

2506/307

**AIRFRAME SYSTEMS II AND**

**AIRFIELD SAFETY III**

**Oct./Nov. 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 ice and rain protection:
  - (i) outline **five** effects of ice accumulation on an aircraft; (5 marks)
  - (ii) with the aid of a labelled sketch, explain the purpose of a typical ice formation spotlight; (4 marks)
  - (iii) explain how the functional testing of the serrated rotor ice detector is carried out. (1 mark)
- (b) With the aid of a labelled sketch, explain the purpose and operation of an aircraft Venturi type fuel system ejector pump. (10 marks)
2. (a) With reference to digital fire detection systems:
  - (i) outline **five** advantages; (5 marks)
  - (ii) explain the operation. (10 marks)
- (b) Name and explain the purpose of each of the various equipment and furnishings in a typical commercial passenger aircraft cabin. (5 marks)
3. (a) With the aid of a labelled sketch, describe the construction and operation of a typical commercial aircraft toilet water system. (16 marks)
- (b) Outline the precautions that must be observed to prevent original solids from entering the drain of an aircraft waste-water system. (4 marks)
4. (a) With the aid of a labelled sketch, describe the installation and operation of powered flight control unit. (13 marks)
- (b) Discuss the fundamental requirements of an aircraft powered flight control system. (7 marks)
5. (a) Describe **three** aircraft autopilot control system classifications. (7  $\frac{1}{2}$  marks)
- (b) Outline **two** general legal requirements for seats, berths, belts and harnesses. (2 marks)
- (c) With the aid of a graph, show the effects of altitude on the human body from sea level to 30,000 ft. (4  $\frac{1}{2}$  marks)

- (d) Highlight the basic disinfection and sterilization procedure that must be observed when handling aircraft portable water systems. (6 marks)

### SECTION B: AIRFIELD SAFETY PROCEDURES III

*Answer TWO questions from this section.*

6. (a) Highlight **seven** requirements for issuance of a certificate of air worthiness by the authority. (7 marks)
- (b) Highlight **five** reasons why an aircraft shall not be registered in Kenya. (5 marks)
- (c) With reference to aircraft nationality and registration marks, show a template of the certificate of aircraft registration. (8 marks)
7. (a) With reference to aircraft accident and incident regulations, describe the:
- (i) **six** entities to whom the final report is sent; (3 marks)
- (ii) conditions for an injury to be classified as serious. (7 marks)
- (b) Dr. Joseph M. Juran believed that good quality management required 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 equipped with emergency lighting equipment to operate. (10 marks)
- (b) With reference to aviation stores procedures:
- (i) highlight **five** advantages of a decentralized store; (5 marks)
- (ii) describe **five** categories of parts and materials that should be disposed in a manner that they cannot be returned to service. (5 marks)

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