	MEM9.2A
18 (f)	1	MEM9.2A
18 (g)	3	MEM9.2AA
19 (a)	1	MEM1.3FA
19 (b)	2	MEM2.8C10A
19 (c)	2	MEM2.8C10A
19 (d)	1	MEM1.3FA
20 (a)	3	MEM2.8C10A
20 (b)	3	MEM1.4FA
20 (c)	4	MEM1.4FA
<b>Section III</b>		
21	15	Metal and Engineering Industry Induction
22	15	Metal and Engineering Industry Induction 1.1FA, 1.2FA, 1.3FA
23	15	1.1FA, 1.2FA, 1.3FA, 1.4FA, 2.1C12A, 2.5C11A, 2.8C10A, 9.2AA, 18.1AA, 18.2AA



**B O A R D O F S T U D I E S**  
NEW SOUTH WALES

## 2003 HSC Metal and Engineering Marking Guidelines

### Question 16 (a)

*Competencies assessed: MEM2.5C11*

#### MARKING GUIDELINES

Criteria	Marks
• Metric micrometer, micrometer, 0 – 25mm micrometer	1

### Question 16 (b)

*Competencies assessed: MEM2.5C11*

#### MARKING GUIDELINES

Criteria	Marks
• 2 decimal places, 0.01 mm	1

### Question 16 (c)

*Competencies assessed: MEM1.3FA*

#### MARKING GUIDELINES

Criteria	Marks
• The correct reading = 6.32 mm	2

**Question 16 (d)***Competencies assessed: MEM2.5C11***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
• Three correct answers	3
• Two correct answers	2
• One correct answer	1

**Question 17 (a)***Competencies assessed: MEM9.2A***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
• Assembly drawing	1

**Question 17 (b)***Competencies assessed: MEM9.2A***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
• Nine (9)	1

**Question 17 (c)***Competencies assessed: MEM2.8C10A***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
• Sixteen (16)	1

**Question 18 (a)***Competencies assessed: MEM9.2A***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
• NTS – Not to Scale	1

**Question 18 (b)***Competencies assessed: MEM9.2A***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
• AS1100	1

**Question 18 (c)***Competencies assessed: MEM9.2A***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
• Detail drawing	1

**Question 18 (d)***Competencies assessed: MEM9.2A***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
• Cross hatching lines, sectioning	1

**Question 18 (e)***Competencies assessed: MEM9.2A***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
• Option B	1

**Question 18 (f)***Competencies assessed: MEM9.2A***MARKING GUIDELINES**

Criteria	Marks
• Allows for a finger grip on the nut for adjusting	1

**Question 18 (g)***Competencies assessed: MEM9.2AA***MARKING GUIDELINES**

Criteria	Marks
• AS1100 requires the break to be shown as drawn. It is standard drawing practice to show the shape of the two ends when the scale will not allow the piece to fit	3
• AS1100 practice, shows two ends, scale will not allow full piece	2
• Any two of three	2
• Any one of three	1

**Question 19 (a)***Competencies assessed: MEM1.3FA***MARKING GUIDELINES**

Criteria	Marks
• 4.6 mm	1

**Question 19 (b)***Competencies assessed: MEM2.8C10A***MARKING GUIDELINES**

Criteria	Marks
• Two correct responses	2
• One correct response	1

**Question 19 (c)***Competencies assessed: MEM2.8C10A***MARKING GUIDELINES**

Criteria	Marks
• Correct response = 0.5 mm	2
• Incorrect response but shows some logical working out	1

**Question 19 (d)***Competencies assessed: MEM1.3FA***MARKING GUIDELINES**

Criteria	Marks
• Feeler gauge	1

**Question 20 (a)***Competencies assessed: MEM2.8C10A***MARKING GUIDELINES**

Criteria	Marks
• Correct answer (formula, correct working)	3
• Incorrect answer, correct formula and working	2
• Correct formula, or some correct working	1

**Question 20 (b)***Competencies assessed: MEM1.4FA***MARKING GUIDELINES**

Criteria	Marks
• Correct item with correct justification	3
• Correct item with some/ little justification	2
• Correct item only	1





**Question 20 (c)**

*Competencies assessed: MEM1.4FA*

**MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
• Outlines a logical sequence of steps that will produce the adjusting screw. Tools, equipment and the adjustment of the die	4
• Outlines the sequence of production and tools used. No adjustment of die	3
• Outlines part of a sequence using some tools and equipment	2
• Outlines some part of the sequence of steps	1

### Section III

#### Question 21 (15 marks)

*Competencies assessed: Metal and Engineering Industry Induction*

#### MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"><li>• Consistently and correctly communicates using precise terminology describing the components of an industry induction program</li><li>• Demonstrates a thorough understanding and knowledge of appropriate safety standards necessary in the workplace</li><li>• Exhibits a comprehensive understanding of the expectations regarding presentation and behaviour in the workplace</li><li>• Demonstrates a detailed understanding of the nature of effective communication within industry induction programs</li></ul>	11–15
<ul style="list-style-type: none"><li>• Communicates using appropriate terminology describing the components of an industry induction program</li><li>• Demonstrates a sound understanding and knowledge of appropriate safety standards necessary in the workplace</li><li>• Exhibits a general understanding of the expectations regarding presentation and behaviour in the workplace</li><li>• Demonstrates an understanding of the nature of effective communication within industry induction programs</li></ul>	6–10
<ul style="list-style-type: none"><li>• Communicates using non-specific terminology</li><li>• Demonstrates a basic understanding and knowledge of appropriate safety standards necessary in the workplace</li><li>• Exhibits a general understanding of the expectations regarding presentation and behaviour in the workplace</li><li>• Outlines a limited understanding of the nature of effective communication within industry induction programs</li></ul>	1–5

**Question 22** (15 marks)*Competencies assessed: 1.1FA, 1.2FA, 1.3FA, Metal and Engineering Industry Induction***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
<ul style="list-style-type: none"><li>• Consistently and correctly communicates issues in precise OHS terminology related to workplace consultation</li><li>• Demonstrates a thorough understanding and application of OHS legislation and regulations as it applies to the metal industry</li><li>• Demonstrates a detailed understanding of stakeholder responsibilities regarding consultation in the workplace</li><li>• Exhibits a comprehensive knowledge of the relevant information required for effective consultation</li></ul>	11–15
<ul style="list-style-type: none"><li>• Communicates using appropriate OHS terminology related to workplace consultation</li><li>• Demonstrates a sound understanding and application of OHS legislation and regulations as it applies to the metal industry</li><li>• Demonstrates a basic knowledge of stakeholder responsibilities regarding consultation in the workplace</li><li>• Outlines a basic knowledge of the relevant information required for consultation</li></ul>	6–10
<ul style="list-style-type: none"><li>• Uses non-specific OHS terminology related to workplace consultation</li><li>• Demonstrates a superficial understanding and application of OHS legislation and regulations as it applies to the metal industry</li><li>• Demonstrates an elementary knowledge and understanding of stakeholder responsibilities regarding consultation in the workplace</li><li>• Outlines some factors that may be covered in the consultation process</li></ul>	1–5

**Question 23** (15 marks)

*Competencies assessed: 1.1FA, 1.2FA, 1.3FA, 1.4FA, 2.1C12A, 2.5C11A, 2.8C10A, 9.2AA, 18.1AA, 18.2AA*

**MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
<ul style="list-style-type: none"><li>• Consistently and correctly communicates using precise terminology to identifies an appropriate sequence of steps to produce the G-clamp</li><li>• Demonstrates a thorough understanding and application of the tools and equipment required to manufacture the G-clamp</li><li>• Applies an in-depth knowledge and understanding of the skills and competencies required to produce the G-clamp</li><li>• Demonstrates a detailed understanding of ongoing and final checking procedures</li></ul>	11–15
<ul style="list-style-type: none"><li>• Communicates using appropriate terminology that identifies a sequence of steps to produce the G-clamp</li><li>• Demonstrates a sound understanding and application of the tools and equipment required to manufacture the G-clamp</li><li>• Applies an in-depth knowledge and understanding related to the skills and competencies required to produce the G-clamp</li><li>• Demonstrates an understanding of ongoing and final checking procedures</li></ul>	6–10
<ul style="list-style-type: none"><li>• Communicates using non-industry specific terminology to identify a sequence of steps to produce part or all of the G-clamp</li><li>• Demonstrates a superficial understanding and application of the tools and equipment required to manufacture the G-clamp</li><li>• Applies a limited understanding of the skills and competencies required to produce the G-clamp</li><li>• Demonstrates a limited understanding of ongoing and final checking procedures</li></ul>	1–5