



B O A R D O F S T U D I E S
NEW SOUTH WALES

2012

**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 5–8

15 marks

- Attempt Questions 11–14
- Allow about 35 minutes for this section

Section III Page 9

15 marks

- Attempt Question 15
- 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.

- 1** What tool is used to mark fold lines on sheet metal?

 - (A) Bradawl
 - (B) Safety knife
 - (C) Marking knife
 - (D) Engineer's scribe

- 2** What is the process of *drawing down* steel?

 - (A) Marking out steel for cutting
 - (B) Increasing the cross-section of steel
 - (C) Making steel into a smaller or thinner section
 - (D) Sketching a steel project on paper before manufacture

- 3** When referring to steel, what does the abbreviation SHS stand for?

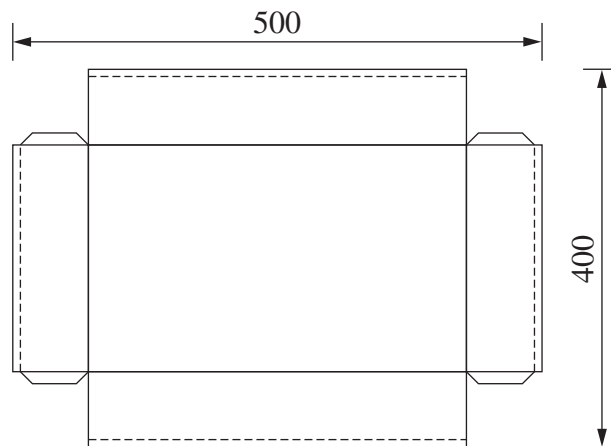
 - (A) Solid hard section
 - (B) Square hollow steel
 - (C) Super hardened steel
 - (D) Square hollow section

- 4** What is *pickling*?

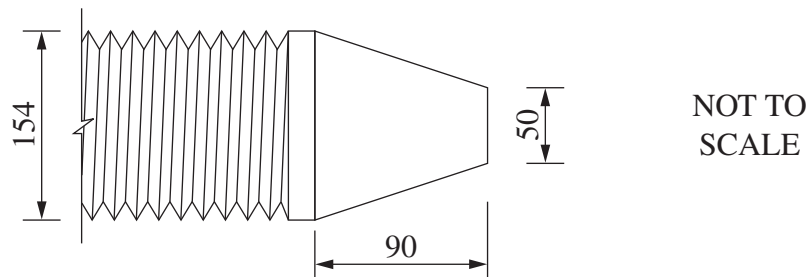
 - (A) The application of a protective finish
 - (B) The removal of scale in a chemical bath
 - (C) The heating and quenching of a metal in a water solution
 - (D) The treatment of metal in an oil solution to preserve the surface

- 5 Which part of the metal lathe transfers power from the gears to the carriage?
- (A) The drive shaft
 - (B) The headstock
 - (C) The lead screw
 - (D) The worm drive
- 6 What is *planishing*?
- (A) The creation of a panned shape
 - (B) Shaping and smoothing sheet metal
 - (C) Creating the curved shape over a stake
 - (D) Expanding the end of a tube on a conical stake
- 7 What is a pan brake used for?
- (A) To fold sheet metal
 - (B) To hold sheet metal
 - (C) To cut ferrous sheet metal
 - (D) To break the grain of sheet metal
- 8 Other than grinding goggles, what items of PPE are needed when cutting a piece of 3 mm steel plate using a 100 mm angle grinder with a cut-off disc?
- (A) Apron, gloves, face shield
 - (B) Apron, ear muffs, face shield
 - (C) Leather shoes, gloves, ear muffs
 - (D) Leather shoes, apron, ear muffs

- 9 What is the minimum number of 1200 mm × 900 mm sheets required to manufacture 20 of the tool trays shown below?



- (A) 6
 (B) 5
 (C) 4
 (D) 3
- 10 The object shown is to be produced on the lathe.



At which of the following angles will the compound slide need to be set, in order to produce the taper?

- (A) 15°
 (B) 30°
 (C) 60°
 (D) 75°

Industrial Technology Metal and Engineering Technologies

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Centre Number

Section II

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Student Number

15 marks

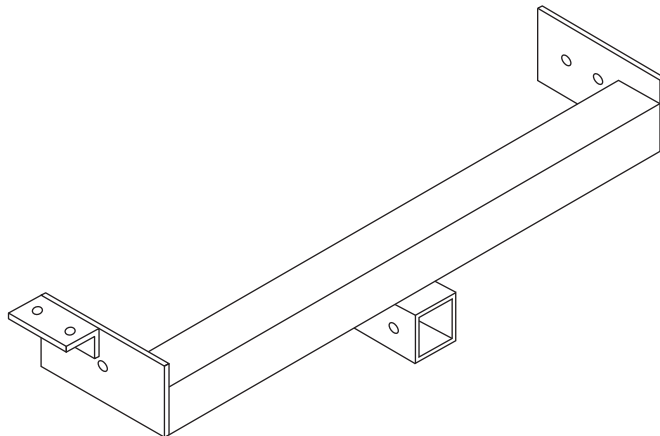
Attempt Questions 11–14

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 (5 marks)

A diagram of a tow bar is shown.



- (a) Identify steel sections that could be used to manufacture the tow bar. 2

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- (b) Describe how the tow bar could be mass-produced. 3

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Question 12 (3 marks)

Describe the process of producing aluminium.

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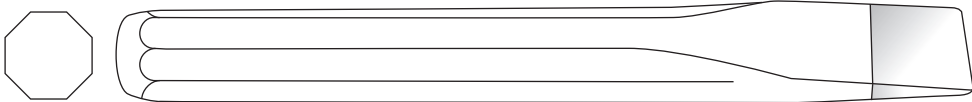
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Question 13 (3 marks)

Describe how the cold chisel shown could be manufactured.

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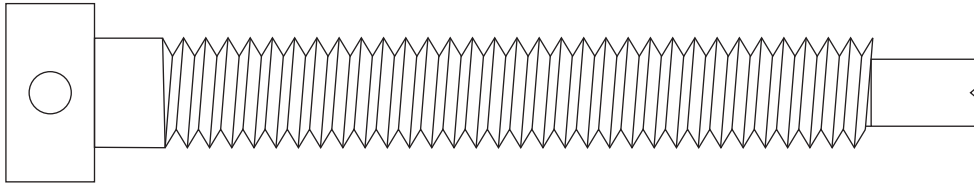
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Question 14 (4 marks)

A spindle from a G clamp is shown. Describe how it could be manufactured.

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Industrial Technology
Metal and Engineering Technologies

Section III

15 marks

Attempt Question 15

Allow about 35 minutes for this section

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

Question 15 (15 marks)

A company is considering expanding its operations to take advantage of new and emerging web-based technologies.

- (a) Describe a range of web-based technologies the company could use to market and sell its goods and/or services. **5**
- (b) Describe the possible impact on both the work practices and the organisation of the company if web-based technologies were implemented. **10**

End of paper

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