

**2007 HSC Notes from
the Marking Centre
Metal and Engineering**

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2007 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 in Metal and Engineering. It contains comments on candidate responses to the 2007 Higher School Certificate examination, indicating the quality of the responses and highlighting their relative strengths and weaknesses.

This document should be read along with the relevant syllabuses, the 2007 Higher School Certificate examinations, 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.

Section I

Question	Correct Response
1	A
2	B
3	A
4	C
5	B
6	A
7	C
8	C
9	B
10	D
11	D
12	D
13	D
14	C
15	A

Section II

Question 16

Candidates in this question were required to read, interpret and analyse information relating to the drawing of the shaft support bearing (page 20).

- (a) Weaker responses did not correctly identify the drawing type as a detailed assembly drawing.
- (b) Weaker responses did not identify the given distance from the end of Item 3 to the centre of diameter 3 oil hole as 20 mm.
- (c) Typical responses referred to the symbol as either a weld symbol or a tolerance. Better responses correctly identified the symbol as referring to surface finish.
- (d) Weaker responses did not calculate the total height of the shaft support bearing as 148 mm. A wide range of answers was offered.
- (e) Better responses named the diagonal lines as *cross hatching* and gave a precise explanation as to what they represent, using industry specific terminology. Weaker responses identified the lines correctly but did not give a satisfactory explanation.
- (f) Better responses correctly calculated either two or three dimensions (A-36 mm, B-70 mm, C-56 mm). In weaker responses, candidates were only able to calculate one correct dimension or simply left the question blank.

Question 17

- (a) Better responses clearly demonstrated an understanding of why the use of a vernier calliper would be most appropriate, citing specific examples such as the capacity to measure internally and the degree of accuracy possible.
- (b) Better responses were able to complete the table, successfully stating both upper and lower limits and correctly calculating the tolerance. Other responses identified the upper limit, not the lower limit, often stating 43.95 mm. Some responses identified both limits but with the incorrect calculation for the tolerance. Weaker responses did not identify either of the limits or tolerance.
- (c) Weaker responses often just rewrote the question in a different format, citing only one example or explanation. Better responses gave several specific examples, with thorough explanations that were clearly written.

Question 18

- (a) Typical responses identified the portable power tool as an angle grinder.

- (b) Better responses identified several appropriate and correct safety checks. Popular responses included damage to the grinding disk, power cord and guards, and to a lesser extent checking appropriate tagged information.
- (c) Weaker responses listed the personal protective equipment required when using an angle grinder, but their justification was either limited or missing.
- (d) Weaker responses only showed a limited understanding of the importance of accident reports. Better responses indicated that they were used for planning accident prevention strategies and the allocation of resources on a local and national level.

Question 19

- (a) Responses included a wide variety of methods to protect the surface finish of a piece of metal held in a bench vice. Better responses included soft jaws or jaw guards.
- (b) Better responses included incorrect tensioning and incorrect blade selection and were often complemented with a list of operational processes.
- (c) In better responses, candidates thoroughly explained both hacksaw blade selection and fitting with selection based on the type of metal being cut, the sectional thickness of the metal or the hardness of the metal being considered. These better responses also provided detail of the fitting process, indicating the direction of the teeth and the correct tensioning. Weaker responses were often very general, using incorrect or limited industry specific terminology.

Section III

General Comments

Candidates should be aware of the assessment rubric at the beginning of Section III that indicates the criteria used to assess the responses to the extended response questions in Section III.

Question 20

Better responses gave a precise marking-out sequence using datum as a reference edge. Procedures for location of holes and fold lines and correct bending sequence followed a logical approach from this reference edge (datum). Correct tool and equipment selection using exact industrial terminology accompanied the manufacturing sequence. Quality checking procedures included checking hole positions, fold lines location and the overall height. Better responses recognised that there was a bending allowance required in calculating the total length of the material. Reference was also given to the type of the material as Mild Steel not just MS.

Mid-range responses indicated a workable sequence with some mention of the selection of material type and size. However, these responses often had a non-sequential procedure with incorrect measurements and folding sequence. Tool and equipment selection were also often incorrectly selected or named. Quality checking procedures were brief often citing squareness as their main criteria.

Weaker responses included a brief list of tools and equipment, incorrect or no mention in regards to the selection of material type and size used in conjunction with the manufacturing process of the bracket. Marking out and folding sequence for weaker responses were generally disjointed. Weaker responses referred to cleaning rather than checking as their main quality checking procedures.

Question 21

Better responses established a clear relationship between the examples cited and the cost and benefits to the employer and employee. The relationship, examples and costs/benefits were detailed. These responses were generally specific and clearly written. These better responses made clear the importance of industrial housekeeping.

Mid-range responses established a basic link or connection between some examples, such as cleanliness, storage and workshop organisation and the resulting effect on the workplace. These responses were substantially well reasoned, but were more general and lacked specifics and detail. Many of these responses only included the benefits of industrial housekeeping, or thought that costs only related to the purchase of items.

Weaker responses often just related the question and supporting material supplied. Many of these responses provided a simple list of industrial housekeeping processes, eg sweeping benches or putting rubbish away, without any explanation of costs or benefits. From these responses it was hard to discern knowledge of the importance of industrial housekeeping. Weaker responses were generally vague and poorly organised, with little or no technical language used.

Question 22

Better responses were able to separate and distinguish between WorkCover and workplace OHS committees. They explained the roles of each in a very clear manner and gave a detailed explanation of the legislative requirement of each. Better responses also gave clear examples of the action taken by both bodies in the workplace.

Mid-range responses sometimes mixed up WorkCover and workplace OHS committees, especially in terms of their legislative requirements. Some separated the two bodies well, but lacked detailed information. Some of these mid-range responses often went off on tangents, mentioning risk assessment, green cards or gave examples from the building industry.

Weaker responses again mixed up Workcover and workplace OHS committees and often provided a lot of incorrect information or related it to the hierarchy of hazards control or included the responsibilities of employees and employers. Many of these responses mentioned workshop safety generally and contained no mention of legislative requirements.

Overall, responses demonstrating knowledge and understanding of both WorkCover and workplace OHS committees and their impact on the engineering industry clearly articulated the contribution of each body in their answer to this question. However, weaker responses confused the two bodies and talked basically about general safety around the workplace, demonstrating a lack of knowledge and understanding in relation to the requirements of the question.

Metal and Engineering

2007 HSC Examination Mapping Grid

Question	Marks	Unit of competency / Element of competency
Section I		
1	1	MEM 18.2AA – Use power tools/ hand held operations
2	1	MEM 9.2AA – Interpret Technical Drawing
3	1	MEM 2.5C11A – Measure with Graduated Devices
4	1	Industry induction
5	1	Industry induction
6	1	MEM 2.8C10A – Perform Computations
7	1	MEM 18.1AB – Use hand tools
8	1	MEM 2.8C10A – Perform Computations
9	1	MEM 2.5C11A – Measure with Graduated Devices
10	1	Industry induction
11	1	MEM 9.2AA – Interpret Technical Drawing
12	1	MEM 18.1AB – Use hand tools
13	1	MEM 1.3FA – Apply quality procedures MEM 2.1C12A – Apply quality systems
14	1	MEM 1.2FA – Apply principles of OHS in a workplace environment
15	1	MEM 2.1C12A – Apply quality systems
Section II		
16 (a)	1	MEM 9.2AA – Interpret Technical Drawing
16 (b)	1	MEM 9.2AA – Interpret Technical Drawing
16 (c)	1	MEM 9.2AA – Interpret Technical Drawing
16 (d)	2	MEM 2.8C10A – Perform Computations
16 (e)	2	MEM 9.2AA – Interpret Technical Drawing
16 (f)	3	MEM 2.8C10A – Perform Computations
17 (a)	2	MEM 2.5C11A – Measure with Graduated Devices
17 (b)	3	MEM 9.2AA – Interpret Technical Drawing MEM 2.8C10A – Perform computations
17 (c)	4	MEM 1.3FA – Apply quality procedures
18 (a)	1	MEM 18.2AA – Use power tools/ hand held operations
18 (b)	2	MEM 18.2AA – Use power tools/ hand held operations
18 (c)	3	MEM 18.2AA – Use power tools/ hand held operations
18 (d)	3	MEM 1.1FA – Undertake interactive workplace communications
19 (a)	1	MEM 18.1AB – Use hand tools
19 (b)	3	MEM 18.1AB – Use hand tools
19 (c)	3	MEM 18.1AB – Use hand tools
Section III		

Question	Marks	Unit of competency / Element of competency
20	15	MEM 1.4FA Plan to undertake a routine task MEM 1.2FA – Apply principles of OHS in a workplace environment MEM 18.1AB – Use hand tools MEM 2.1C12A – Apply quality systems
21	15	MEM 1.2FA – Apply principles of OHS in a workplace environment MEM 18.1AB – Use hand tools
22	15	Industry induction

2007 HSC Metal and Engineering Marking Guidelines

Section II

Question 16 (a)

Competencies assessed: MEM 9.2AA

MARKING GUIDELINES

Criteria	Marks
• Correctly indicates type of drawing	1

Question 16 (b)

Competencies assessed: MEM 9.2AA

MARKING GUIDELINES

Criteria	Marks
• Correctly indicates the distance	1

Question 16 (c)

Competencies assessed: MEM 9.2AA

MARKING GUIDELINES

Criteria	Marks
• Correctly identifies the symbol.	1

Question 16 (d)*Competencies assessed: MEM 2.8C10A***MARKING GUIDELINES**

Criteria	Marks
• Correctly calculates total height using correct data, showing working	2
• Correct answer only, AND/OR correct answer based on incorrect data.	1

Question 16 (e)*Competencies assessed: MEM 9.2AA***MARKING GUIDELINES**

Criteria	Marks
• Provides the correct name AND explanation	2
• Provides the correct name OR correct explanation	1

Question 16 (f)*Competencies assessed: MEM 2.8C10A***MARKING GUIDELINES**

Criteria	Marks
• Provides 3 correct responses	3
• Provides 2 correct responses	2
• Provides 1 correct response	1

Question 17 (a)*Competencies assessed: MEM 2.5C11A***MARKING GUIDELINES**

Criteria	Marks
• Provides two valid reasons for the use of vernier calipers	2
• Provides one valid reason for the use of a vernier caliper	1

Question 17 (b)

Competencies assessed: MEM 9.2AA, MEM 2.8C10A

MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> Interprets the upper and lower limits and correctly calculates the tolerance 	3
<ul style="list-style-type: none"> Interprets the upper and lower limits OR <ul style="list-style-type: none"> Interprets either the upper and lower limits and makes the correct calculation based on incorrect data 	2
<ul style="list-style-type: none"> Interprets either the upper and lower limits OR <ul style="list-style-type: none"> Makes a correct calculation 	1

Question 17 (c)

Competencies assessed: MEM 1.3FA

MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> Provides an in-depth explanation with multiple appropriate examples 	4
<ul style="list-style-type: none"> Provides a sound explanation with multiple and appropriate examples 	3
<ul style="list-style-type: none"> Provides a limited explanation with one or two examples 	2
<ul style="list-style-type: none"> Provides a basic explanation OR Provides some examples 	1

Question 18 (a)

Competencies assessed: MEM 18.2AA

MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> Provides the correct response 	1

Question 18 (b)

Competencies assessed: MEM 18.2AA

MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> Provides several appropriate and correct safety checks 	2
<ul style="list-style-type: none"> Provides an appropriate and correct safety check 	1

Question 18 (c)*Competencies assessed: MEM 18.2AA***MARKING GUIDELINES**

Criteria	Marks
• Lists several pieces of PPE appropriate for angle grinder and justifies their selection	3
• Lists a piece of PPE and justifies its selection, OR lists several pieces of PPE	2
• Lists a piece of PPE	1

Question 18 (d)*Competencies assessed: MEM 1.1FA***MARKING GUIDELINES**

Criteria	Marks
• Response shows a comprehensive understanding of accident reports and their use.	3
• Response shows a reasonable understanding of accident reports and their use.	2
• Response shows a limited understanding of accident reports and their use.	1

Question 19 (a)*Competencies assessed: MEM 18.1AB***MARKING GUIDELINES**

Criteria	Marks
• Provides ONE correct method	1

Question 19 (b)*Competencies assessed: MEM 18.1AB***MARKING GUIDELINES**

Criteria	Marks
• Provides THREE possible and correct techniques	3
• Provides TWO possible and correct techniques	2
• Provides ONE possible and correct technique	1

Question 19 (c)*Competencies assessed: MEM 18.1AB***MARKING GUIDELINES**

Criteria	Marks
• Provides a thorough explanation of blade selection and the complete process of fitting a new blade.	3
• Provides an adequate explanation of blade selection and an incomplete process of fitting a new blade OR provides a thorough explanation of blade selection OR outlines and the complete process of fitting a new blade.	2
• Provides a limited explanation of blade selection OR an incomplete process of fitting a new blade.	1

Section III

Question 20

Competencies assessed: MEM 1.4FA, MEM 1.2FA, MEM 18.1AB, MEM 2.1C12A

MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> Communicates the details of a suitable job procedure using precise industry terminology in a well-reasoned and cohesive response Applies in-depth knowledge and understanding of the tools and equipment required to produce the Bracket Demonstrates an extensive understanding and knowledge of the application of quality procedures required to produce the Bracket 	13–15
<ul style="list-style-type: none"> Communicates the details of suitable job procedure using detailed industry terminology Applies thorough knowledge and understanding of the tools and equipment required to produce the Bracket in a clear and organised response Demonstrates a specific understanding and knowledge of the quality procedures required to produce the Bracket 	10–12
<ul style="list-style-type: none"> Communicates the details of a suitable job procedure using general industry terminology Applies sound knowledge and understanding of the tools and equipment required to produce the Bracket in a substantially well-reasoned and organised response Demonstrates an appropriate understanding and knowledge the application of quality procedures required to produce the Bracket 	7–9
<ul style="list-style-type: none"> Communicates the details of a possible job procedure using basic industry terminology Applies limited knowledge and understanding of the tools and equipment required to produce the Bracket with some organisation evident in the response Demonstrates some understanding and knowledge of quality procedures required to produce the Bracket 	4–6
<ul style="list-style-type: none"> Communicates some steps of a procedure using non-specific industry terminology with little evidence of reasoning or cohesion in response Applies superficial knowledge and understanding of the tools and equipment required to produce the Bracket Demonstrates a limited or no understanding of the quality procedures required to produce the Bracket 	1–3

Question 21

Competencies assessed: MEM 1.2FA, MEM 18.1AB

MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> • Demonstrates an extensive understanding and knowledge of industrial housekeeping in a Metal and Engineering workplace • Explains at an in-depth level the costs and benefits of industrial housekeeping to employers and employees, in a well-reasoned and cohesive response • Communicates, using precise industry terminology some appropriate examples of industrial housekeeping and their effect on the Metal and Engineering industry. 	13–15
<ul style="list-style-type: none"> • Demonstrates an thorough understanding and knowledge of industrial housekeeping in a Metal and Engineering workplace • Explains at a detailed level the costs and benefits of industrial housekeeping to employers and employees in a clear and organised response • Communicates, using industry terminology some appropriate examples of industrial housekeeping and their effect on the Metal and Engineering industry. 	10–12
<ul style="list-style-type: none"> • Demonstrates an sound understanding and knowledge industrial housekeeping in a Metal and Engineering workplace • Explains at a basic level the costs and benefits of industrial housekeeping to employers and employees with a substantially well-reasoned and organised response • Communicates, in general terms, several appropriate examples of industrial housekeeping. 	7–9
<ul style="list-style-type: none"> • Demonstrates an some understanding and knowledge of industrial housekeeping in a Metal and Engineering workplace • Makes some attempt to relate industrial housekeeping as a benefit to the employer and/or the employee with some organisation evident in the response • Mentions examples of industrial housekeeping. 	4–6
<ul style="list-style-type: none"> • Demonstrates a minimal understanding and knowledge of the industrial housekeeping in a Metal and Engineering workplace • Attempts to describes industrial housekeeping with little evidence of reasoning or cohesion in response • Mentions, using non-industry specific terms examples of industrial housekeeping 	1–3

Question 22

Competencies assessed: Industry induction

MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> • Using precise industry terminology, demonstrates an in-depth understanding and knowledge of the roles of WorkCover(NSW) and OHS workplace committees • Provides an extensive analysis of the impact these bodies have on safety in the Metal and Engineering workplace in well-reasoned and cohesive response • Demonstrates extensive understanding and knowledge of the legislative requirements of WorkCover(NSW) and OHS workplace committees 	13–15
<ul style="list-style-type: none"> • Using specific industry terminology, demonstrates a well-developed understanding and knowledge of the roles of WorkCover(NSW) and OHS workplace committees • Provides an analysis of the impact these bodies have on safety in the Metal and Engineering workplace, in a clear and organised response • Demonstrates a thorough understanding and knowledge of the legislative requirements of WorkCover(NSW) and OHS workplace committees. 	10–12
<ul style="list-style-type: none"> • Using general industry terminology, demonstrates a sound understanding and knowledge of the roles of WorkCover(NSW) and OHS workplace committees • Provides an incomplete analysis of the impact these bodies have on safety in the Metal and Engineering workplace in a substantially well-reasoned and organised response • Demonstrates a limited understanding and knowledge of the range of the legislative requirements of WorkCover(NSW) and OHS workplace committees. 	7–9
<ul style="list-style-type: none"> • Using some industry terminology, demonstrates a basic understanding and knowledge of the roles of WorkCover(NSW) and OHS workplace committees • Provides little or no analysis of the impact these bodies have on safety in the Metal and Engineering workplace with some attempt of organisation evident in the response • Demonstrates a minimal understanding and knowledge of the range of the legislative requirements of WorkCover(NSW) and OHS workplace committees. 	4–6
<ul style="list-style-type: none"> • Using non-specific industry terminology, lists some of the roles of WorkCover(NSW) and OHS workplace committees • Provides little or no analysis of the impact of these bodies on the safety in the Metal and engineering workplace. • Demonstrates little or no understanding and knowledge of of the legislative requirements of WorkCover(NSW) and OHS workplace committees. 	1–3