

**STUDENT NUMBER**

**CENTRE NUMBER**

**HIGHER SCHOOL CERTIFICATE EXAMINATION**

**2000**

# **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 13.
- Questions 1 and 2 are **COMPULSORY**.
- Attempt **ONE** question **ONLY** from Questions 3, 4 and 5.
- Answer the questions in the spaces provided in this paper.
- Board-approved calculators may be used.



QUESTION 1 (Continued)

(a) Refer to the drawing of the jeweller's vice shown in Figure 1 on the previous page.

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

.....

(ii) Name the metal used for the jaw.

.....

(iii) Determine the sizes of the following features:

- 1 Thickness of the plate .....
- 2 Maximum diameter of the countersinks in the plate .....
- 3 Overall length of the vice screw .....
- 4 Smallest diameter of the vice screw .....
- 5 The spherical end of the vice screw .....

(iv) Explain the notation on the M10 × 1.5 thread.

- M .....
- 10 .....
- 1.5 .....

(v) Explain the dimension 13 A/F on the head of the vice screw.

.....

(vi) How many items make up the assembled vice?

.....

(vii) What is the purpose of the Ø4 'step' on the end of the vice screw?

.....

(viii) Why are countersunk head machine screws used instead of hexagonal head bolts in the assembly of this jeweller's vice?

.....

(ix) What diameter drill would be used to allow the screw thread to be cut into the yoke?

.....

(x) What is the radius of the curved recess in the jaw?

.....

(xi) How could the handle be held in place in the head of the vice screw?

.....

QUESTION 1 (Continued)

(b) List, in order of use, the THREE taps used to cut a M4 thread in a blind hole.

Tap 1 .....

Tap 2 .....

Tap 3 .....

(c) Each diagram on pages 4 and 5 shows an engineering tool.

(i)

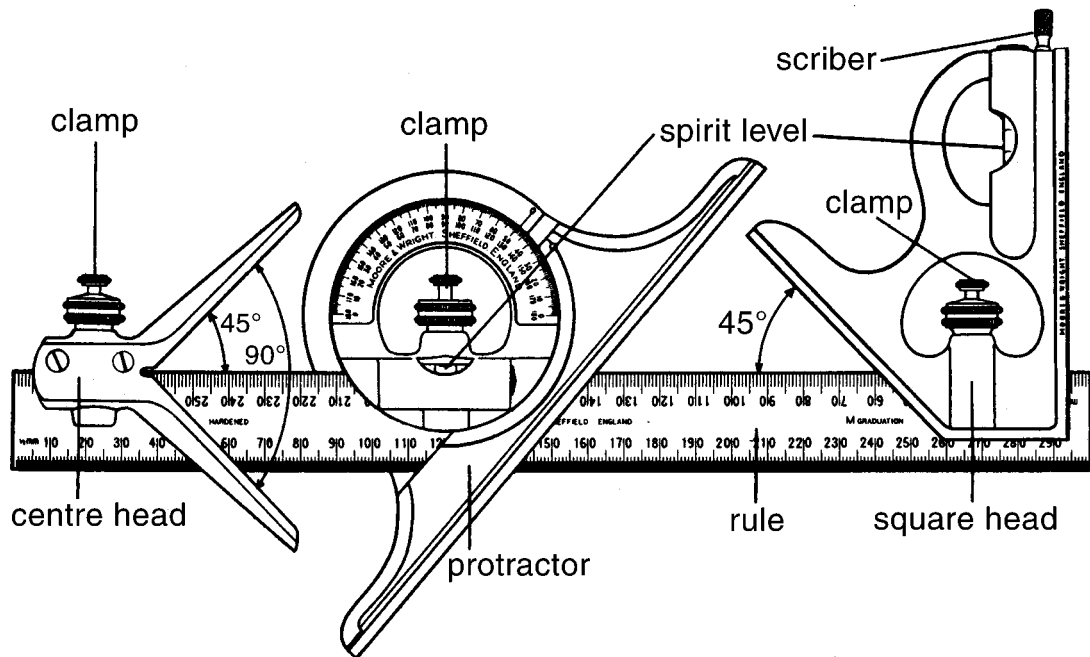


FIG. 2

1 Name this tool.

.....

2 State THREE uses of this tool.

Use 1 .....

Use 2 .....

Use 3 .....

QUESTION 1 (Continued)

(ii)

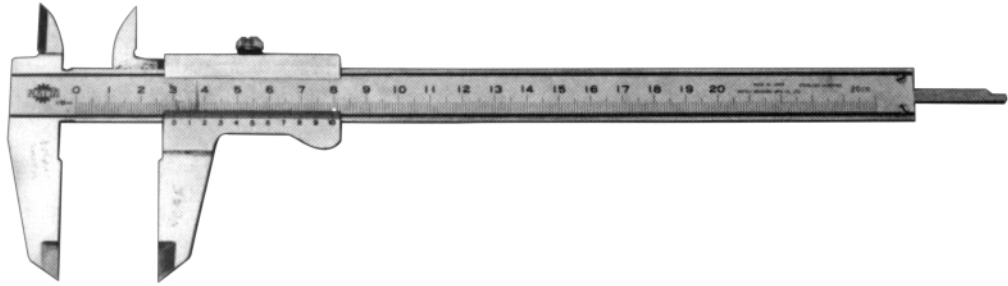


FIG. 3

1 Name this tool .

.....

2 State THREE uses of this tool.

Use 1 .....

Use 2 .....

Use 3 .....

(iii)

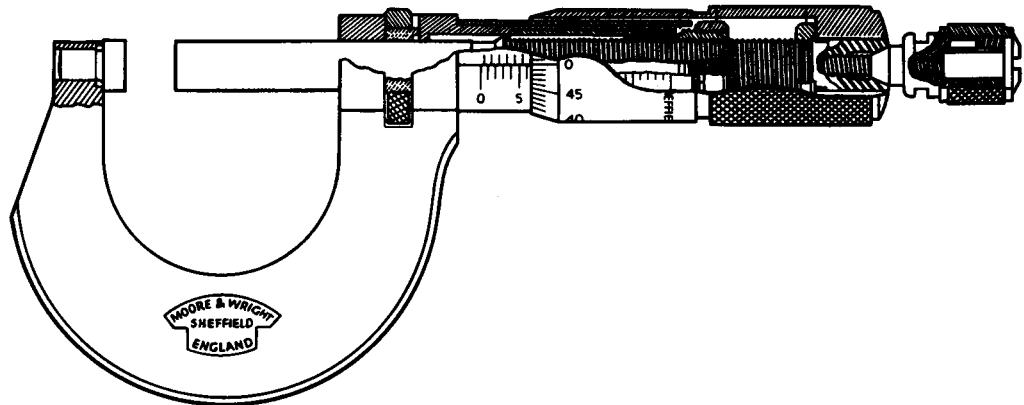


FIG. 4

1 Name this tool.

.....

2 Determine the reading on the scale shown.

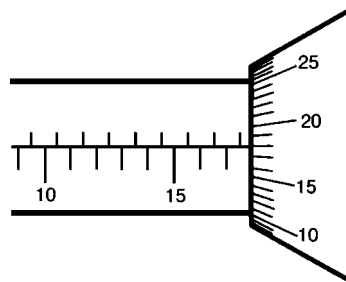


FIG. 5

Reading ..... mm

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

(a) Figure 6 shows detailed drawings of a jeweller's vice.

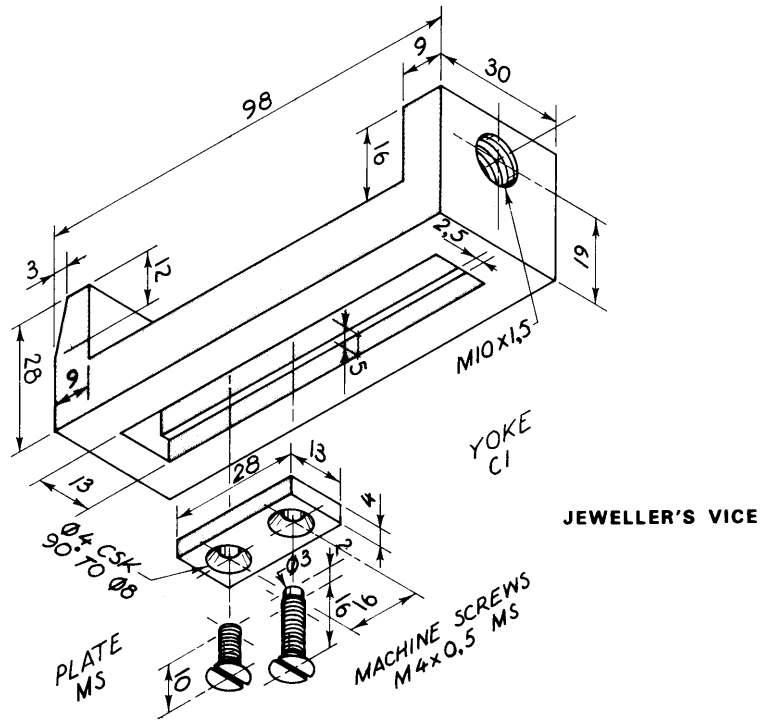


FIG. 6

(i) Give the overall dimensions of the yoke.

.....

(ii) State the tool(s) required and procedure to be followed to mark out and cut the M10 × 1.5 threaded hole in the yoke.

Tool(s) .....

.....

Procedure .....

.....

.....

.....

.....

.....

.....



QUESTION 2 (Continued)

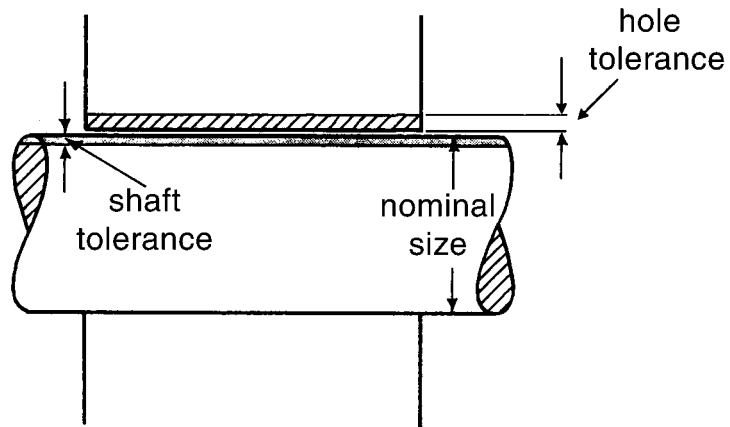
(b) (i) State THREE personal safety items that should be worn in a workshop.

- 1 .....
- 2 .....
- 3 .....

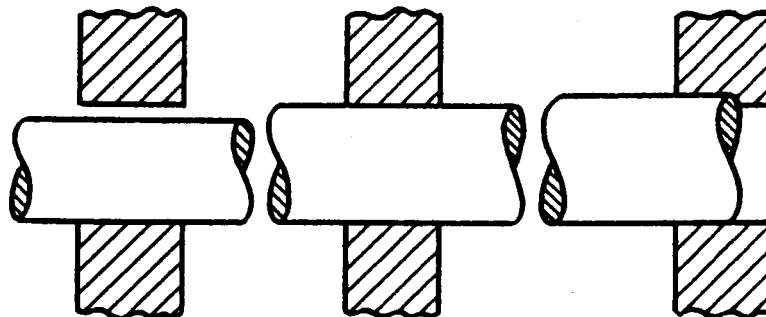
(ii) State TWO safety inspections to be carried out on handtools.

- 1 .....
- 2 .....

(c) Complete the names of the 'types of fits' shown in Figure 7.



*A shaft and hole showing tolerances*



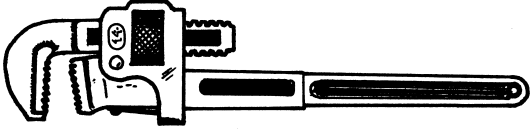
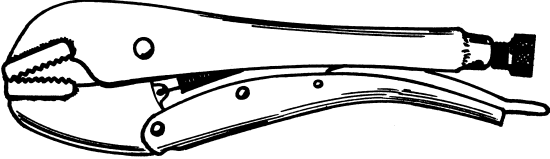
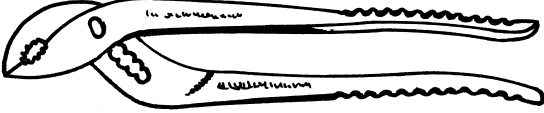
(i) ..... Transition (ii) .....

FIG. 7

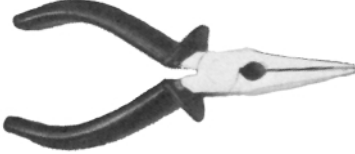




QUESTION 2 (Continued)

(d) Identify the types of wrench shown.

<i>Wrench</i>	<i>Name</i>
	<p>.....</p>
	<p>.....</p>
	<p>.....</p>

(e) Identify the types of pliers shown.

<i>Pliers</i>	<i>Name</i>
	<p>.....</p>
	<p>.....</p>
	<p>.....</p>

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

EITHER

**QUESTION 3 (12 marks)**

Details of an actuator arm are given in Figure 8.

(a) Draw below, in third angle projection:

- (i) a top view of the arm;
- (ii) a front view of the arm;

when viewed from the arrow.

NOTE: The drawing is to be freehand.

Scale: full size

Centre lines for the  $\varnothing 12$  hole are given.

Show hidden detail of only the  $\varnothing 20$  bore.

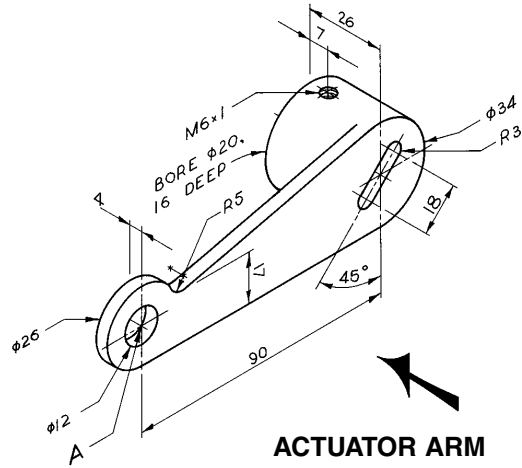
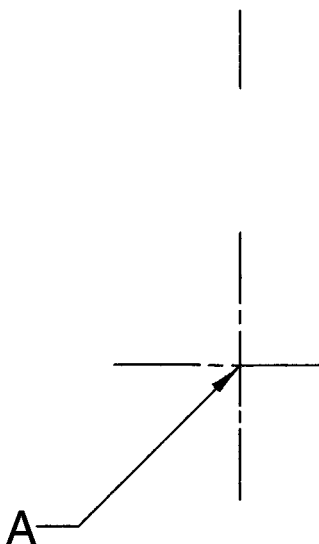


FIG. 8

(b) Using correct dimensioning techniques, show:

- a radius of 5 mm;
- the  $\varnothing 12$  hole;
- the 90 mm between centres.



OR

Please turn over

**QUESTION 4** (12 marks)

The top and front views of a bracket are shown in Figure 9.

On the next page, draw a full size, freehand, isometric sketch of the bracket when viewed from the direction indicated by the arrow in Figure 9.

Corner A is given as a starting point for the drawing.

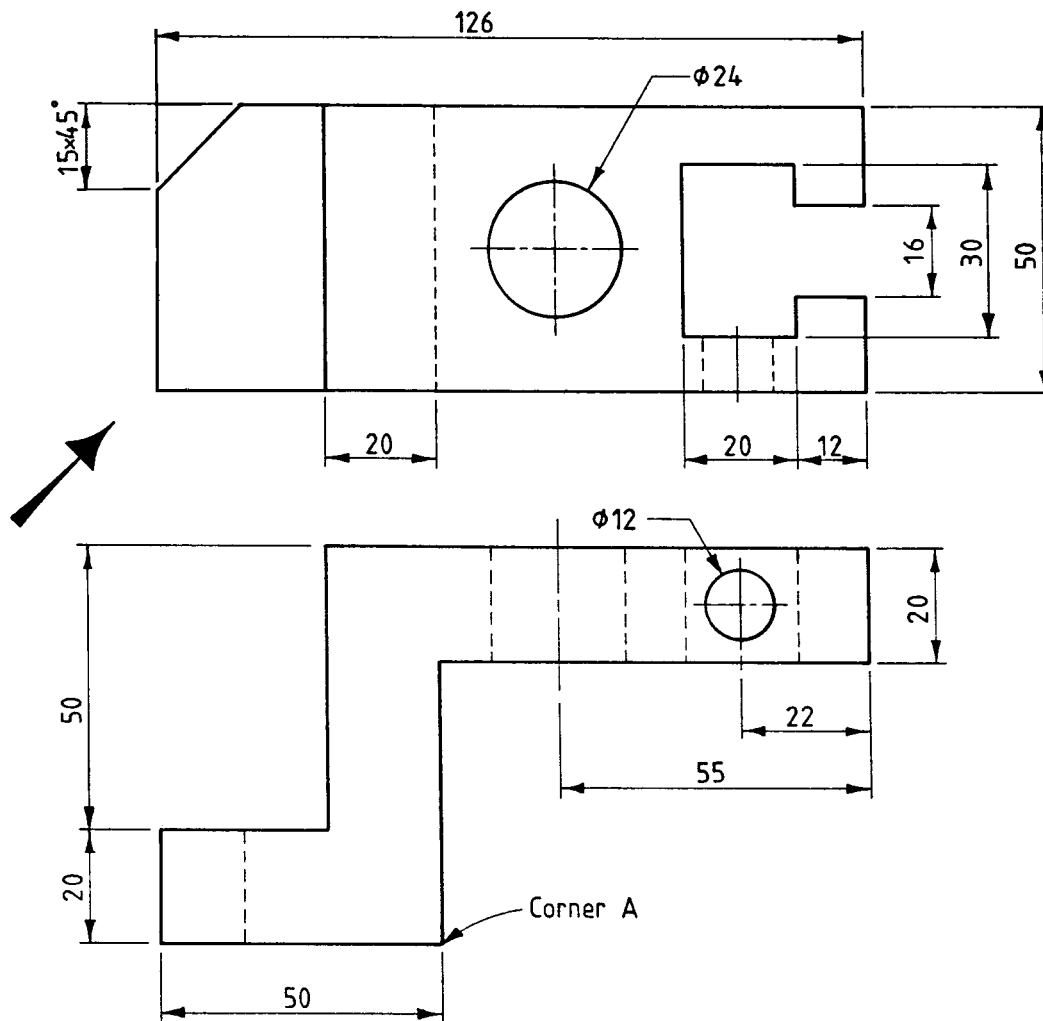


FIG. 9



OR

**Please turn over**

**QUESTION 5** (12 marks)

Details of a base plate are shown in Figure 10.

Using the centre lines given for centre **A**, make an accurate full-size drawing of the base plate.

Use **correct geometrical construction** to locate all centres, tangency and limiting points.

NOTE: Construction lines are  
NOT to be erased.

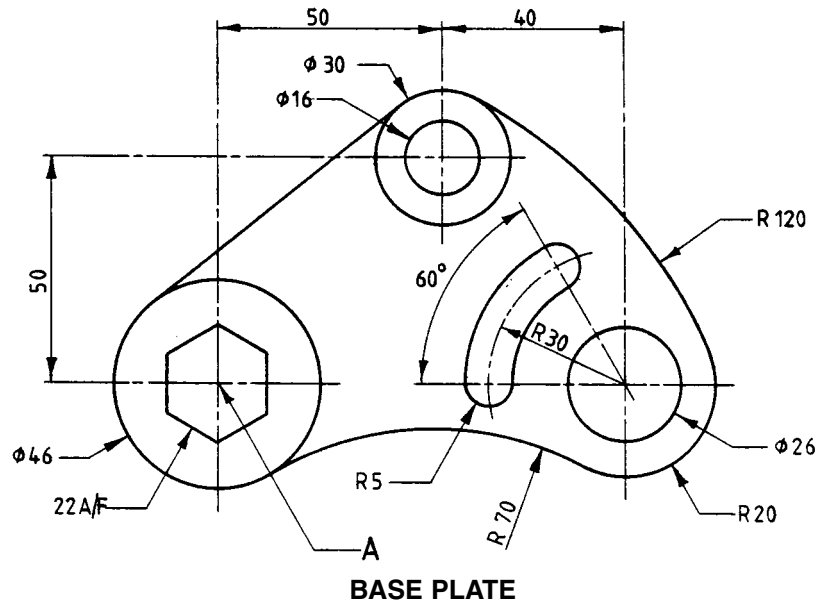
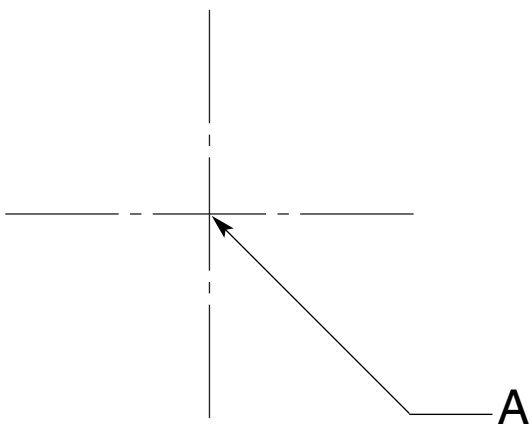


FIG. 10



**End of paper**