



**2013**

**HIGHER SCHOOL CERTIFICATE  
EXAMINATION**

# Industrial Technology

## Metal and Engineering Technologies

### General Instructions

- Reading time – 5 minutes
- Working time –  $1\frac{1}{2}$  hours
- Write using black or blue pen  
Black pen is preferred
- Draw diagrams using pencil
- Board-approved calculators may be used
- Write your Centre Number and Student Number at the top of page 5

**Total marks – 40**

**Section I** Pages 2–4

**10 marks**

- Attempt Questions 1–10
- Allow about 20 minutes for this section

**Section II** Pages 5–7

**15 marks**

- Attempt Questions 11–15
- Allow about 35 minutes for this section

**Section III** Page 9

**15 marks**

- Attempt Question 16
- Allow about 35 minutes for this section

## Section I

**10 marks**

**Attempt Questions 1–10**

**Allow about 20 minutes for this section**

Use the multiple-choice answer sheet for Questions 1–10.

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- 1** Which one of the following is a non-ferrous metal?

  - (A) Lead
  - (B) Cast iron
  - (C) Mild steel
  - (D) Stainless steel
  
- 2** Bronze is an alloy of copper and what other material?

  - (A) Aluminium
  - (B) Lead
  - (C) Tin
  - (D) Zinc
  
- 3** What is the correct temper colour when heat treating centre punches?

  - (A) Brown
  - (B) Purple
  - (C) Red
  - (D) Yellow
  
- 4** Which tool will most accurately mark a line parallel to an internal edge?

  - (A) A scribe
  - (B) Dividers
  - (C) Jenny calipers
  - (D) Insider calipers

5 What type of welding flame is illustrated?



- (A) Cutting
- (B) Carburising
- (C) Neutral
- (D) Oxidising

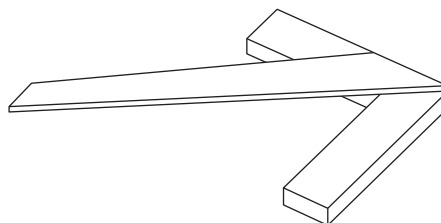
6 What is the most common cutter direction used on a milling machine?

- (A) Axial milling
- (B) Climb milling
- (C) Down milling
- (D) Up milling

7 What is the purpose of upsetting metal?

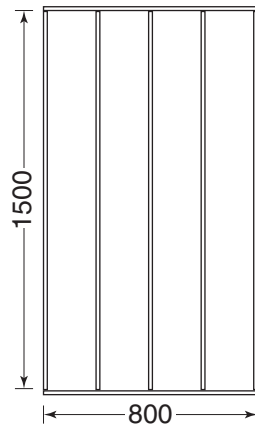
- (A) To reduce the area
- (B) To soften the metal
- (C) To increase the flexibility of the metal
- (D) To make the metal into a thicker section

8 What is the name of the marking out tool shown?



- (A) A try square
- (B) A sliding bevel
- (C) A centre square
- (D) An engineer's square

- 9 A fabricator is contracted to make the metal grid shown.



- What is the minimum number of 6.5 m lengths of 25 mm black pipe required to manufacture eight metal grids, identical to the dimensions shown?
- (A) 9  
(B) 10  
(C) 11  
(D) 12
- 10 A sheet metal worker is commissioned to produce 125 work trays. Each work tray is fabricated using 30 rivets, and there are 1000 rivets in each box.

Allowing for 10% wastage, how many boxes of rivets are required?

- (A) 3  
(B) 4  
(C) 5  
(D) 6

**Industrial Technology**  
**Metal and Engineering Technologies**

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Centre Number

**Section II**

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Student Number

**15 marks**

**Attempt Questions 11–15**

**Allow about 35 minutes for this section**

Answer the questions in the spaces provided. These spaces provide guidance for the expected length of response.

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**Question 11** (2 marks)

Identify TWO fixed powered machines that are suitable to cut metal to length. **2**

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**Question 12** (3 marks)

Outline a pre-operational safety checklist for a fixed drilling machine. **3**

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**Question 13** (3 marks)

Outline the process of brazing a mild steel butt joint.

**3**

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**Question 14** (3 marks)

Describe the benefits of using laser cutting equipment.

**3**

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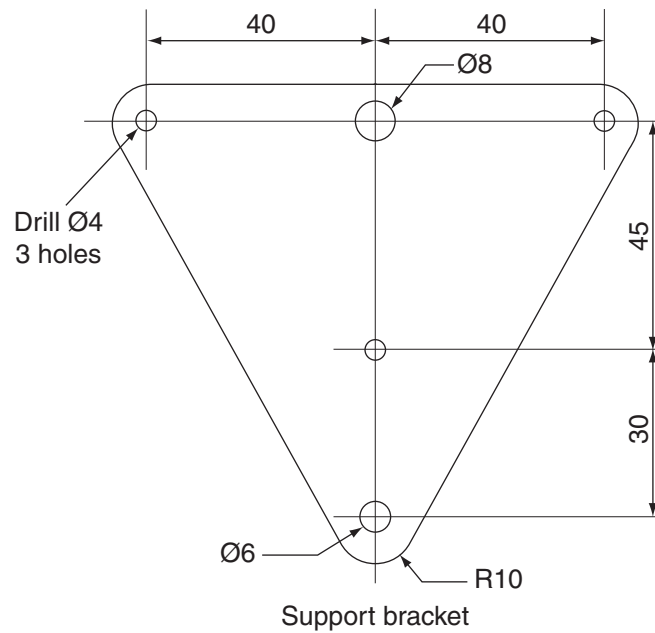
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**Question 15** (4 marks)

A diagram of a support bracket is shown.

4



Complete the table below, identifying the missing steps in the sequence to mark out the support bracket from a length of  $120 \times 100 \times 6$  mm mild steel plate. For each step list the tools required.

<i>Sequence of steps</i>	<i>Tools</i>
1. Mark length of 100 mm and square off	Rule, try square, scribe
2. ....	.....
3. ....	.....
4. Punch centre marks for the 5 holes	.....
5. ....	.....
6. Witness punch the outside shape of bracket	.....

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# Industrial Technology

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### Section III

**15 marks**

**Attempt Question 16**

**Allow about 35 minutes for this section**

Answer the question in a writing booklet provided. Extra writing booklets are available.

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#### **Question 16 (15 marks)**

- |     |   |          |
|-----|---|----------|
| (a) | Explain why a company should comply with safety standards.                                      | <b>6</b> |
| (b) | Assess strategies that a company could implement to establish and maintain a safe work culture. | <b>9</b> |

**End of paper**

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