

29.16 METALWORK (445)

29.16.1 Metalwork Paper 1 (445/1)

445/1
METALWORK
Paper 1
Oct./Nov. 2008
2¹/₂ hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL
Kenya Certificate of Secondary Education
METALWORK
Paper 1
THEORY
2¹/₂ hours

Instructions to candidates

Candidates should have the following materials for this examination:

Answer booklet
Drawing instruments
Drawing paper size A3.

This paper has TWO sections: A and B.

Answer ALL the questions in section A. Answer question 11 and any other THREE questions from section B.

All dimensions are in millimetres unless otherwise stated.

This paper consists of 7 printed pages.

Candidates should check the question paper to ensure that all the pages are printed as indicated and no questions are missing.

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SECTION A (40 marks)

Answer all the questions in this section.

- 1** (a) State **four** reasons for wearing protective clothing when grinding metal. (2 marks)
- (b) Differentiate between public and private sectors as applied to the manufacturing industry. (2 marks)
- 2** (a) State **three** ways of classifying files. (1½ marks)
- (b) State **two** uses of each of the following tools:
- (i) cross cut chisel;
- (ii) half-round file. (2 marks)
- 3** (a) State **four** uses of trammel in sheet metal work. (2 marks)
- (b) Sketch and name the most suitable hand tool for cutting internal curves in tin plate. (1½ marks)
- 4** Differentiate between physical and mechanical properties of metal and give **two** examples of each property. (4 marks)
- 5** (a) Explain the following faults as applied to gas welding:
- (i) backfire;
- (ii) flashback. (2 marks)
- (b) State **two** causes of each of the faults in (a) above. (2 marks)
- 6** Use labelled sketches to show **three** uses of vernier calipers. (4½ marks)
- 7** With the aid of labelled sketches, outline the steps of punching a hole in a metal bar on an anvil. (3 marks)
- 8** (a) State **four** differences between soft soldering and brazing. (2 marks)
- (b) Describe **three** methods of strengthening an edge of sheet metal. (3 marks)
- 9** (a) State **two** advantages of pop-riveting over snap-head riveting. (2 marks)
- (b) State **three** reasons for finishing metal surfaces. (1½ marks)

- 10 Figure 1 shows two orthographic views of a machined block drawn in first angle projection.

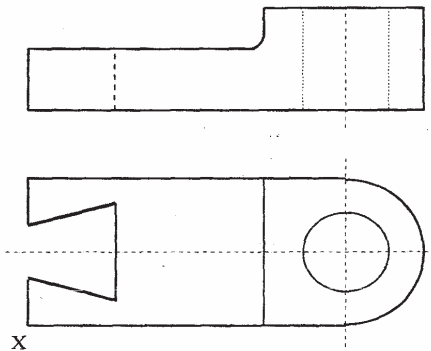


Figure 1

Sketch the isometric view of the block taking X as the lowest point.

(5 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 two views of a machined block drawn in first angle projection. Draw full size in third angle projection:

- (a) a section view along the cutting plane A-A.
(b) a section view along the cutting plane B-B.

(15 marks)

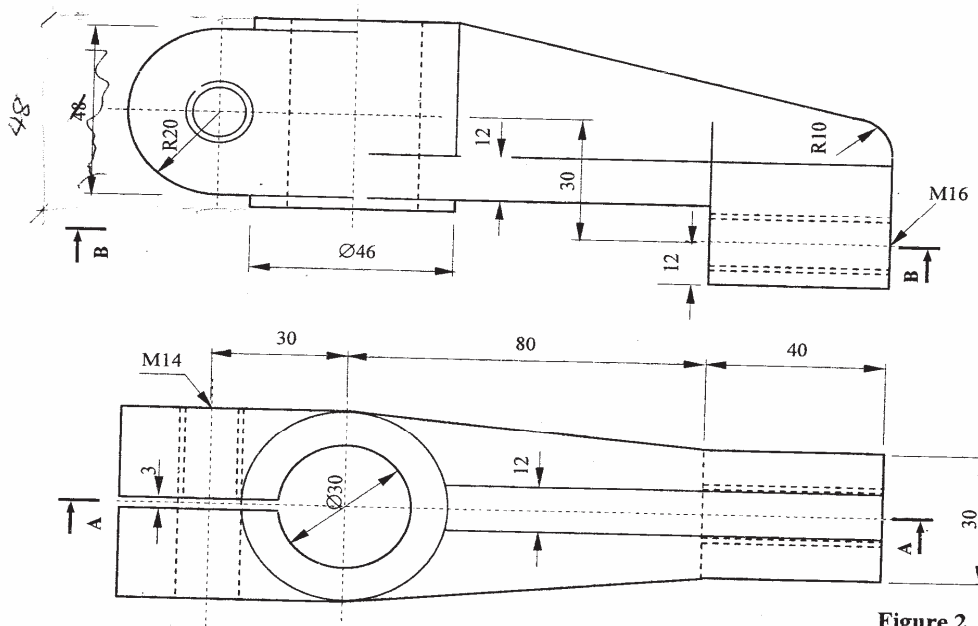
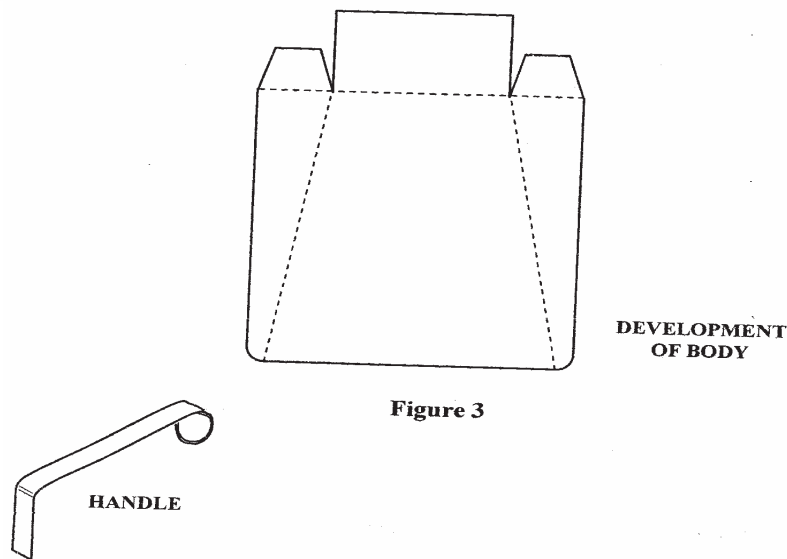


Figure 2

12 Figure 3 shows a scoop handle and the development of the body.



- (a) Sketch a pictorial view of the folded body with the handle brazed to the body. (5 marks)
- (b) Outline the procedure of:
- (i) folding the scoop body;
 - (ii) making the handle;
 - (iii) brazing the handle to the body. (10 marks)
- 13 (a) Name the most suitable metals for making each of the following items and state **two** reasons for each choice:
- (i) soldering wire;
 - (ii) surface plate;
 - (iii) twist drill. (4½ marks)
- (b) Illustrate each of the following forms of metal supply and state **two** applications of each form:
- (i) zed bar;
 - (ii) angle bar;
 - (iii) square pipe. (4½ marks)
- (c) Describe each of the following metal finishing processes:
- (i) bluing;
 - (ii) lacquering;
 - (iii) planishing. (6 marks)

14 Figure 4 shows a single cover riveted butt joint.

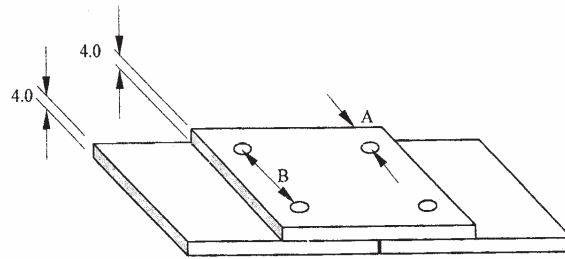


Figure 4

(a) Using the information given in the diagram, determine:

- (i) the rivet shank diameter;
- (ii) shank length for a snap-head rivet;
- (iii) edge distance A;
- (iv) pitch distance B.

(6¹/₂ marks)

(b) State **three** factors to consider when selecting the type of rivet head used.

(1¹/₂ marks)

(c) Outline the procedure of riveting the joint using snap-head rivets.

(7 marks)

15 (a) State **three** differences between cold and hot forging.

(3 marks)

(b) Figure 5 shows a chain support eye to be made from a 6 mm silver steel rod.

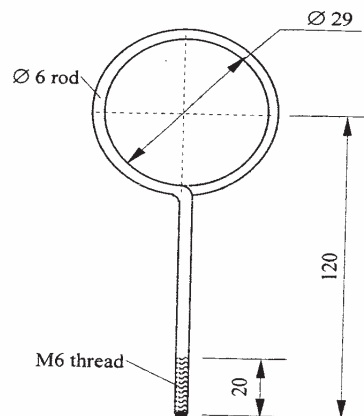


Figure 5

- (i) Determine the total length of the rod
- (ii) Outline the procedure of forming the eye
- (iii) Outline the procedure of cutting the threads.

(12 marks)