

**2002 HSC Notes from
the Marking Centre
Metal and Engineering**

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2002 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 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 Metal and Engineering (Curriculum Framework)

Section I

There are 15 multiple-choice questions in this paper.

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

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

Section II

35 Marks Compulsory Questions.

Question 16

This question asked the candidates to refer to a sketch of a trolley wheel and they were asked to interpret the drawing.

- Most candidates indicated that the drawing was in third angle projection.
- Most candidates could indicate how many items made up the subassembly.
- While some candidates answered this question well, many were not able to distinguish clearly between a sketch and a detail drawing.

Question 17

Candidates were asked to answer a series of questions relating to a drawing on page 17 of the examination paper, again interpretation of the drawing.

- (a) This question was answered poorly by most candidates. There was a distinct lack of understanding of this drawing which is an exploded pictorial.
- (b) Most candidates knew the abbreviation required.
- (c) The responses indicated that most candidates are still not familiar with metric standards for nut and bolt representations.
- (d) The quality of the responses for this part was poor. Many candidates failed to show any working and appeared to guess the overall length.
- (e) While many candidates appeared to understand the notion of SNUG being a locking device, they were not able to define the advantages of the item.

Question 18

Very few candidates answered the entire question correctly.

- (a) This part was answered by some candidates.
- (b) Whilst the exact term for the tool is *vernier micrometer*, the majority of candidates referred to it purely as a micrometer. The justification for its use, (reading to 3 decimal places), was rarely expressed. Many candidates did not attempt this part of the question.

Question 19

This question asked candidates to apply their knowledge of Hand and Power Tools in answering questions relating to a diagram.

- (a) Only a few candidates were able to name all three components to gain full marks.
- (b) Many candidates did not respond to the range of categories within the one question. Candidates who responded well to this question were well practised in structuring their answers.

Question 20

Candidates were asked to indicate the required location of a belt to obtain a particular drilling speed.

- (a) Most candidates answered this question by marking the correct location of the belt on the diagram.
- (b) Most candidates responded well. Some candidates simply stated the answer and they were appropriately rewarded whilst many used the formulae supplied to calculate the correct speed.

Section III

Question 21

In this question candidates were asked to outline the characteristics and features of both apprenticeships and traineeships in NSW. Candidates were also asked to discuss the advantages and disadvantages of both training methods.

The quality of the candidate's responses varied; however most could identify some aspects related to the training arrangements for the metal industry in NSW.

The superior responses differentiated between traineeships and apprenticeships, and linked them with the features mentioned in the stem of the question. These answers mentioned some or all of the following: indentures, length of time for training, ages for apprentices and trainees, the obligations of the employer, the costs and benefits of each training method.

In weaker responses some confusion was shown in distinguishing between traineeships and apprenticeships leading to very broad responses about 'training'.

Most candidates spoke of the advantages of on-the-job training, while a smaller number mentioned the TAFE component. A small percentage of responses mentioned the regulation and protection afforded by relevant awards.

Generally, most candidates provided very broad points and did not use industry specific terminology. For example, many responses pointed out the poor wages earned by apprentices and trainees - but then failed to provide any substantial evidence to support their discussion.

Overall, candidates did not make full use of the extended response rubric provided.

Question 22

In this question candidates were asked to discuss the roles and responsibilities of employers, employees and the Occupational Health and Safety (OHS) committee in reducing / eliminating unsafe work practices. Candidates were provided with stimulus materials showing examples of unsafe practices. Candidates were also required to determine the value of current OHS legislation in changing workplace practice and culture.

The quality of the candidates' responses varied considerably, although most candidates could identify some hazards and provide possible solutions to eliminate the problems.

Candidates providing the best responses discussed the roles and responsibilities of all stakeholders and linked them to the examples provided. These responses differentiated between Occupational Health and Safety Committees and Work Cover in their role and powers within a metal industry workplace.

The coverage of the impact of OHS legislation was poorly answered. The better responses, however, critically determined the value of the legislation in changing attitudes and cultures. They also provided examples and the costs and benefits of training to support their evaluation.

Generally, candidates made little use of the extended response rubric.

Question 23

This question required candidates to read a simple drawing and develop a sequence of steps to manufacture an article – a hanger. Candidates were also required to include in the process checking procedures to ensure the hanger had been produced to the specifications set out in the drawing provided.

In general, most candidates could identify a sequence of steps. The ability to communicate their ideas and knowledge using precise industry terminology, however, was limited.

In the good responses candidates read the question and recognized that only one hanger had to be made, and that the required checking procedures were post-production.

It was evident that candidates who had knowledge of production planning could sequence the tasks appropriately and relate tools and equipment to each process. A well reasoned and cohesive response usually included a logical sequence that incorporated preparation, marking out, shaping and finishing. The best responses included all areas of production rather than a simple account of the marking out procedures.

A small number of candidates demonstrated an understanding of checking. Good responses were specific. They often included the use of another suitably qualified person to check that the hanger had been produced to size, shape and within tolerance, using suitable measuring and testing tools.

Metal and Engineering

2002 HSC Examination Mapping Grid

Question	Marks	Unit of Competency
1	1	MEM1.1FA Undertake interactive workplace communication
2	1	MEM18.1AA Use hand tools
3	1	MEM18.1AA Use hand tools
4	1	MEM2.5C11A Measure with graduated devices
5	1	MEM1.2FA Apply principles of OH&S in work environment
6	1	MEM18.1AA Use hand tools
7	1	MEM2.8C10A Perform computations
8	1	Manufacturing and engineering industry induction
9	1	MEM1.2FA Apply principles of OH&S in work environment
10	1	MEM1.3FA Apply quality procedures
11	1	MEM1.2FA Apply principles of OH&S in work environment
12	1	Manufacturing and engineering industry induction
13	1	Manufacturing and engineering industry induction
14	1	MEM2.5 C11A Measure with graduated devices
15	1	MEM1.3FA Apply quality procedures
16 (a)	1	MEM9.2AA Interpret technical drawing
16 (b)	1	MEM9.2AA Interpret technical drawing
16 (c)	4	MEM9.2AA Interpret technical drawing
17 (a)	1	MEM9.2AA Interpret technical drawing
17 (b)	1	MEM9.2AA Interpret technical drawing
17 (c)	2	MEM9.2AA Interpret technical drawing
17 (d)	2	MEM2.8C10A Perform computations MEM9.2AA Interpret technical drawing
17 (e)	3	MEM9.2AA Interpret technical drawing
18 (a)	4	MEM2.8C10A Perform computations MEM9.2AA Interpret technical drawing
18 (b)	2	MEM2.1C12A Apply quality systems
19 (a)	3	MEM18.2AA Use power tools/hand-held operations
19 (b)	5	MEM1.2FA Apply principles of OH&S in work environment MEM18.2AA Use power tools/hand-held operations
20 (a)	2	MEM18.2AA Use power tools/hand-held operations
20 (b)	4	MEM2.8C10A Perform computations
21	15	Manufacturing and engineering industry induction

Question	Marks	Unit of Competency
22	15	MEM1.1FA Undertake interactive workplace communication MEM1.2FA Apply principles of OH&S in work environment MEM1.3FA Apply quality procedures MEM1.4FA Plan to undertake a routine task MEM2.1C12A Apply quality systems Manufacturing and engineering industry induction
23	15	MEM1.1FA Undertake interactive workplace communication MEM1.2FA Apply principles of OH&S in workplace MEM1.3FA Apply quality procedures MEM1.4FA Plan to undertake a routine task MEM2.1C12A Apply quality systems 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 Manufacturing and engineering industry induction

2002 HSC Metal and Engineering Marking Guidelines

Section II

Question 16 (a)

Units of competency assessed: MEM 9.2AA

MARKING GUIDELINES

Criteria	Marks
• Names the angle of projection used	1

Question 16 (b)

Units of competency assessed: MEM 9.2AA

MARKING GUIDELINES

Criteria	Marks
• Correct number of items	1

Question 16 (c)

Units of competency assessed: MEM 9.2AA

MARKING GUIDELINES

Criteria	Marks
• Clearly identifies reasons and justifies response	3–4
• Identifies reasons with limited or no justification	2
• Indicates some related issues with manufacturing the item from the sketch	1

Question 17 (a)*Units of competency assessed: MEM 9.2AA***MARKING GUIDELINES**

Criteria	Marks
• Representation identified	1

Question 17 (b)*Units of competency assessed: MEM 9.2AA***MARKING GUIDELINES**

Criteria	Marks
• MS = mild steel	1

Question 17 (c)*Units of competency assessed: MEM 9.2AA***MARKING GUIDELINES**

Criteria	Marks
• Identifies both components correctly	2
• Identifies one component correctly	1

Question 17 (d)*Units of competency assessed: MEM 2.8C10A, MEM 9.2AA***MARKING GUIDELINES**

Criteria	Marks
• Calculates the length of the pin correctly	2
• Calculates the length but makes an error (working shown)	1

Question 17 (e)*Units of competency assessed: MEM 9.2AA***MARKING GUIDELINES**

Criteria	Marks
• Explains three purposes	3
• Explains two purposes	2
• Explains a purpose	1

Question 18 (a)

Units of competency assessed: MEM 2.8C10A, MEM 9.2AA

MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> Calculates Wheel bore Tolerance, PIN diameter Upper limit, PIN diameter Lower limit, PIN diameter Tolerance <p><i>Note: One mark per correct answer</i></p>	4

Question 18 (b)

Units of competency assessed: MEM 2.1C12A

MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> Names measuring device correctly and justifies 	2
<ul style="list-style-type: none"> Names measuring device correctly 	1

Question 19 (a)

Units of competency assessed: MEM 18.2AA

MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> Labels three parts 	3
<ul style="list-style-type: none"> Labels two parts 	2
<ul style="list-style-type: none"> Labels one part 	1

Question 19 (b)

Units of competency assessed: MEM1.2FA, MEM18.2AA

MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> Describes a range of safety considerations 	4–5
<ul style="list-style-type: none"> Provides a limited range of safety considerations 	2–3
<ul style="list-style-type: none"> Lists a related safety consideration 	1

Question 20 (a)*Units of competency assessed: MEM 18.2AA***MARKING GUIDELINES**

Criteria	Marks
• Indicates the correct position of the belt	2
• Indicates one pulley correct	1

Question 20 (b)*Units of competency assessed: MEM2.8C10A***MARKING GUIDELINES**

Criteria	Marks
• Calculates correct answer	4
• Shows appropriate working with a minor computational error	3
• Shows appropriate working with a major computational error	2
• Makes some attempt substituting numbers in the formula	1

Section III

Question 21

Units of competency assessed: Manufacturing and engineering industry induction

MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none">• Consistently and correctly communicates using precise terminology in describing apprenticeships and traineeships• Demonstrates a thorough understanding and application of apprenticeships and traineeships in the metal industry, their benefits and costs• Exhibits a comprehensive understanding of industry awards• Demonstrates a thorough understanding of the obligations and responsibilities of the employer and employee	11–15
<ul style="list-style-type: none">• Communicates using industry terminology in describing apprenticeships and traineeships• Demonstrates a sound understanding of apprenticeships and traineeships, their benefits and costs• Exhibits a basic understanding of industry awards• Demonstrates an understanding of the obligations and responsibilities of the employer and employee	6–10
<ul style="list-style-type: none">• Communicates using non-industry specific terminology in describing apprenticeships and traineeships• Demonstrates a superficial understanding of apprenticeships and traineeships, their benefits and costs• Exhibits some understanding of industry awards• Demonstrates limited or irrelevant understanding of the obligations and responsibilities of the employer and employee	1–5

Question 22

Units of competency assessed: MEM1.1FA, MEM1.2FA, MEM1.3FA, MEM1.4FA, MEM2.1C12A, Manufacturing and engineering industry induction

MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> • Consistently and correctly communicates in precise OHS terminology • Demonstrates a thorough understanding and application of the OHS procedure • Demonstrates an extensive knowledge and understanding of OHS legislation in the metal industry • Demonstrates critical reasoning when discussing OHS 	11–15
<ul style="list-style-type: none"> • Uses appropriate OHS terminology • Demonstrates a sound understanding and application of the OHS procedure • Demonstrates a basic knowledge and understanding of OHS legislation in the metal industry • Frames written response about OHS in a descriptive manner 	6–10
<ul style="list-style-type: none"> • Uses non-industry specific OHS terminology • Demonstrates a superficial understanding and application of the OHS procedure • Demonstrates an elementary knowledge and understanding of OHS legislation in the metal industry • Frames written responses using unsupported generalisations/ irrelevant material about OHS 	1–5

Question 23

Units of competency assessed: MEM1.1FA, MEM1.2FA, MEM1.3FA, MEM1.4FA, MEM2.1C12A, MEM2.5C11A, MEM2.8C10A, MEM9.2AA, MEM18.1AA, MEM18.2AA, Manufacturing and engineering industry induction

MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> • Consistently and correctly communicates using precise terminology in describing the production of the hanger • Demonstrates a thorough understanding and application of the tools and equipment required to manufacture the hanger • Applies an in-depth knowledge and understanding related to the competencies required to manufacture the hanger • Exhibits a comprehensive understanding of drawing interpretation • Demonstrates a thorough understanding of ongoing quality procedures 	11–15
<ul style="list-style-type: none"> • Communicates using appropriate terminology in describing the production of the hanger • Demonstrates a sound understanding and application of the tools and equipment required to manufacture the hanger • Demonstrates a sound understanding relative to the competencies required to manufacture the hanger • Exhibits a basic understanding of drawing interpretation • Demonstrates an understanding of quality procedures as an ongoing process 	6–10
<ul style="list-style-type: none"> • Communicates using non-industry specific terms in describing the production of the hanger • Demonstrates a superficial understanding and application of the tools and equipment required to manufacture the hanger • Demonstrates a limited understanding relative to the competencies required to manufacture the hanger • Exhibits some understanding of drawing interpretation • Demonstrates a limited understanding of quality procedures 	1–5