

Name.....Adm No.....Stream.....

METALWORK

School.....

445/2

PAPER 2

FORM 4

JULY 2024

2½ hours

NYAHOKAKIRA CLUSTER TWO 2024

Kenya Certificate of Secondary Education

2½ hours

Instructions to Candidates

- (a) Write your name, admission number and class in the spaces provided above.
- (b) Students should have the following for this examination;
Drawing instruments;
Scientific calculator;
Drawing paper.
- (c) This paper consists of **two** sections: **A** and **B**.
- (d) Answer **all** the questions in section **A** in the spaces provided.
- (e) Answer **question 11** on drawing paper and any other **three** questions from section **B** in the spaces provided.
- (f) All dimensions in millimeters unless otherwise stated.
- (g) This paper comprises of **15** printed pages.
- (h) Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.
- (i) Candidates should answer the questions in English.

For Examiners use only

| Section | Question | Maximum Score | Candidate's Score |
|-------------|----------|---------------|-------------------|
| A | 1 - 10 | 40 | |
| B | 11 | 15 | |
| | 12 | 15 | |
| | 13 | 15 | |
| | 14 | 15 | |
| | 15 | 15 | |
| Total Score | | | |

SECTION A (40 marks)

Answer **ALL** questions in this section in the spaces provided.

1. (a) Name **ONE** solvent commonly used in paints. **(1mark)**

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- (b) State **TWO** causes of burns in a workshop. **(1mark)**

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2. (a) List **FOUR** uses of steel rule. **(2marks)**

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- (b) (i) Use a sketch to show how strength of a butt joint can be increased when brazing.

(2marks)

- (ii) State **TWO** uses of a dot punch. **(1mark)**

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3. (a) State **FOUR** safety precautions to be observed when using sheet metal. **(2marks)**

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(b) Using a good sketch, show how an odd-leg calipers is set for a given measurement.

(2marks)

4. (a) State the rivet material which could be used to rivet a pan handle made of aluminium and state the reason for your choice **(1mark)**

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(b) State **TWO** effects of each of the following alloying elements on iron; **(3marks)**

(i) Chromium

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(ii) Manganese

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(iii) Nickel

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5. (a) Define the term **'upsetting'** as used in forging. **(1mark)**

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(b) State **TWO** reasons for twisting metal bars. **(2marks)**

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6. (a) Explain each of the following terms as used in forging: **(3marks)**

I. Piping

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II. Necking

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III. Hardie

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(b) State **THREE** types of cold chisel and give **one** use for each case. **(3marks)**

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7. (a) State the;

I. Effect of prolonged heating in brazing **(1mark)**

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II. Reason for concentrating heat on the thicker piece of metal when brazing two metals. **(1mark)**

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(b) With reference to arc welding;

I. Define the term 'tack welding' **(1mark)**

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II. State the use of tacks **(1mark)**

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8. With the aid of labeled sketches, distinguish between turning and facing in lathe work.

(3marks)

9. State **FOUR** safety precautions to be observed in a metal workshop. **(2marks)**

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10. (a) State **THREE** specifications of a hacksaw blade. **(1½marks)**

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(b) Name **THREE** types of cold chisels and give one use of each. **(3marks)**

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(c) List **FIVE** operations that can be performed on a drilling machine. **(2½marks)**

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SECTION B (60 marks)

Answer **question 11** on **A3** paper and any other **three questions** from this section in the spaces provided. Candidates are advised to spend not more than **25 minutes** on this **question 11**.

11. **Figure 1** shows a block draw in First angle projection. Draw in **full size** the isometric projection of the block. (15marks)

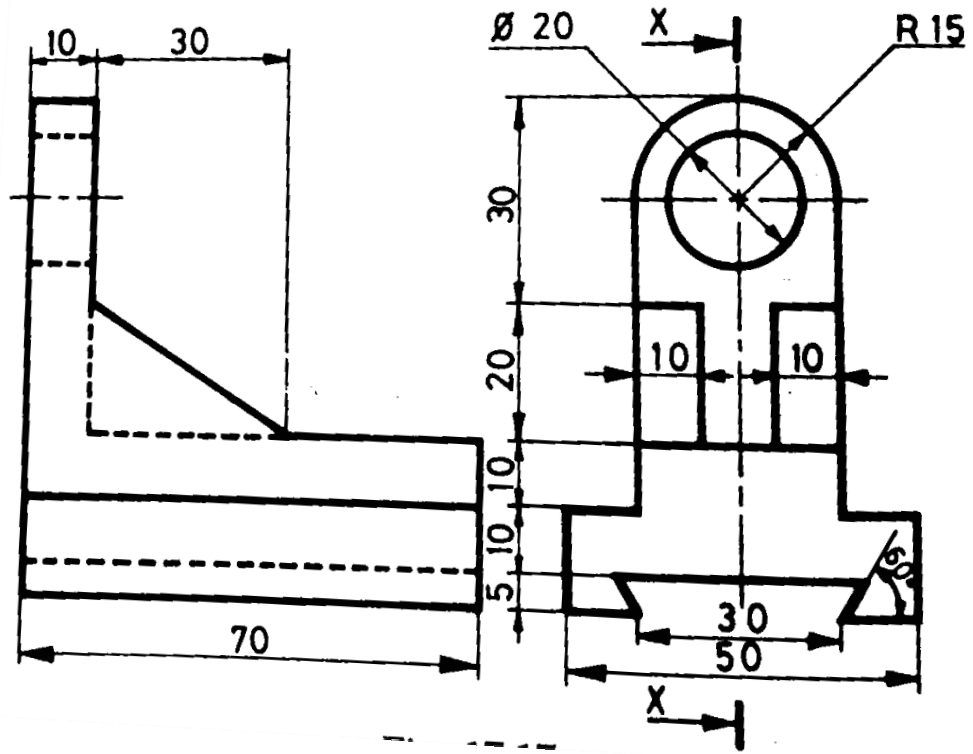


Figure 1

12. (a) With the aid of sketches, explain the procedure of drilling a hole on a centre lathe.

(10marks)

(b) State and sketch **TWO** methods of producing a short taper on a lathe machine.

(5marks)

13. (a) **Figure 2** shows a drawing of a bench drilling machine.

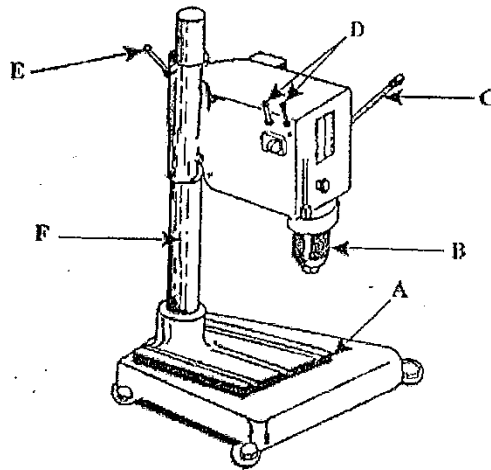


Figure 2

a) Name the parts labeled **A, B, C, D, E, and F** and state one function of each. **(6marks)**

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b) Outline **three** safety precautions to observe when using the machine. **(3marks)**

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c) Explain the relationship between the following; **(6marks)**

i. Speed and feed

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ii. Speed and drill bit diameter

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iii. Feed and material

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14. (a) With the aid of sketches, describe each of the following methods of arc welding.

(8marks)

i. leftward welding

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ii. rightward welding

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(b) Give **THREE** common methods used in each of the following weld tests: **(3marks)**

i. Non-destructive

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ii. destructive

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(c) State **FOUR** advantages of using rightward welding method. **(4marks)**

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15. (a) With the aid of sketches, describe each of the following welding defects:

i. Lack of fusion

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ii. Porosity

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iii. Poor penetration

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iv. Undercut

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(b) Explain **TWO** possible causes of each of the defects in 13(a). **(4marks)**

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(c) State the effects of the defects in each case.

(4marks)

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(d) State **ONE** general and common cause of welding defects.

(1mark)

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