

2506/307

**AIRFRAME SYSTEMS II AND
AIRFIELD SAFETY III**

Oct./Nov. 2021

Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

**DIPLOMA IN AERONAUTICAL ENGINEERING
(AIRFRAMES AND ENGINES OPTION)**

MODULE III

AIRFRAME SYSTEMS II AND AIRFIELD SAFETY III

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

Answer booklet;

Drawing instruments.

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

*Answer **THREE** questions from section **A** and **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 3 printed pages.

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

SECTION A: AIRFRAME SYSTEMS II

Answer **THREE** questions from this section.

1. (a) State **four** methods of preventing or controlling ice formation on an aircraft. (2 marks)
- (b) With reference to wing deicer system trouble shooting, highlight the causes and the respective corrective actions for each of the following failures:
 - (i) slow boot inflation; (6 marks)
 - (ii) system will not cycle. (2 marks)
- (c) With reference to aircraft fuel system;
 - (i) explain each of the **three** types of aircraft fuel tanks; (3 marks)
 - (ii) with the aid of a labelled cross-sectional sketch, describe the operation of a four-way poppet valve. (7 marks)
2. (a) Highlight the requirements for overheat and fire protection systems. (10 marks)
- (b) With the aid of a labelled schematic sketch, show a typical toilet water and waste system for an aircraft with two front toilets. (10 marks)
3. (a) With the aid of a labelled sketch, explain the basic operation of fly-by-wire control system. (17 marks)
- (b) Outline **three** disadvantages of fly-by-wire control system. (3 marks)
4. (a) Describe each of the following basic auto pilot unit elements:
 - (i) sensing;
 - (ii) computing. (10 marks)
- (b) With reference to aircraft structural repair:
 - (i) show a typical wire locking for three bolts in a row; (3 marks)
 - (ii) highlight the general rules followed when using the safety wire method of safetying. (7 marks)

5. (a) With the aid of labelled sketches, describe the adjustment of the spray pattern during aircraft painting. (12 marks)
- (b) With reference to aircraft equipment and furnishing, highlight the inspection and servicing procedure of a life raft. (8 marks)

SECTION B: AIRFIELD SAFETY PROCEDURES III

Answer TWO questions from this section.

6. (a) With reference to aircraft accident investigations, explain the information found in the 'factual information' section of a final report. (20 marks)
7. (a) With reference to airworthiness regulations:
- (i) explain the reasons for issue of a special flight permit; (6 marks)
- (ii) Outline **four** categories for issue of certificate of airworthiness. (4 marks)
- (b) With reference to aircraft maintenance and inspection regulations:
- (i) highlight the requirements for persons approved to authorize an aircraft return to service; (4 marks)
- (ii) discuss the best practices during maintenance. (6 marks)
8. (a) With reference to search and rescue:
- (i) describe the manoeuvres by an aircraft to indicate the assistance of the surface aircraft to which the signal is directed is no longer required; (3 marks)
- (ii) using sketches, highlight the ground-air-visual signal codes for use by rescue units. (7 marks)
- (b) Describe **four** advantages of a centralized store. (4 marks)
- (c) Discuss the requisition and issuing of parts and materials in a technical store. (6 marks)

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