

4.5 METAL WORK (445)

4.5.1 Metal Work Paper 1 (445/1)

SECTION A (40 marks)

Answer all the questions in this section.

- 1 (a) State **four** causes of accidents when using a cold chisel. (2 marks)
- (b) State the minimum entry requirement for each of the following courses:
- (i) artisan;
 - (ii) diploma;
 - (iii) craft. (1 ½ marks)
- 2 (a) Outline the procedure of reading a micrometer. (2 marks)
- (b) State **four** uses of a scribing block. (2 marks)
- 3 (a) Use sketches to show the length of each of the following rivets:
- (i) countersunk head;
 - (ii) round head;
 - (iii) raised countersunk. (3 marks)
- (b) Use labelled sketches to show **two** uses of a template. (3 marks)
- 4 Name a suitable material and state the property that makes it appropriate for making each of the following:
- (a) twist drill bit;
 - (b) rivet;
 - (c) head of ball peen hammer;
 - (d) kitchen knife blade. (4 marks)
- 5 (a) With reference to filing explain:
- (i) the term pinning;
 - (ii) how pinning is prevented;
 - (iii) how pinning is treated. (3 marks)
- (b) (i) Use a labelled sketch to show the safe edge of a file. (2 marks)
- (ii) State the function of the safe edge of a file.
- 6 (a) State **two** advantages of a leg vice over engineer's vice. (2 marks)
- (b) Outline the procedure of locating the centre of a round bar using the centre head and the rule of a combination set. (2 marks)
- 7 (a) State **two** forms in which filler metal for brazing is manufactured. (1 mark)
- (b) Give **one** reason for manufacturing filler metals in different forms. (1 mark)

- 8 (a) Explain the term welding. (1 mark)
- (b) State **two** advantages of rightward welding over leftward welding. (2 marks)
- 9 Describe the process of oil blacking as applied to metal finishing. (3 marks)
- 10 Figure 1 shows an oblique drawing of a block.

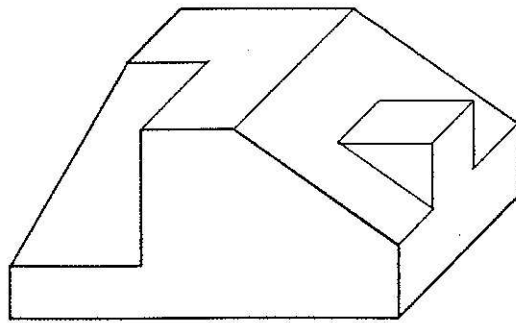


Figure 1

Sketch in third angle projection the three orthographic views of the block. (5 ½ marks)

SECTION B (60 marks)

*Answer question 11 and any other **three** questions from this section.
Candidates are advised to spend not more than 25 minutes on question 11.*

- 11 Figure 2 shows orthographic views of a machined block drawn in third angle projection.

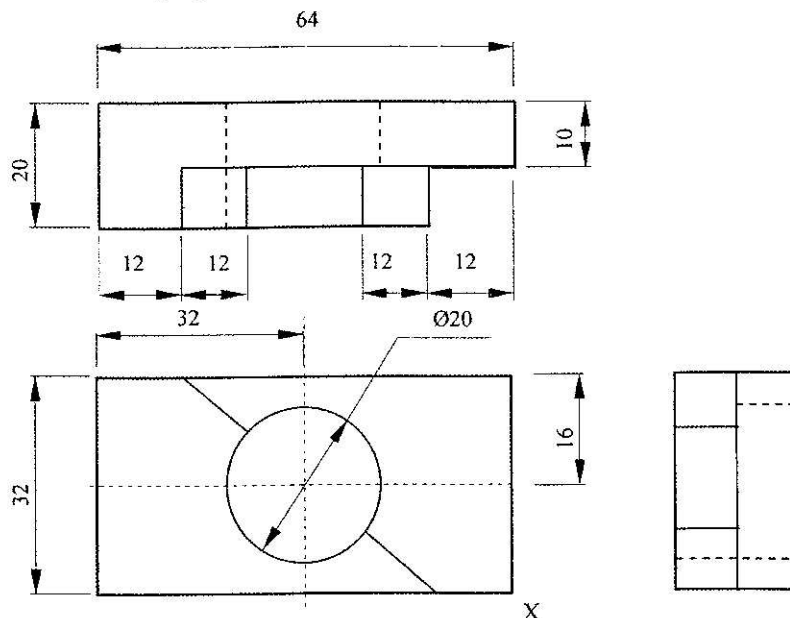


Figure 2

On the grid paper provided, draw the isometric view of the block taking X as the lowest point. Show **three** leading dimensions. (15 marks)

- 12 (a) Figure 3 shows a link to be made of 6 mm thick mild steel. Outline the procedure of making the link naming all the tools required in each step. (6 marks)

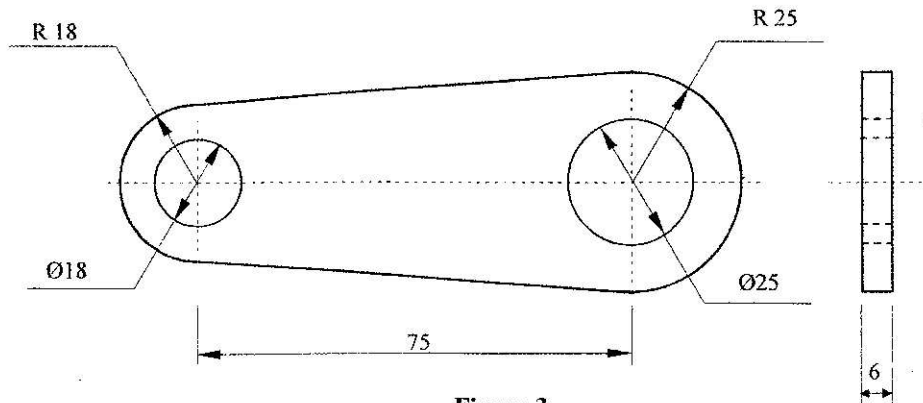


Figure 3

- (b) (i) Sketch a pop rivet and label its parts.
(ii) List **three** steps involved in preparing work pieces for pop riveting.
(iii) With the aid of sketches, outline the procedure of pop riveting. (9 marks)
- 13 (a) Sketch an anvil and label three parts. (3 ½ marks)
- (b) Figure 4 shows a portion of an arm bar made from a 6.0 mm square mild steel rod.

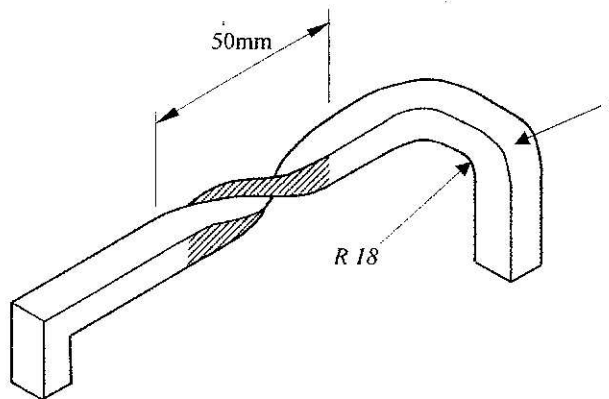


Figure 4

- (i) Determine the length of the material required to form the bend labelled *l*.
(ii) With the aid of sketches, outline the procedure of making the arm bar. (11 ½ marks)
- 14 (a) Use sketches to show the difference between a lap joint and a flush lap joint. (2 marks)
- (b) Outline the procedure of sweating as applied to soft soldering and name all the tools and materials required in each step. (8 marks)
- (c) Give **four** safety precautions to be observed when soldering. (2 marks)
- (d) State **three** reasons why copper is preferred in making head of a soldering iron. (3 marks)

- 15** (a) Sketch a gas welding torch and:
- (i) label **five** parts;
 - (ii) state **three** precautions to be observed when handling it. (7½ marks)
- (b) (i) Use labelled sketches to show the three types of gas welding flames.
- (ii) Explain how each of the flames is obtained. (7½ marks)