



STUDENT NUMBER

CENTRE NUMBER

**HIGHER SCHOOL CERTIFICATE EXAMINATION**

**1996**

# **INDUSTRY STUDIES**

**2 UNIT**

**METAL AND ENGINEERING STRAND**

## **SECTION II**

*(30 Marks)*

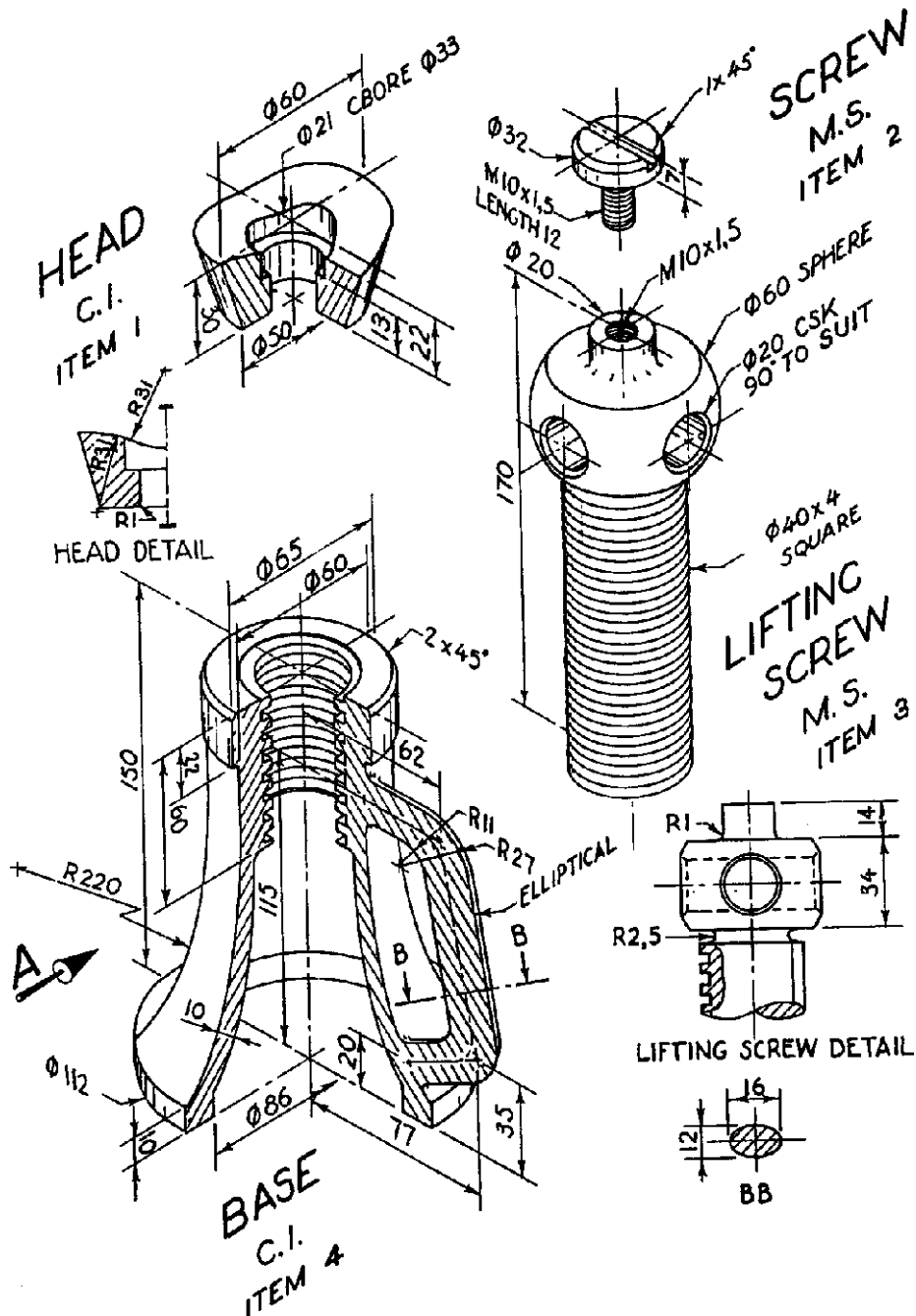
*Total time allowed for Sections I and II—One hour and a half  
(Plus 5 minutes' reading time)*

### **DIRECTIONS TO CANDIDATES**

- Write your Student Number and Centre Number at the top right-hand corner of this page and page 9.
- Questions 1 and 2 are COMPULSORY.
- Attempt ONE question from Questions 3, 4, and 5.
- Answer the questions in the spaces provided in this paper.
- Board-approved calculators may be used.

**QUESTION 1.** This question is COMPULSORY. (10 marks)

## BOTTLE JACK



'Programmed Technical Drawing' Bk3, Mullins & Cooper, Longman Cheshire '83 p184. Courtesy Addison Wesley Longman Australia. ([www.awl.com.au](http://www.awl.com.au))

FIG. 1

## QUESTION 1. (Continued)

- (a) Refer to the drawing of the bottle jack shown in Figure 1 on page 2 and answer the following questions.

- (i) State the type of drawing shown in Figure 1.

.....

- (ii) The bottle jack is made up of four component parts. Name the parts.

<i>Item number</i>	<i>Item name</i>
1	
2	
3	
4	

- (iii) Under the item names in Figure 1 are *either* the initials MS *or* CI. What do these abbreviations represent?

MS .....

CI .....

- (iv) Determine the sizes of the components of the bottle jack.

1. Overall height of the base .....
2. Largest diameter of the head .....
3. Largest internal diameter of the base .....
4. Diameter of the counterbore in the head .....
5. Diameter of threaded section of the lifting screw .....
6. Diameter of the unthreaded holes in the lifting screw .....
7. Minimum height of the assembled bottle jack .....

- (v) For the thread on the screw, item 2, state:

1. diameter .....
2. pitch .....
3. length .....

- (vi) Why is the handle on the base sectioned at BB?

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**Question 1 continues on page 4**

## QUESTION 1. (Continued)

- (vii) 1. Name the other type of section used on the base.

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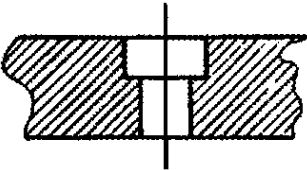
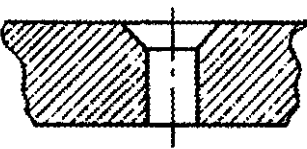
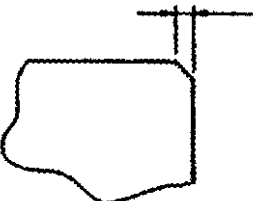
2. You are allowed to use this type of section when the base is viewed from A.  
Explain why this is allowable.

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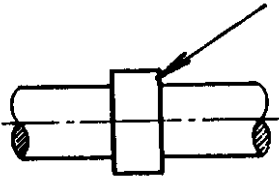
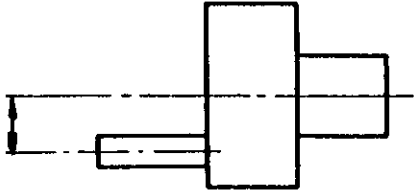


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- (b) Complete the table below. Give the correct technical term for each of the symbols.

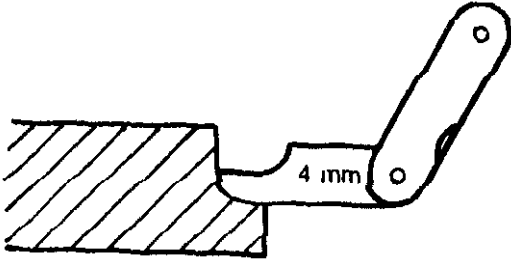
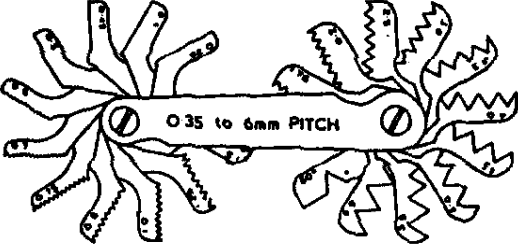
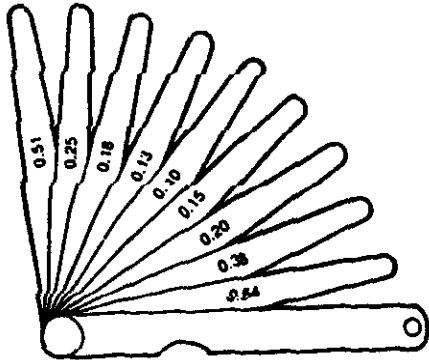
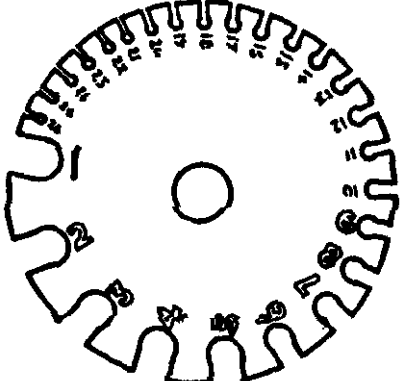
<i>Conventional representation</i>	<i>Technical name</i>
	
	
	

## QUESTION 1. (Continued)

<i>Conventional representation</i>	<i>Technical name</i>
	
	
	
	

**QUESTION 2.** This question is COMPULSORY. (8 marks)

(a) State the use of each of the gauges shown below.

<i>Item</i>	<i>Use</i>
	Gauge 1 ..... ..... .....
	Gauge 2 ..... ..... .....
	Gauge 3 ..... ..... .....
	Gauge 4 ..... ..... .....

## QUESTION 2. (Continued)

- (b) The gasket shown in Figure 2 is to be made from a piece of aluminium sheet,  $120 \times 50 \times 1$ .

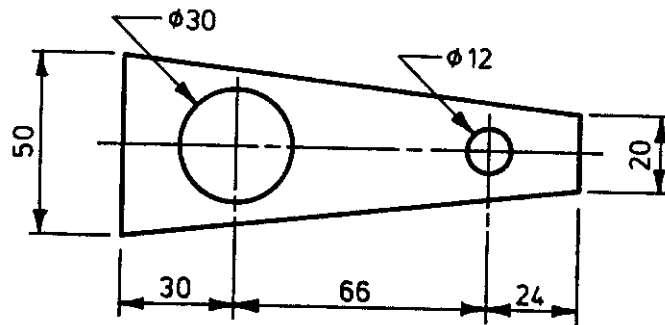


FIG. 2

- (i) The handtools available for marking out the gasket are blue stain, engineer's square, scribe, centre punch, dividers, rule, ball-pein hammer.

Using this equipment, list the appropriate steps in marking out the gasket.

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.....

- (ii) The hand and machine tools available to make this component include straight snips, finishing files, hole saw set, twist drill set, bench drill, machine vice, clamping bolts, timber packing, and cutting fluid.

Using this equipment, list the appropriate steps in making the gasket.

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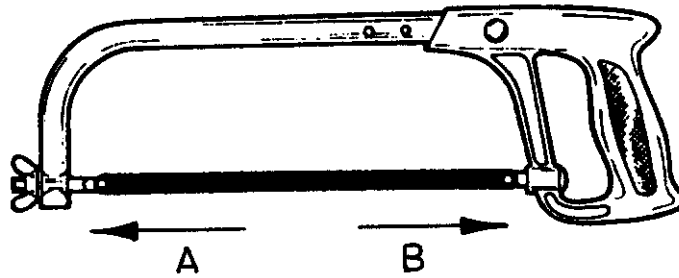
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**Question 2 continues on page 8**

## QUESTION 2. (Continued)

- (c) A hacksaw is shown in Figure 3. Circle the arrow that shows the correct direction the teeth should face on the blade of the hacksaw.



NBB 07 Hand and Power Tools (student workbook), TAFE 1991, p35. Courtesy Manufacturing and Engineering ESC, NSW TAFE Commission.

FIG. 3

- (d) Coarse and fine-pitched hacksaw blades are available. State which blade is most suited to cut Ø30 aluminium and state a reason for this selection.

Blade pitch .....

Reason .....

.....

.....

- (e) Name a portable power tool that may be used to cut a 100 × 100 square hole in sheet aluminium.

.....

- (f) For each of the following tools, state a possible cause of danger that may result from poor maintenance.

Files .....

Chisels .....

Hammers .....

Hacksaw .....



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**QUESTIONS 3, 4, and 5.**

Attempt ONE question from Questions 3, 4, and 5.

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**Please turn over**

Attempt ONE question from Questions 3, 4, and 5.

*EITHER*

**QUESTION 3.** (12 marks)

Details of a spanner are shown in Figure 4 below. Using the starting-point A (as shown below), make an accurate full-size drawing of the spanner. Use correct geometrical construction to locate all centres and limiting points.

NOTE. Construction lines are NOT TO BE ERASED.

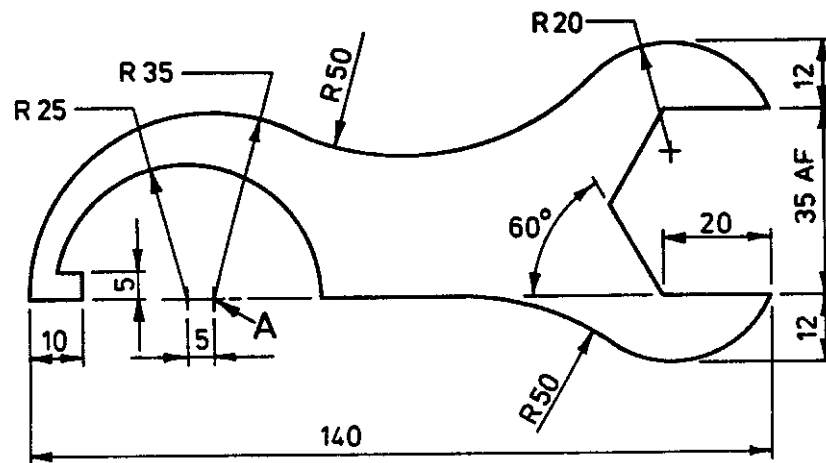


FIG. 4

+

A

*OR*

**QUESTION 4.** (12 marks)

Details of a cast-iron guide are given in Figure 5.

- (a) Draw the top and front views only of the guide. Your drawings are to be half full-size, freehand and in third-angle orthogonal projection.

NOTE. The front view is to be seen in the direction of arrow A.  
The centre lines of the  $\varnothing 50$  hole have been given.

- (b) Show all hidden detail.
- (c) Using correct dimensioning technique, show the:

- diameter 50 hole;
- radius 11;
- distance between centres of the slot;
- maximum height.

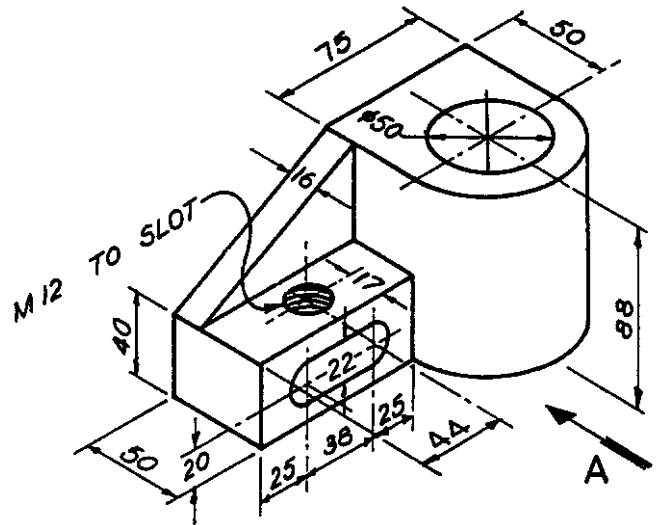
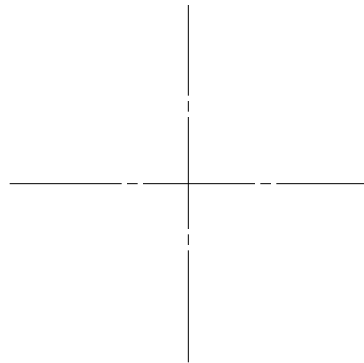


FIG. 5



OR

Please turn over

**QUESTION 5.** (12 marks)

The top and front views of an adjustable bracket are shown in Figure 6.

In the space provided below, draw a full-size, freehand, isometric sketch of the bracket when viewed from the direction indicated by the arrow.

The starting-point for the bottom corner is given below.

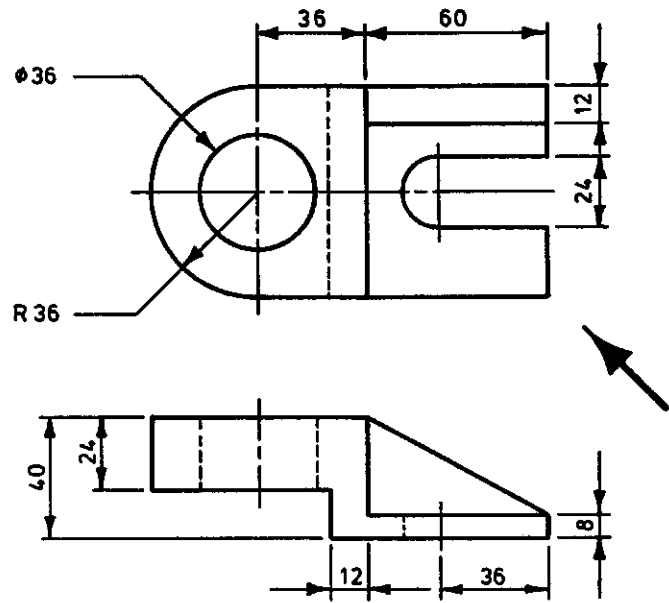


FIG. 6

'Technical Drawing', Boundy and Hass, McGraw Hill 3rd edn, 1993, p127 #4.31.

Start sketch here →