

# 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**

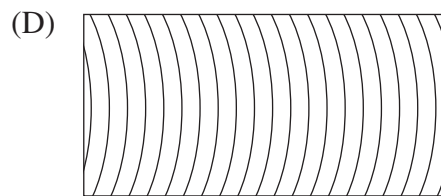
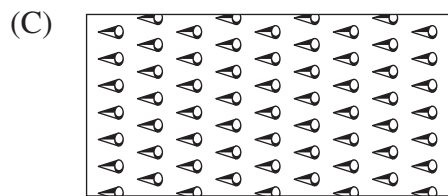
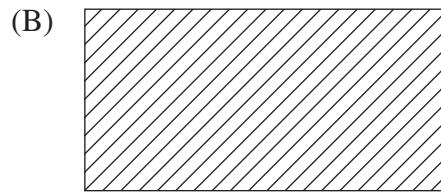
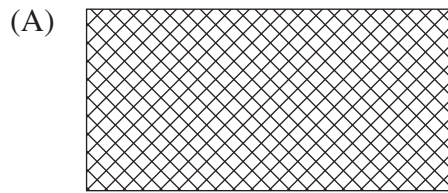
**Attempt Questions 1–10**

**Allow about 20 minutes for this section**

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

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**1** Which of the following shows the face of a double cut file?



**2** Which tool would best support cylindrical work?

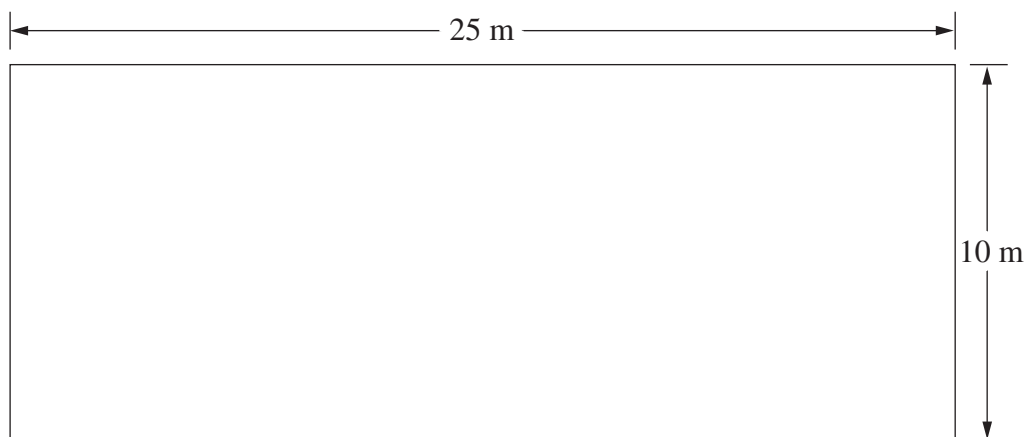
- (A) A G cramp
- (B) A Vee block
- (C) A machine vice
- (D) A surface gauge

**3** On which tool does a mushroom head form after prolonged use?

- (A) A button die
- (B) A cold chisel
- (C) A second cut file
- (D) A ball peen hammer

- 4 From which ore is aluminium produced?
- (A) Bauxite
  - (B) Copper
  - (C) Manganese
  - (D) Sphalerite
- 5 What is the process by which metal is heated and shaped by plastic deformation?
- (A) Casting
  - (B) Forging
  - (C) Soldering
  - (D) Welding
- 6 Which turning process is used to produce a diamond pattern on a metal stock?
- (A) Boring
  - (B) Drilling
  - (C) Facing
  - (D) Knurling
- 7 Why are pilot holes drilled before drilling a large diameter hole in metal?
- (A) To prevent irregularities on the surface
  - (B) To remove the need for centre punching
  - (C) To overcome the cutting resistance of the web
  - (D) To prevent jamming and breaking as the drill breaks through the metal

- 8 The dimensions of a metal and engineering workshop are shown.  $15 \text{ m}^2$  of its area is dedicated to storage.



- What percentage of the total floor area is dedicated to storage?
- (A) 6%  
(B) 12%  
(C) 60%  
(D) 67%
- 9 Which of the following provides three reasons for treating sheet metal edges?
- (A) Safer to handle, for additional strength, to remove grains  
(B) For improved appearance, to remove grains, safer to handle  
(C) To remove grains, for improved appearance, for additional strength  
(D) For additional strength, for improved appearance, safer to handle
- 10 A large metal and engineering company pays for its workers' professional association fees. The fee is \$457 for a full-time tradesman and \$250 for a part-time tradesman. An apprentice fee is 48% of a part-time tradesman's fee.

How much does it cost the company if there are 137 full-time tradesmen, 22 part-time tradesmen and 27 apprentices?

- (A) \$65 849  
(B) \$68 109  
(C) \$71 349  
(D) \$74 589

# 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.

### Question 11 (1 mark)

Identify a machine that can be used to produce cylindrical pieces from mild steel. **1**

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### Question 12 (3 marks)

Describe the safety precautions that need to be taken while MIG welding. **3**

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**Question 13** (3 marks)

In what ways does cutting fluid improve the machining of mild steel?

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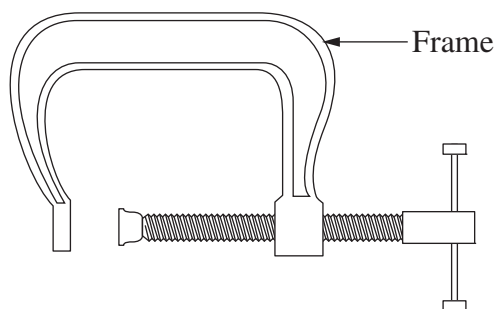
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**Question 14** (3 marks)

Outline the process that would be used to cast the frame of the tool shown.

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**Question 15** (5 marks)

Describe different methods that are used to treat the surface of mild steel to improve its corrosion resistance.

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# Industrial Technology Metal and Engineering Technologies

## Section III

**15 marks**

**Attempt Question 16**

**Allow about 35 minutes for this section**

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

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

- (a) Describe the impact of government legislation on work practices. **6**
- (b) Evaluate the effect of new and emerging technologies on work practices in industry. **9**

**End of paper**

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