BOARD OF STUDIES
NEW SOUTH WALES

STUDENT NUMBER

CENTRE NUMBER

HIGHER SCHOOL CERTIFICATE EXAMINATION

1998

INDUSTRY STUDIES

2 UNIT

METAL AND ENGINEERING STRAND SECTION II

(30 Marks)

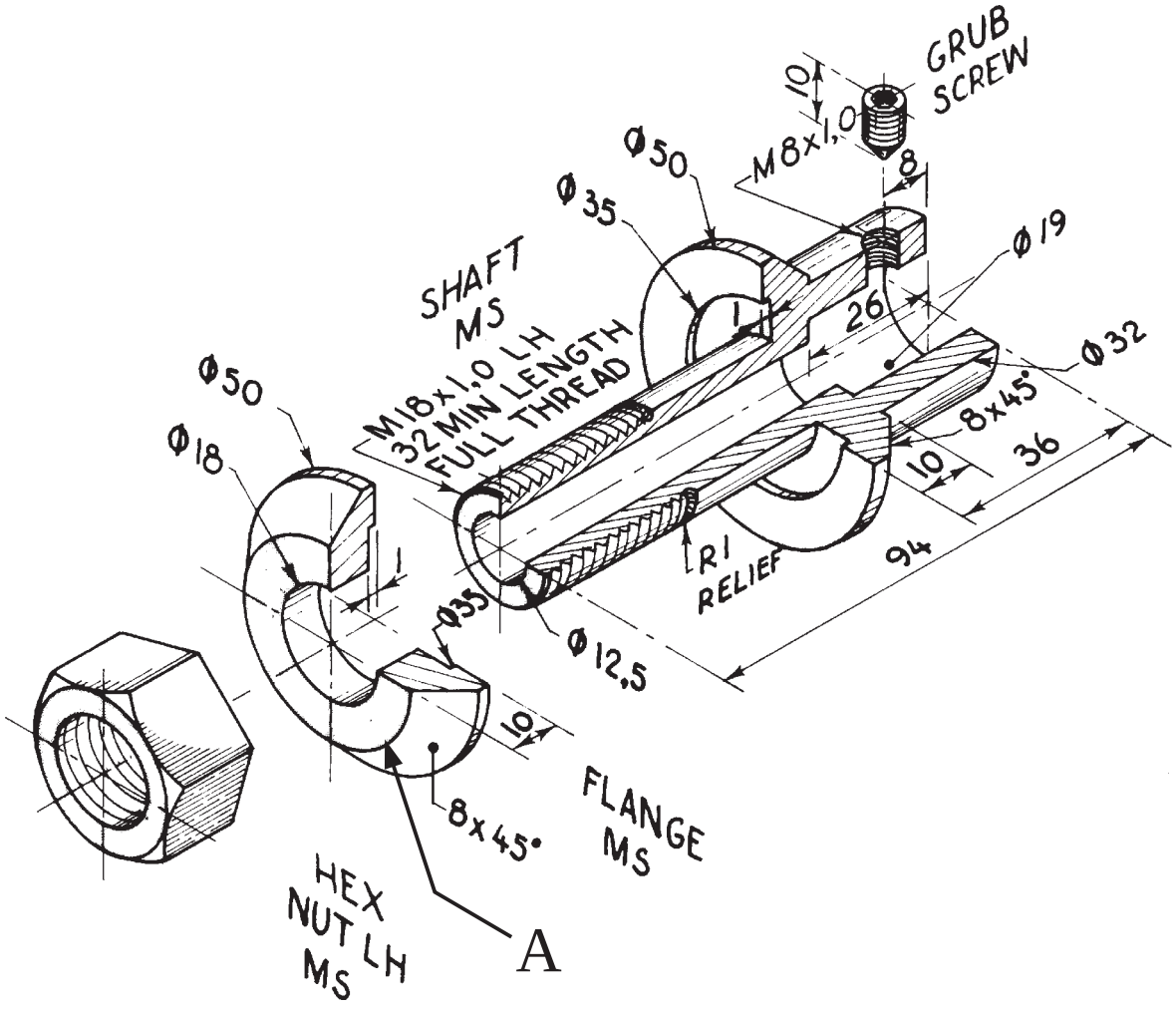
Total time allowed for Sections I and II—One hour and a half
(Plus 5 minutes reading time)

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)

BUFFING ARBOR



Programmed and Technical Drawing Book 3, Mullins and Cooper, Addison Wesley Longman Australia Pty Ltd

FIG. 1

QUESTION 1. (Continued)

(a) Refer to the drawing of the buffing arbor shown in Figure 1 on the previous page.

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

.....

(ii) State the type of section used on the flange and the shaft.

.....

(iii) Determine the sizes of the following features.

1. Diameter of drill used to produce the hole through the flange .....
2. Overall length of the grub screw .....
3. Minor diameter of the grub screw .....
4. Counterbore in the end of the shaft: depth .....
   diameter .....
5. Chamfer on the flange .....
6. Length of the ∅32 section of the shaft .....
7. Diameter indicated as A .....

(iv) State why there are no detailed dimensions given for the hexagonal nut.

.....

(v) State what the initials 'LH' mean when referring to the M18 × 1,0 thread.

.....

(vi) Name the material used for the flange.

.....

(vii) State a tool used to tightly assemble the following:

1. hexagonal nut .....
2. grub screw .....

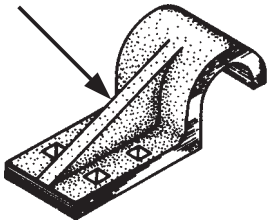
Question 1 continues on page 4

QUESTION 1. (Continued)

(b) Each diagram below shows an engineering feature.

(i) Name EACH feature.

(ii) Briefly state the function of EACH feature.



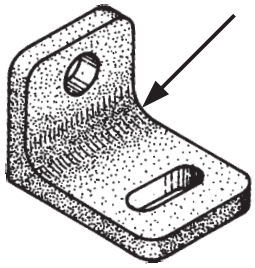
Name .....

Function .....

.....

.....

FIG. 2



Name .....

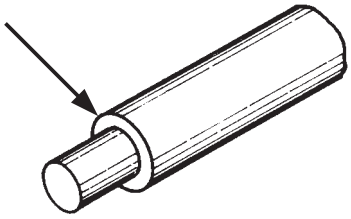
Function .....

.....

.....

FIG. 3

ook 2,
ngman



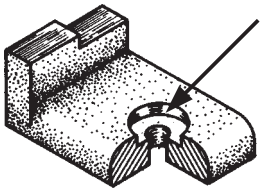
Name .....

Function .....

.....

.....

FIG. 4



Name .....

Function .....

.....

.....

FIG. 5

QUESTION 1. (Continued)

(c) Determine the reading on the vernier scale illustrated below.

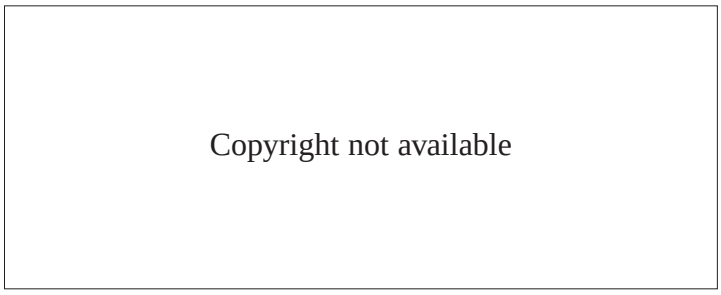


FIG. 6

Reading ..... mm

(d) Name the most appropriate tool or gauge for measuring the features listed below.

Feature/dimension	*Tool/gauge*
5 m length of steel rod	
Pitch of a screw thread	
Diameter of a ∅3·5 rod	
Internal radius	
0·3 mm gap	
200 mm length	

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

(a) Figure 7 below shows a detailed drawing of a false jaw.

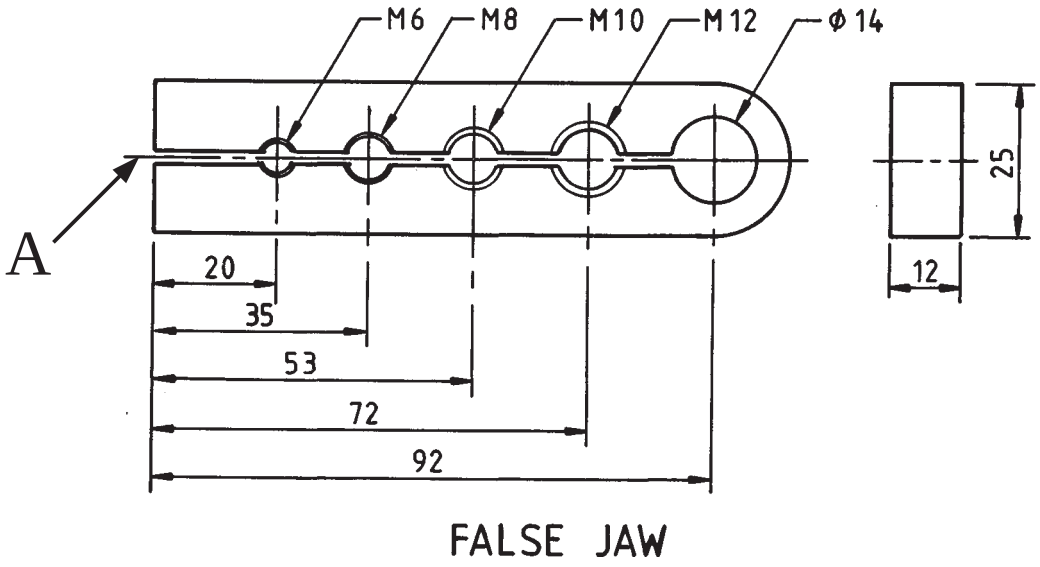


FIG. 7

(i) Give the minimum dimensions of the mild steel required to make this item.

.....

(ii) State the tool(s) required and procedure to be followed to accurately mark the centre line indicated as A.

Tool(s) .....

Procedure .....

.....

.....

(iii) Explain why many dimensions are given from the left-hand end.

.....

.....

QUESTION 2. (Continued)

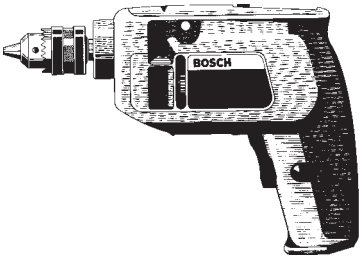
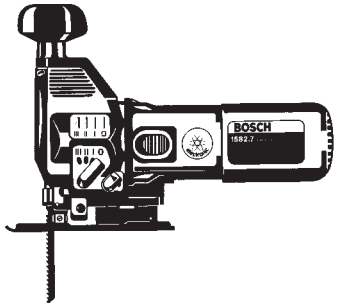
(iv) Outline a procedure that could be followed to mark out and produce the M12 threaded hole. Name the tool(s) required for EACH step.

Procedure	*Tool(s) required*

Question 2 continues on page 8

QUESTION 2. (Continued)

(b) Complete the table below by naming the portable power tools pictured. Suggest ONE common application for EACH tool.

Portable power tools	*Name*	*Application*
 *Bosch Power Tool Manual*		
 *Bosch Power Tool Manual*		
 *Makita Trade Catalogue*		

(c) State THREE safety precautions that must be observed when using portable power tools.

(i) .....

(ii) .....

(iii) .....

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Please turn over

Attempt ONE question from Questions 3, 4 and 5.

EITHER

QUESTION 3. (12 marks)

Details of a spacer are shown in Figure 8. Using the centre lines given below for centre A, make an accurate drawing of the spacer. Use correct geometrical construction to locate all centres and limiting points.

NOTE. Construction lines are NOT TO BE ERASED.

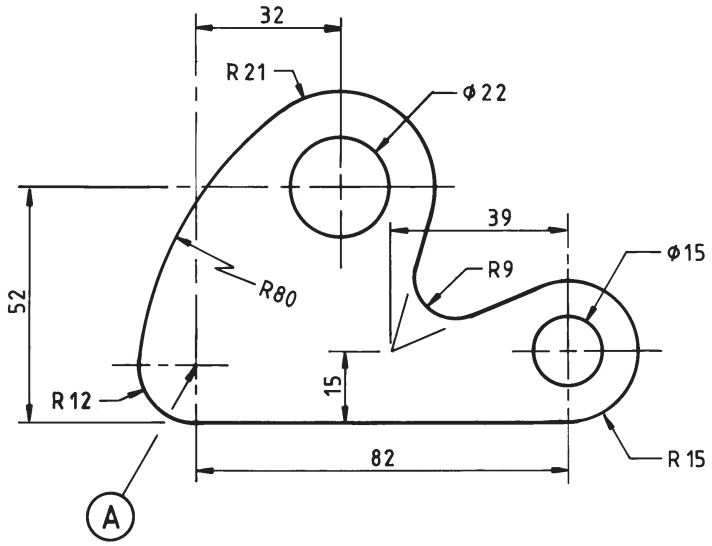
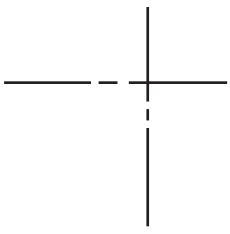


FIG. 8

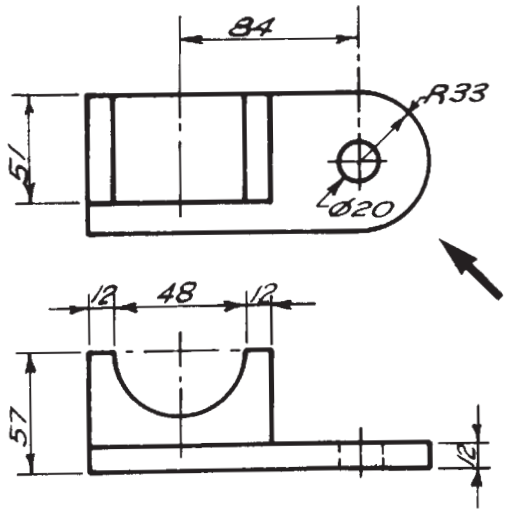


OR

QUESTION 4. (12 marks)

The top and front views of a support bracket are shown in Figure 9. In the space below, draw a full-size, freehand, isometric sketch of the bracket when viewed from the direction indicated by the arrow.

The centre of the top of the ∅20 hole is given below.



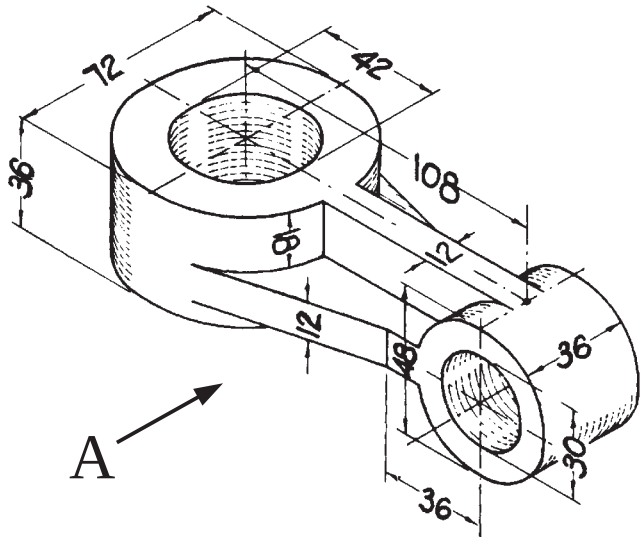
Fitness and Taylor, Descriptive Geometry and Drawing, Bk 2, Jacaranda, 1979, P71 – reprinted with permission of Jacaranda Wiley Austalia Ltd

FIG. 9

OR

QUESTION 5. (12 marks)

Details of a toggle arm are given in Figure 10.



Fitness and Taylor, Descriptive Geometry and Drawing, Bk 2, Jacaranda, 1979, p 71 – reprinted with permission of Jacaranda Wiley Ltd

FIG. 10

(a) Draw on page 13:

(i) a front view of the toggle arm, and

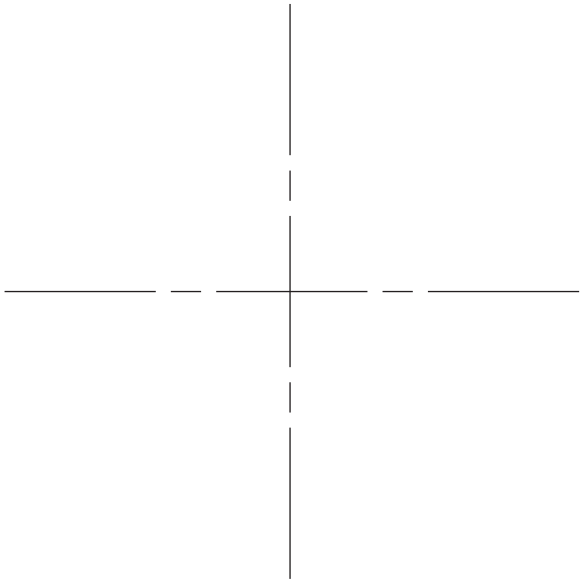
(ii) a top view of the toggle arm

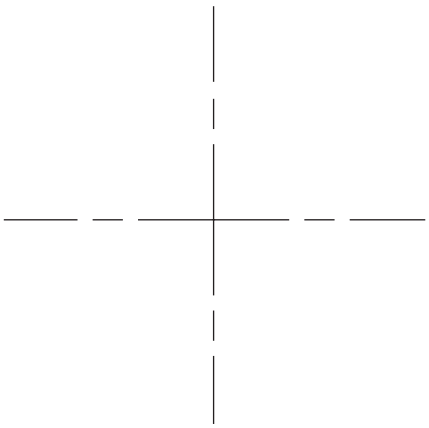
when the front view of the toggle arm is viewed from A.

NOTE. The drawing is to be freehand.
Scale is full-size.
The centre lines for the ∅30 hole in the front view are given.
The centre lines for the ∅42 hole in the top view are given.
Hidden detail lines are required.

(b) Using correct dimensioning techniques, show:

- diameter 42 hole;
- 108 mm centre distance;
- thickness of a web.





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