BOSTES | BOARD OF STUDIES TEACHING & EDUCATIONAL STANDARDS NSW

2016 HSC Metal and Engineering Marking Guidelines

Section I

Multiple-choice Answer Key

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

Section II

Question 16 (a)

Criteria	Marks
• Correctly identifies the power tool	1

Sample answer:

Jigsaw

Question 16 (b)

Criteria	Marks
• Fully explains the importance of correct blade selection	2
• Provides a reason for correct blade section	1

Sample answer:

A fine pitch blade is used when cutting thin material. As a rule you always aim to use a blade which will have at least 3 teeth in contact with the work at any one time. Then there is less chance of breaking teeth on the blade. This will also prolong the life of the blade reducing cost in replacements.

Question 16 (c)

Criteria	Marks
• Fully explains the importance of reporting accidents	3
• Briefly explains the importance of reporting accidents	2
• Provides a valid point	1

Sample answer:

It is important to report accidents (actual or near miss) to the supervisor to ensure detailed knowledge of the dangers in the workshop. Investigations of the report will occur to provide data to establish safer work procedures to reduce the recurrence of injuries. First aid attention can also be given to the injured person when the injury is reported.

Question 17 (a)

Criteria	Marks
• Correctly identifies 5–6 tools/gauges	3
• Correctly identifies 3–4 tools/gauges	2
• Correctly identifies 1–2 tools/gauges	1

Sample answer:

Feature/Dimension	*Tool/Gauge*
The pitch of a screw thread	Thread pitch gauge
A 5 m length of steel	Measuring tape
A 0.2 mm gap	Feeler gauge
An internal radius	Radius gauge
2.3 mm drill bit	Micrometer/Vernier caliper
The inside diameter of a machined hole	Vernier caliper/Inside micrometer/Telescopic gauge/Inside caliper

Question 17 (b)

Criteria	Marks
• Explains why it is important to adhere to a tolerance in the production of products	2
• Provides a relevant point	1

Sample answer:

It allows components to be manufactured anywhere in the world and still meet specifications and requirements. It allows parts to be assembled correctly and, if movement between the parts is required, the tolerance provides the maximum clearance allowable for perfect fit.

Question 17 (c)

Criteria	Marks
• Using precise industry terminology identifies all of the tools required to produce the internal M12 thread • Justifies the importance of selecting the appropriate hand tools for the task	4
• Using some industry terminology identifies most of the tools required to produce the internal M12 thread • Identifies some reason for selecting the hand tools	3
• Identifies a correct tool and a reason for selecting	2
• Identifies a correct tool or a reason	1

Sample answer:

The tools required would be a series of taps. Example; taper and plug or bottoming tap (to cut the thread to the bottom of the blind hole). An adjustable tap wrench to take the range of taps with the driving force from the operator's hands applied from each end of the wrench.

Question 18 (a)

Criteria	Marks
• Correctly identifies the term	1

Sample answer:

Not to scale

Question 18 (b)

Criteria	Marks
• Provides the correct working out and answer	2
• Provides inaccurate working out with correct answer OR • Provides some correct working out with incorrect answer OR • Provides correct answer only	1

Sample answer:

$75 + 5 = 80$

$80 \times 2 = 160$

$160 \times 14 = 2240$

$\therefore 2240$ mm of flat bar will be required.

Question 18 (c)

Criteria	Marks
• Explains reasons why the drawing is the most appropriate type of drawing	2
• Provides a reason why the drawing is the most appropriate type of drawing	1

Sample answer:

These drawings show how the work is assembled, along with details needed for manufacture. It satisfies both the function of an assembly drawing, sub-assembly drawing and a detailed drawing.

Question 18 (d)

Criteria	Marks
• Proposes the steps required, in a logical sequence, to successfully mark out and efficiently manufacture the cap plate • Names all the relevant tools required	6
• Proposes the steps required, in a logical sequence, to mark out and manufacture the cap plate • Names most tools required	5
• Proposes some appropriate steps in a logical sequence • Lists some tools required	3–4
• Lists some steps of the marking out AND/OR the manufacturing processes AND/OR some tools	1–2

Sample answer:

Sequence of steps – marking out	*Tools*
• Interpret drawing • Apply marking medium • Mark datum A / B • From datum A mark parallel lines 12.5 mm and 62.5 mm • From datum B mark parallel lines 20 mm and 120 mm • Centre punch the four intersection points of the lines from datum A and datum B for drilling	• Engineers rule • Engineers square • Jenny callipers • Centre punch • Marking medium • Ball pein hammer • Engineers scriber
Sequence of steps – manufacture	*Tools*
• Secure plate in drilling vice for drilling • Check for squareness • Drill the 4 x 8 mm diameter holes • Deburr holes • Finish/deburr plate	• Appropriate PPE • Files • 8 mm twist drill • Drill vice • Cutting fluid • Pedestal drill • Engineers square

Question 19 (a)

Criteria	Marks
• Explains reasons why safety signs are presented this way	2
• Provides a valid reason why safety signs are presented this way	1

Sample answer:

- Information can be effectively communicated without the need for understanding the local language eg English
- Workers with poor reading skills are able to understand the intent of the message.
- The message is able to be decoded by the brain quickly and accurately.

Question 19 (b)

Criteria	Marks
• Correctly identifies the four categories of safety sign and their two main colours	4
• Correctly identifies three categories of safety sign and their two main colours	3
• Correctly identifies two categories of safety sign and their two main colours	2
• Correctly identifies one category of safety sign and its two main colours	1

Sample answer:

- Hazard Warning sign – yellow and black
- Emergency Information sign – green and white
- Regulatory Prohibition sign – red, white and/or black
- Regulatory Mandatory sign – blue and white

Question 19 (c)

Criteria	Marks
• Demonstrates a comprehensive understanding of how the metal and engineering industry uses material safety data sheets	3
• Demonstrates a sound understanding of how the metal and engineering industry uses material safety data sheets	2
• Demonstrates a basic understanding of material safety data sheets	1

Answers could include:

- Identify the product name of the hazardous substance
- Identify the chemical name of ingredients
- Precautions for safe use, handling and storage
- Manufacturer's or importer's name and contact details
- Decide whether improvements to control measures are necessary
- Identify necessary control measures before the introduction of a new substance including what PPE is required.

Section III

Question 20

Criteria	Marks
• Correctly uses precise industry terminology in a well-reasoned and cohesive response • Demonstrates an extensive understanding of safe work method statements • Demonstrates an extensive knowledge and understanding of the relationship between materials, manual handling practices and storage	13–15
• Uses appropriate industry terminology in a cohesive response • Demonstrates a thorough understanding of safe work method statements • Demonstrates a thorough knowledge and understanding of the relationship between materials, manual handling practices and storage	10–12
• Uses appropriate industry terminology • Demonstrates a sound understanding of safe work method statements • Demonstrates a sound knowledge and understanding of the relationship between materials, manual handling practices and storage	7–9
• Uses basic industry terminology • Displays a basic understanding of safe work method statements • Demonstrates a basic knowledge and understanding of the relationship between materials and the way they are handled AND/OR stored	4–6
• Uses limited industry terminology • Provides a limited understanding of safe work method statements • Provides an awareness of materials and the way they should be handled or stored	1–3

Answers could include:

- Multiple deliveries could be expected at the beginning of the day
- Location and overflow of materials in receiving dock
- Size and weight of the deliveries – manual handling
- Personnel required
- Time constraints – down time
- Layout – path of material movement
- Storage of material
- Suggest ways of minimising issues and achieving tasks
- Take time to plan carefully/develop a SWMS
  - SWMS number
  - Activity
  - Approval
  - Training required
  - Code of practice
  - Legislation and standards that apply to the activity
  - PPE/barricades required for the activity

- Sufficient workers
- Manual handling procedures followed
- Path marked and made safe
- Sufficient tools for job/task
- Correctly trained workers
- First aid
- Planning for inclement weather (hot, wet, cold)
- Traffic control for delivery and movement of material.

Section IV

Question 21 (a)

Criteria	Marks
• Identifies who is required to be inducted and when it needs to take place	2
• Identifies who is required to be inducted OR • Identifies when an induction needs to take place	1

Sample answer:

Everybody that enters the workplace must undergo some form of an induction. This induction is tailored to their involvement within the workplace. This must be conducted prior to entering the worksite.

Question 21 (b)

Criteria	Marks
• Demonstrates an in-depth understanding of why communication is important and can reduce injuries	3
• Demonstrates a sound understanding of why communication is important and can reduce injuries	2
• Demonstrates a limited understanding of why communication can reduce injuries	1

Sample answer:

Communication is a vital element in the day-to-day functioning of organisations. In the workplace, the potential hazards change regularly and lack of communication could be the cause of an accident. By improving communication, such as displaying signage and SOPs in the workplace, a safer environment can be created minimising future workplace injuries and accidents.

Question 21 (c)

Criteria	Marks
• Demonstrates, in a well-reasoned and cohesive response, an extensive understanding of the importance of an induction process • Using precise industry terminology, demonstrates an extensive understanding of a broad range of features of an induction process	9–10
• Demonstrates, in a clear organised response, a thorough understanding of the importance of an induction process • Using specific industry terminology, demonstrates a thorough understanding of a range of features of an induction process	7–8
• Demonstrates a sound understanding of the importance of an induction process • Using sound industry terminology, explains some features of an induction process	5–6
• Demonstrates a basic understanding of the importance of an induction process • Using basic industry terminology, briefly outlines some features of an induction process	3–4
• Displays a limited understanding of the importance of an induction process • Provides limited features of an induction program	1–2

Sample answer:

The importance of the process is to help the new employee to contribute more effectively to the production process, which will increase productivity and help eliminate waste and potential workplace accidents and injuries, causing a cost to the organisation and the employee. It will also assist the new employee to communicate more effectively to assist in improving efficiency. The induction process must be completed prior to the new employee commencing their duties.

Answers could include:

- Company's business plan, goals and mission statement
- WHS legislation information
- Employers' and employees' rights and responsibilities
- Identification of common workplace hazards
- Fire safety
- Purpose and use of PPE
- Locations of amenities – toilets, break area, working areas etc.
- Evacuation areas and procedures
- Appropriate code of conduct
- Material and manual handling
- Training
- Organisation's hierarchy or structure.

2016 HSC Metal and Engineering
Mapping Grid

Section I

Question	Marks	Unit of competency / Element of competency	Employability skills (Please put an X where appropriate)							
			Communication	Teamwork	Problem–solving	Initiative and enterprise	Planning and organising	Self–management	Learning	Technology
1	1	MEM18001C / Use hand tools — Element 1 – page 83							X	
2	1	MEM18001C / Use hand tools — Element 1 – page 83					X		X	
3	1	MEM15024A / Apply quality procedures — Element 1 – page 67	X				X		X	
4	1	MEM12024A / Perform computations — Element 3 – pages 32 and 34			X				X	
5	1	MEM12024A / Perform computations — Element 3 – pages 32 and 34			X				X	
6	1	MEM12023A / Perform engineering measurements — Element 1 – page 24			X				X	
7	1	MEM13014A / Apply principles of work health and safety in the work environment — Element 2 – page 45								X
8	1	MEM12023A / Perform engineering measurements — Element 1 – page 24	X		X				X	
9	1	MEM13014A / Apply principles of work health and safety in the work environment — Element 1 – page 39					X		X	
10	1	Induction / Manufacturing, engineering and related industries induction — Element 2 – page 12				X			X	
11	1	MEM09002B / Interpret technical drawing — Element 1 – page 18			X				X	
12	1	MEM09002B / Interpret technical drawing — Element 1 – page 18	X		X				X	
13	1	Induction / Manufacturing, engineering and related industries induction — Element 3 – page 13							X	
14	1	Induction / Manufacturing, engineering and related industries induction — Element 3 – page 13							X	
15	1	Induction / Manufacturing, engineering and related industries induction — Element 3 – page 13							X	

Section II

Question	Marks	Unit of competency / Element of competency	Employability skills (Please put an X where appropriate)							
			Communication	Teamwork	Problem–solving	Initiative and enterprise	Planning and organising	Self–management	Learning	Technology
16 (a)	1	MEM18002B / Use power tools/hand held operations — Element 1 – page 89							X	X
16 (b)	2	MEM18002B / Use power tools/hand held operations — Element 1 – page 89						X	X	X
16 (c)	3	MEM18002B / Use power tools/hand held operations — Element 1 – page 90	X			X		X		
17 (a)	3	MEM12023A / Perform engineering measurements — Element 1 – page 24							X	
17 (b)	2	MEM12023A / Perform engineering measurements — Element 1 – page 24							X	
17 (c)	4	MEM18001C / Use hand tools — Element 1 – page 83			X				X	
18 (a)	1	MEM09002B / Interpret technical drawing — Element 2 – page 19	X						X	
18 (b)	2	MEM12024A / Perform computations — Element 1 – page 32			X				X	
18 (c)	2	MEM09002B / Interpret technical drawing — Element 1 – page 18	X						X	
18 (d)	6	MEM14004A / Plan to undertake a routine task — Element 2 – pages 50–56	X		X		X		X	
19 (a)	2	MEM13014A / Apply principles of work health and safety in the work environment — Element 1 – page 44	X						X	X
19 (b)	4	MEM13014A / Apply principles of work health and safety in the work environment — Element 1 – page 44	X						X	X
19 (c)	3	MEM15002A / Apply quality systems — Element 1 – page 61							X	

Section III

Question	Marks	Unit of competency / Element of competency	Employability skills (Please put an X where appropriate)							
			Communication	Teamwork	Problem–solving	Initiative and enterprise	Planning and organising	Self–management	Learning	Technology
20	15	MEM13014A / Apply principles of work health and safety in the work environment — Element 1 – pages 38–39	X	X					X	

Section IV

Question	Marks	Unit of competency / Element of competency	Employability skills (Please put an X where appropriate)							
			Communication	Teamwork	Problem–solving	Initiative and enterprise	Planning and organising	Self–management	Learning	Technology
21 (a)	2	Induction / Manufacturing, engineering and related industries induction — Element 3 – page 13	X						X	
21 (b)	3	MEM16007A / Work with others in a manufacturing, engineering or related environment — Element 2 – page 73	X				X	X	X	
21 (c)	10	Induction / Manufacturing, engineering and related industries induction — Element 3 – page 13	X				X	X	X	