



BOARD OF STUDIES
NEW SOUTH WALES

2013 HSC Industrial Technology Metal and Engineering Technologies Marking Guidelines

Section I

Multiple-choice Answer Key

Question	Answer
1	A
2	C
3	D
4	C
5	B
6	D
7	D
8	C
9	D
10	C

Section II

Question 11

Criteria	Marks
• Names TWO appropriate cutting machines	2
• Names ONE appropriate cutting machine	1

Answers could include:

- Brobo saw/cold saw
- Power hacksaw/horizontal bandsaw
- Cut-off machine/lathe
- Cutoff machine/power guillotine/hydraulic shears
- Band saw/drop saw

Question 12

Criteria	Marks
• Provides a comprehensive outline of an appropriate safety checklist for a fixed drilling machine	3
• Identifies some appropriate safety checks for a fixed drilling machine	2
• Identifies one appropriate safety check for a fixed drilling machine	1

Sample answer:

- Drill is securely held and on centre
- Jacob's chuck key has been removed, if chuck key fitted
- Work is securely clamped
- Drill point is in line with punch mark for the hole
- Spindle speed is correct
- Guards are in place

Question 13

Criteria	Marks
• Outlines the main features of the process for brazing a butt joint	3
• Indicates some features of the process of brazing a butt joint	2
• Identifies a feature of the process for brazing a butt joint	1

Sample answer:

- The metal is heated until a bright red colour
- The filler rod is slightly heated in the flame and/or dipped into the flux; if no flux is attached to filler rod
- The heat is applied to whole joint, the filler rod flows through and around the seam to complete the weld

Answers could include:

- The parent metal joints are close fitting and clean
- Heated to bright red colour
- Filler rod heated and flux attached
- Filler rod front of flame
- The flux will melt and flow onto the seam, the rod will follow
- The heat is applied to whole joint, the filler rod flows through and around the seam
- Remove the flame
- Parent metal allowed to cool

Question 14

Criteria	Marks
• Provides clear understanding of the benefits of laser cutting equipment	3
• Provides an understanding of the benefits of laser cutting equipment	2
• Provides some relevant information	1

Answers could include:

Benefits compared to:

- Mechanical cutting
 - Easier work holding
 - Reduced contamination of work piece
 - Precision, may be better, laser beam does not wear
 - Reduced warping
 - Some materials are very difficult to cut by more traditional means
- Plasma cutting
 - More precise
 - Using less energy when cutting sheet metal
- Company issues
 - Increased profitability
 - Unskilled labour
 - Higher output
 - CNC operated

Question 15

Criteria	Marks
<ul style="list-style-type: none"> • Correctly completes a sequence of steps to mark out support bracket from a length of 120 × 100 × 6 mm mild steel plate • Lists appropriate tools 	4
<ul style="list-style-type: none"> • Identifies at least TWO appropriate steps • Identifies the appropriate tools 	3
<ul style="list-style-type: none"> • Identifies at least ONE appropriate step AND <ul style="list-style-type: none"> • Indicates an appropriate tool 	2
<ul style="list-style-type: none"> • Indicates an appropriate step OR <ul style="list-style-type: none"> • Identifies an appropriate tool 	1

Sample answer:

<i>Sequence of steps</i>	<i>Tools</i>
1. Mark length of 100 mm and square off	Rule, engineers square, scribe
2. Measure 50 mm for centre line and measure 10 mm from top, scribe line parallel	Scriber/jenny calliper, ruler, try square, engineers square
3. From middle centre line, measure up from base, 10 mm, 40 mm and 85 mm for hole centres. From top parallel centre line, measure out 40 mm from middle centre line	Ruler, scribe
4. Punch centre marks for the 5 holes	Centre punch, ball pein hammer
5. From each corner set divider to a radius of 10 mm and scribe arcs on each corner. Draw tangent lines to outside of radius lines	Divider, ruler, scribe
6. Witness punch the outside shape of bracket	Centre/prick punch, ball pein hammer

Section III

Question 16 (a)

Criteria	Marks
• Provides a detailed explanation of why it is important for a company to comply with safety standards	6
• Provides a sound explanation of why it is important for a company to comply with safety standards	4–5
• Provides a limited explanation of why it is important for a company to comply with safety standards	2–3
• Provides some relevant information	1

Sample answer:

It is important for a company to comply with safety standards for a number of reasons. Firstly, they are legally responsible for the safety of their employees and can be both financially and even criminally liable should the company be at fault for the injury or death of an employee. Another reason to comply with safety standards is to ensure that production is not disrupted. An industrial accident can cause a stop in production, which in turn will result in financial losses on top of the financial losses to paying worker's compensation for an injured worker. Injured employees may also have to be replaced and this will also add to the cost of workplace injuries, as it will be an extra wage to pay out. Morale and productivity could suffer as employees do not feel safe in the workplace and can even reach a point of production being stopped by employees until their right to a safe work environment is met.

Answers could include:

- Duty of care
- Government legislation
- Financial security
- Marketability of a product
- Good will of company
- Ethical issue

Question 16 (b)

Criteria	Marks
• Provides a detailed assessment of strategies a company could implement to establish and maintain a safe work culture	9
• Provides an assessment of strategies a company could implement to establish and maintain a safe work culture	7–8
• Relates strategies a company could implement to establish and maintain a safe work culture	4–6
• Attempts to provide strategies a company could implement to establish and maintain a safe work culture	2–3
• Provides some relevant information	1

Sample answer:

A range of methods could implement to establish and maintain a safe work culture are; establish a WHS committee, erect clear signage, and train employees.

Establishing a WHS committee ensures that all members of the work place are represented and participate in risk assessments, site maintenance and site inspections. This method is very effective in ensuring communication of WHS requirements is clearly spread between all levels of the work force. It provides the opportunity for different perspectives on work place safety to be considered. A WHS committee also spreads responsibility for workplace safety across the entire company, which ensures everyone applies a consistent approach to safe work practices and management practices and fosters a positive and safe work place culture.

Erecting clear signage that utilises graphical information, over complex written policies, allows for both a reminder of safe work practices in hazardous areas and clear communication of safe work practices to workers with limited literacy. Signage is an excellent method to maintain a safe workplace culture as they are quick to recognise and serve as constant reminders of safe work practices and hazards to people who may not have any training eg visitors to the workplace. Signage is particularly useful in the event of new safety requirement or hazard. It is far quicker to erect a slippery floor sign over a spill than send a memo out to all staff.

Training is another excellent method to ensure and maintain a safe workplace culture. It directly communicates safe work practices to employees and can ensure each employee is assessed as to how well they understand safety requirements or the correct procedure to work with hazardous materials, machinery or environments. It gives the employees a chance to clarify their understanding of the safe work practices as well as possibly develop their own skills in the use of machinery. When it is registered what an employee is trained to do, it is easier for management to ensure the employees are placed appropriately in a production line to ensure the employees own safety and the safety of others.

Answers may include:

Assess a range of methods that could implement effectively to establish and maintain a safe work culture.

- Establish a WHS committee (Risk assessments / Site maintenance + inspection)
- Improve signage so that people who can't read can understand what is required
- Train employees re: WHS procedures eg evacuation
- Practice evacuation procedures once every 6 months
- Improve communication — meetings, posters, emails, message boards
- Train employees — in service and keep a register of trained personnel to identify training required
- Keep and maintain a register of incidents
- Monitoring
- Maintenance
- Supply PPE
- Site meeting
- Risk assessments

Industrial Technology Metal and Engineering Technologies

2013 HSC Examination Mapping Grid

Section I

Question	Marks	Content	Syllabus outcomes
1	1	Materials	H1.2
2	1	Materials	H1.2
3	1	Processes tools and machinery	H2.1
4	1	Processes tools and machinery	H2.1
5	1	Processes tools and machinery	H2.1
6	1	Processes tools and machinery	H2.1
7	1	Processes tools and machinery	H2.1
8	1	Processes tools and machinery	H2.1
9	1	Materials	H3.2
10	1	Materials	H3.2

Section II

Question	Marks	Content	Syllabus outcomes
11	2	Processes tools and machinery	H1.2, H4.1
12	3	Processes tools and machinery	H1.2, H2.1
13	3	Processes tools and machinery	H1.2
14	3	Processes tools and machinery	H1.2, H7.2
15	4	Processes tools and machinery	H1.2, H3.1, H4.1, H4.2, H4.3

Section III

Question	Marks	Content	Syllabus outcomes
16 (a)	6	OHS (WHS)	H2.1, H6.1, H7.1, H7.2
16 (b)	9	OHS (WHS)	H2.1, H7.1, H7.2