

2506/105
2507/105
WORKSHOP TECHNOLOGY AND
LIFE SKILLS
Oct./Nov. 2022
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL
DIPLOMA IN AERONAUTICAL ENGINEERING
(AIRFRAMES AND ENGINES OPTION)
(AVIONICS OPTION)

MODULE I

WORKSHOP TECHNOLOGY AND LIFE SKILLS

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

Mathematical tables;

Non-programmable scientific calculator;

Answer booklet.

This paper consists of EIGHT questions in TWO sections; A and B.

Answer question ONE (COMPULSORY) and any other TWO questions from section A.

Answer TWO questions from section B.

All questions carry equal marks.

Maximum marks for each part of a question are as shown.

Candidates should answer the questions in English.

This paper consists of 4 printed pages.

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

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SECTION A: WORKSHOP TECHNOLOGY

Answer question ONE (Compulsory) and any other TWO questions from this section.

1. (a) List **two** safety precautions that should be observed in a mechanical workshop. (2 marks)
- (b) (i) Outline **two** uses of a vernier calliper.
(ii) Sketch a vernier calliper with an accuracy of 0.02 mm, reading 26.24 mm. (4 marks)
- (c) (i) Highlight the procedure for installing a hacksaw blade.
(ii) With the aid of a sketch, explain the use of fullers in hand forming. (11 marks)
- (d) Outline **one** use of each of the following foundry tools:
(i) hatchet stake;
(ii) funnel stake;
(iii) creasing iron. (3 marks)
2. (a) (i) Explain 'limits of size' with regard to limits and fits.
(ii) A hole and shaft combination is given as:
- $$\text{hole } 40 \pm \begin{matrix} 0.046 \\ 0.000 \end{matrix}$$
- $$\text{shaft } 40 \begin{matrix} - 0.010 \\ - 0.029 \end{matrix}$$
- Determine the allowance and hence the type of fit. (7 marks)
- (b) With the aid of sketches, describe the ultrasonic method of flaw detection. (10 marks)
- (c) Outline **three** reasons for edge treatment on sheet metal components. (3 marks)

3. (a) List **three** functions of cutting fluids. (3 marks)
- (b) (i) Illustrate plain turning on a lathe machine.
- (ii) Outline **two** advantages and **two** disadvantages of using four jaw chuck of a lathe machine. (7 marks)
- (c) Illustrate each of following milling techniques:
- (i) up cut;
- (ii) down cut. (5 marks)
- (d) With the aid of a sketch, describe straddle milling. (5 marks)
4. (a) With the aid of a sketch, describe the Metal Inert Gas (MIG) welding process. (7 marks)
- (b) Explain each of the following metal finishing processes:
- (i) bluing;
- (ii) polishing. (6 marks)
- (c) Describe the process of carburization of steel components. (7 marks)
5. (a) Explain the mechanism of electrochemical corrosion. (4 marks)
- (b) Explain each of the following corrosion protection methods:
- (i) cathodic protection;
- (ii) galvanization. (6 marks)
- (c) Describe the procedure for setting the neutral flame in Oxy-acetylene gas welding. (4 marks)
- (d) Describe each of the following heat treatment processes:
- (i) annealing;
- (ii) tempering. (6 marks)

SECTION B: LIFE SKILLS

Answer any TWO questions from this section.

6. (a) Individuals are often advised to strive to discover their strengths. Outline **four** benefits that may be derived from such discovery. (4 marks)
- (b) Explain **three** measures that the management of an organization may take to minimize the chances of employees being subjected to unnecessary stress. (6 marks)
- (c) Certain feelings make such people to engage in risky behaviour. List **six** such feelings. (3 marks)
- (d) Hermann wishes to make a decision on a certain issue. Highlight the steps that he should follow to enhance the effectiveness of the decision. (7 marks)
7. (a) Outline **four** factors that may promote negotiation between two parties. (4 marks)
- (b) Highlight **four** ways in which one may demonstrate empathy to a person who is hospitalized. (4 marks)
- (c) Explain **three** reasons that make it necessary for the youth to manage their time effectively. (6 marks)
- (d) Explain **three** strategies that a person may adopt to promote self acceptance. (6 marks)
8. (a) Distinguish between active leisure and passive leisure, citing **two** examples of activities in each case. (6 marks)
- (b) Outline **four** ways in which an individual may exhibit living positively with Human Immuno-Deficiency Virus (H.I.V). (4 marks)
- (c) Explain **five** indicators of gender discrimination at the work place. (10 marks)

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