

2506/307

AIRFRAME SYSTEMS II AND

AIRFIELD SAFETY III

June/July 2023

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) With reference to aircraft fuel system, discuss a typical jet engine fuel:
 - (i) vent; (10 marks)
 - (ii) deep stick. (5 marks)
- (b) Explain **five** fire detection system installation faults that could result in false fire warnings. (5 marks)
2. (a) Outline the preparation of aircraft for weighing. (5 marks)
- (b) With the aid of a labelled diagram, show a typical passenger aircraft water supply system. (6 marks)
- (c) With the aid of a labelled sketch, explain the flow through a typical aircraft pneumatic de-ice system ejector control valve with the solenoid in the energised position. (9 marks)
3. (a) With the aid of a labelled sketch, describe a typical aircraft life raft. (16 marks)
- (b) Explain the purpose of **four** contents of an inflatable life raft survival pack. (4 marks)
4. (a) With reference to aircraft structural repair:
 - (i) explain the classification of damage; (3 marks)
 - (ii) outline the details of an aircraft structural repair report; (3 marks)
 - (iii) With the aid of a labelled sketch, show the details of a patch repair. (3 marks)
- (b) With the aid of a labelled sketch, explain the operation of the hydraulic 'Q-feel' unit as applied in aircraft powered flight control. (11 marks)
5. (a) Explain:
 - (i) the autopilot loop functions; (4 marks)
 - (ii) **three** integrity requirements and failure responses of the autopilot loops. (6 marks)
- (b) (i) State the purpose of aircraft partitions; (5 marks)
- (ii) With reference to aircraft furnishing material, complete table 1. (2 marks)

Table 1

Item No.	Item Description	Material
1.	Stowage bins	
2.	Passenger service Units (PSUs)	
3.	Seat tracks	
4.	Ceiling panels	

- (c) Explain **three** types of aircraft equipment. (3 marks)

SECTION B: AIRFIELD, SAFETY AND PROCEDURES III

Answer TWO questions from this section.

6. (a) Discuss the conditions that will warrant issue of a certificate of airworthiness by the authority (7 marks)
- (b) Highlight **five** reasons why an aircraft shall not be registered in Kenya. (5 marks)
- (c) With reference to nationality and registration marks, show a template of the certificate of registration. (8 marks)
7. (a) With reference to aircraft accident and incident regulations describe the:
- (i) entities which the final report is sent; (3 marks)
- (ii) conditions of an injury to be classified as 'serious'. (7 marks)
- (b) Dr. Joseph M. Juran believe that good quality management requires quality actions to be planned out, improved and controlled. Outline his **ten** steps to quality improvement. (10 marks)
8. (a) With reference to aircraft crash and rescue, discuss the requirements for an aircraft enabled with emergency lighting equipment to operate. (10 marks)
- (b) With reference to aviation stores procedures:
- (i) highlight **five** advantages of a decentralized store;
- (ii) describe **five** categories of parts and materials that should be disposed in a manner that they cannot be returned to service. (10 marks)

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