

**2004 HSC Notes from  
the Marking Centre  
Metal and Engineering**

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# 2004 HSC NOTES FROM THE MARKING CENTRE METAL AND ENGINEERING (Curriculum Framework)

## 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 2004 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 2004 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 (15 marks)

There are 15 multiple-choice questions.

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

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

## Section II (35 marks)

The questions in this section are short response items, in parts. All questions are compulsory. Areas examined include:

- MEM2.5C11A – Measure with graduated devices
- MEM2.8C10A – Perform computations
- MEM9.2AA – Interpret technical drawing
- MEM18.1AA – Use hand tools
- MEM18.2AA – Use power tools/hand held operations

### Question 16

In this question candidates were required to answer a series of questions interpreting aspects relating to drawings of a Drilling Jig.

- (a) Most candidates could identify the (1) Drill Guide, (4) C-washer and (5) Button Feet correctly.
- (b) Candidates who could identify the correct assembly of the components described the correct thread as M20 x 2.5. Many candidates selected the incorrect thread at the other end of the Locating Pin.
- (c) The purpose of the slot in the C-washer was not well understood, especially in relation to the scenario provided.
- (d) Many candidates provided a very general description without detailing the logical way each component of the Drilling Jig fitted together.
- (e) The majority of candidates correctly identified a potential source of damage caused by drilling past the required depth and damaging or severing the Locating Pin. In nearly all cases these candidates suggested setting a depth stop, using a preset spacer or marking the required depth on the drill. Few candidates provided other feasible problems and solutions.

### Question 17

This question required candidates to identify and calculate tolerances and clearance.

- (a) The concept of tolerance as being the difference between high and low limit sizes was generally well recognised, although not always well expressed.
- (b) Candidates found it challenging to identify the upper and lower limits of the Bush. However, the computation of tolerance was well attempted.
- (c) Many candidates were able to identify a limit on one or both components but were unable to complete the calculation of the correct answer.

### Question 18

In this question candidates were required to answer a series of questions related to drills and the process of drilling.

- (a) Most candidates did not correctly identify the item, reflecting a poor grasp of the basics in hand and power tools and their operations.
- (b) Although a large number of candidates answered the question being asked, many did not use industry-specific terminology in their answer.

- c) The question required candidates to select and substitute values into the formula provided. The majority of candidates were able to substitute but did not select the correct values, therefore were not able to determine the correct drill speed to correctly answer the question.

### **Question 19**

This question dealt with knowledge and skills required with thread cutting.

- (a) Candidates, in general, showed limited knowledge of hand tools and their operations.
- (b) The majority of candidates demonstrated a limited knowledge of these specific hand tools and their operations.
- (c) Many candidates were able to select the appropriate tool but were not able to adequately justify their selection and describe its use.

### **Section III (30 marks)**

The questions in this section are extended response items. Candidates attempt two questions, each with a value of 15 marks.

#### **Question 20**

In this question candidates were required to propose a job plan and to identify procedures and tools required to produce an item. This question was the second most popular extended response item.

The responses covered the full range of marks available. Hand tools and various other types of equipment were included in responses.

Marks were awarded for appropriate procedures and uses of tools identified and the logical sequencing of procedures.

The better responses were well written and indicated a sound sequencing of events needed to produce the item. Overall most candidates could plan the basic steps for the manufacture of the item but did not correctly sequence those steps.

#### **Question 21**

In this question candidates were required to describe the training requirements and employment conditions of an apprenticeship in NSW.

This question was answered by the least number of candidates, possibly indicating a lack of familiarity with the background knowledge required.

Generally, candidates were not able to nominate any employment conditions other than poor wages. Training conditions were generally described well with most candidates understanding the on and off-the-job training concept.

The poorer responses mentioned items such as OHS and on-and off-the-job training but made little or no mention of employment conditions.

## **Question 22**

In this question candidates were required to analyse suitable methods for preventing hazards in a metal and engineering workplace. This was the most popular question attempted in Section III.

The responses covered the full range of marks available.

The better responses identified the key components of hazard prevention and then linked them together, drawing out implications for the workplace. The concept of hazard identification, risk assessment, appropriate risk controls and the contribution of communication and workplace consultation were evident in these responses. A key discriminating factor in all better responses was the candidate's ability to use specific industry terminology to construct a well-reasoned and cohesive analysis.

Many mid-range responses acknowledged the concept of hazard prevention as being a process of hazard identification and risk control, briefly outlining the contribution of workplace consultation. Some candidates added suitable workplace examples to support their analysis.

The poorer responses simply listed a series of risks or hazards without explanation or drawing out implications to the workplace. These responses often lacked coherence and made little or no use of industry specific terms.

# Metal and Engineering

## 2004 HSC Examination Mapping Grid

Question	Marks	Unit of competency / Element of competency	
<b>Section I</b>			
1	1	Industry induction	
2	1	MEM1.2FA	OHS
3	1	MEM18.2FA	Power tools
4	1	MEM1.2FA	OHS
5	1	MEM9.2AA	Interpret engineering
6	1	MEM18.2AA	Power tools
7	1	MEM2.5CIIA	Grad devices
8	1	MEM1.2FA	OHS
9	1	MEM18.1AA	Use of hand tools
10	1	MEM18.1AA	Use of hand tools
11	1	MEM2.5CIIA	Grad devices
12	1	MEM1.1FA	Undertake interactive workplace communication
13	1	MEM1.1FA	Work communication
14	1	Industry induction	
15	1	MEM1.3FA	Quality proc.
<b>Section II</b>			
16 (a)	3	MEM9.2AA	Interpret technical drawing
16 (b)	2	MEM9.2AA	Interpret technical drawing
16 (c)	2	MEM1.1FA	Undertake interactive workplace communication
16 (d)	3	MEM9.2AA	Interpret technical drawing
16 (e)	4	MEM9.2AA	Interpret technical drawing
17 (a)	1	MEM9.2AA	Interpret technical drawing
17 (b)	2	MEM9.2AA	Interpret technical drawing
17 (c)	3	MEM9.2AA	Interpret technical drawing

Question	Marks	Unit of competency / Element of competency
18 (a)	1	MEM18.1AA Use hand tools
18 (b)	2	MEM18.1AA Use hand tools
18 (c)	4	MEM2.8CIOA Perform computations
19 (a)	1	MEM18.1AA Use hand tools
19 (b)	3	MEM18.1AA Use hand tools
19 (c)	4	MEM18.1AA Use hand tools
<b>Section III</b>		
20	15	MEM1.4FA Plan to undertake a routine task
21	15	Industry induction
22	15	MEM1.2FA Apply principles of occupational health and safety (OHS) in the work environment

## 2004 HSC Metal and Engineering Marking Guidelines

### Section II

#### Question 16 (a)

*Competencies assessed: MEM9.2AA*

#### MARKING GUIDELINES

Criteria	Marks
• Identifies 3 parts correctly	3
• Identifies 2 parts correctly	2
• Identifies 1 part correctly	1

#### Question 16 (b)

*Competencies assessed: MEM9.2AA*

#### MARKING GUIDELINES

Criteria	Marks
• Indicates both aspects — diameter and pitch	2
• Indicates diameter only	1

**Question 16 (c)***Outcomes assessed: MEM1.1FA***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
• Makes the relationship between the SLOT and the C-washer evident	2
• Relates the SLOT and the C-washer but with limited detail	1

**Question 16 (d)***Outcomes assessed: MEM9.2AA***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
• Provides a logical assembly of the appropriate components	3
• Provides an incomplete assembly involving more than two components	2
• Provides a limited assembly involving two components	1

**Question 16 (e)***Outcomes assessed: MEM9.2AA***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
• Names at least two possibilities for damage and indicates the main features of some appropriate precautions that can be used to prevent these	4
• Names a possibility for damage and indicates the main features of relevant precaution(s) that could be used to prevent this damage	3
• Names a possibility for damage and indicates the main features of a precaution	2
• Names a possibility for damage OR indicates the main features of a precaution	1

**Question 17 (a)***Outcomes assessed: MEM9.2AA***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
• States the meaning and provides a quality	1

**Question 17 (b)***Outcomes assessed: MEM9.2AA***MARKING GUIDELINES**

Criteria	Marks
• Gives both the upper limit and lower limit and calculates tolerance	2
• Gives both the upper limit and lower limit OR calculates tolerance based on incorrect limits	1

**Question 17 (c)***Outcomes assessed: MEM9.2AA***MARKING GUIDELINES**

Criteria	Marks
• Calculates MAX clearance: demonstrates an understanding of the concept of tolerance, substituting appropriate measurements and providing the correct answer	3
• Attempts calculation of MAX clearance: demonstrates an understanding of the concept of tolerance by substituting appropriate measurements, with some minor arithmetic error	2
• Attempts calculation of MAX clearance: demonstrates an understanding of the concept of tolerance by providing an answer based on incorrect measurements, or, by providing the correct answer with no working	1

**Question 18 (a)***Outcomes assessed: MEM18.1AA***MARKING GUIDELINES**

Criteria	Marks
• Provides correct name	1

**Question 18 (b)***Outcomes assessed: MEM18.1AA***MARKING GUIDELINES**

Criteria	Marks
• Names the two features	2
• Names one feature	1

**Question 18 (c)***Outcomes assessed: MEM2.8C10A***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
• Correct answer with evidence of correct substitutions and working	4
• Attempts to find the value of $R_F$ , with an incorrect answer resulting from minor arithmetic error or incorrect substitution of one variable	3
• Substitutes correctly for $D_F$ or $D_D$ and provides correct answer based on these substitutions	2
OR	
• Gives correct answer with inadequate or no working	
• Attempts a calculation with at least one value substituted correctly	1

**Question 19 (a)***Outcomes assessed: MEM18.1AA***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
• Provides the correct name	1

**Question 19 (b)***Outcomes assessed: MEM18.1AA***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
• Names three tools correctly	3
• Names two tools correctly	2
• Names a tool correctly	1

**Question 19 (c)***Outcomes assessed: MEM18.1AA***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
<ul style="list-style-type: none"><li>• Selects the appropriate tool and provides the main features of a complete and logical set of steps to repair the thread</li></ul>	4
<ul style="list-style-type: none"><li>• Selects the appropriate tool and provides features of a basic set of steps to repair the thread</li></ul> OR <ul style="list-style-type: none"><li>• Provides features of a complete and logical set of steps to repair the thread, using an inappropriate tool</li></ul>	3
<ul style="list-style-type: none"><li>• Selects the appropriate tool and provides an incomplete set of steps to repair the thread</li></ul> OR <ul style="list-style-type: none"><li>• Provides a basic set of steps using an inappropriate tool</li></ul>	2
<ul style="list-style-type: none"><li>• Names the appropriate tool</li></ul> OR <ul style="list-style-type: none"><li>• Lists some steps related to repairing the thread</li></ul>	1

## Section III

### Question 20

Competencies assessed: MEM1.4FA

#### MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> <li>Consistently and correctly communicates the details of a suitable job plan using precise industry terminology</li> <li>Applies an in-depth knowledge and understanding of procedures required to produce the Plate</li> <li>Demonstrates thorough understanding and knowledge of tools and equipment required to produce the Plate</li> </ul>	13–15
<ul style="list-style-type: none"> <li>Communicates the details of a suitable job plan using some appropriate industry terminology</li> <li>Applies a detailed knowledge and understanding of procedures required to produce the Plate</li> <li>Demonstrates sound understanding and knowledge of tools and equipment required to produce the Plate</li> </ul>	10–12
<ul style="list-style-type: none"> <li>Communicates the details of a suitable job plan using general industry terminology</li> <li>Applies an elementary knowledge and understanding of the skills and competencies required to produce the Plate</li> <li>Demonstrates an appropriate level of understanding and knowledge of tools and equipment required to produce the Plate</li> </ul>	7–9
<ul style="list-style-type: none"> <li>Communicates the details of a suitable job plan using basic industry terminology</li> <li>Applies a limited knowledge and understanding of procedures required to produce the Plate</li> <li>Demonstrates general understanding and knowledge of tools and equipment required to produce the Plate</li> </ul>	4–6
<ul style="list-style-type: none"> <li>Communicates some aspects of a job plan using non-specific terminology</li> <li>Makes reference to some procedures required to produce the Plate</li> <li>Demonstrates superficial understanding and knowledge of tools and equipment required to produce the Plate</li> </ul>	1–3

**Question 21***Competencies assessed: Metal and Engineering Industry Induction***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
<ul style="list-style-type: none"><li>• Consistently and correctly communicates using precise industry terminology</li><li>• Demonstrates thorough understanding and knowledge of the training and employment conditions of an apprenticeship</li><li>• Demonstrates the ability to consistently select, organise and describe relevant information</li></ul>	13–15
<ul style="list-style-type: none"><li>• Communicates using relevant industry terminology</li><li>• Demonstrates detailed understanding and knowledge of the training and employment conditions of an apprenticeship</li><li>• Demonstrates the ability to select, organise and describe relevant material</li></ul>	10–12
<ul style="list-style-type: none"><li>• Communicates using appropriate industry terminology</li><li>• Demonstrates an appropriate level of understanding and knowledge of the training and employment conditions of an apprenticeship</li><li>• Demonstrates an adequate ability to select, organise and describe relevant material</li></ul>	7–9
<ul style="list-style-type: none"><li>• Communicates using general industry terminology</li><li>• Demonstrates limited understanding and knowledge of the training and employment conditions of an apprenticeship</li><li>• Demonstrates a limited ability to describe relevant information</li></ul>	4–6
<ul style="list-style-type: none"><li>• Communicates using non-specific terminology</li><li>• Demonstrates superficial understanding and knowledge of the training and employment conditions of an apprenticeship</li><li>• Demonstrates little or no ability to describe relevant information</li></ul>	1–3

**Question 22***Competencies assessed: MEM1.2FA***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
<ul style="list-style-type: none"><li>• Consistently and correctly communicates using precise industry terminology</li><li>• Demonstrates comprehensive understanding of methods for the prevention of hazards in an industrial workplace</li></ul>	13–15
<ul style="list-style-type: none"><li>• Communicates using detailed industry terminology</li><li>• Demonstrates accomplished understanding of methods for the prevention of hazards in an industrial workplace</li></ul>	10–12
<ul style="list-style-type: none"><li>• Communicates using appropriate industry terminology</li><li>• Demonstrates an elementary understanding of methods for the prevention of hazards in an industrial workplace</li></ul>	7–9
<ul style="list-style-type: none"><li>• Communicates using general industry terminology</li><li>• Demonstrates a incomplete understanding of methods for the prevention of hazards in an industrial workplace</li></ul>	4–6
<ul style="list-style-type: none"><li>• Communicates using non-specific terminology</li><li>• Demonstrates limited understanding of methods for the prevention of hazards in an industrial workplace</li></ul>	1–3