

2506/106

2507/106

**AIRFRAMES STRUCTURES,
AIRFIELD SAFETY AND PROCEDURES**

June/July 2018

Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

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

MODULE I

AIRFRAMES STRUCTURES, AIRFIELD SAFETY AND PROCEDURES

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

Answer booklet;

Mathematical tables/ Non programmable calculator;

Drawing instruments.

This paper consists of EIGHT questions in THREE sections; A, B and C.

Answer THREE questions from section A, ONE question from section B and ONE question from section C.

All questions carry equal marks.

Maximum marks for each question are as indicated.

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 STRUCTURES

Answer **THREE** questions from this section.

1. (a) Explain **three** main types of turbine aviation fuels giving their freezing points. (6 marks)
- (b) With the aid of labelled sketches, explain the construction of a rigid removable fuel tank. (10 marks)
- (c) Outline **four** precautions considered when defuelling an aircraft. (4 marks)
2. (a) Explain **five** aircraft manuals used in aircraft maintenance. (10 marks)
- (b) With reference to aircraft structural damage, describe each of the following types of damages and defects:
 - (i) dent;
 - (ii) chattering;
 - (iii) crack;
 - (iv) upsetting;
 - (v) scratch.(5 marks)
- (c) List **five** factors used by an aircraft technician to decide upon the repairability of a sheet metal structure. (5 marks)
3. (a) Explain **six** major location designations as used in aircraft location numbering system. (12 marks)
- (b) Outline the major zones of an aircraft as specified by the ATA-100 specifications. (8 marks)
4. (a) Outline **five** functions of aircraft landing gear. (5 marks)
- (b) With the aid of a sketch, show the construction of a nose landing gear. (5 marks)
- (c) With the aid of sketches, describe **five** stresses that act on an aircraft structure. (10 marks)

SECTION B: AERODYNAMICS

Answer ONE question from this section.

5. (a) Explain **three** types of parasite drag. (6 marks)
- (b) With the aid of a sketch, explain the formulation of the boundary layer. (7 marks)
- (c) With the aid of a total drag vs airspeed curve, show the relationship between induced drag and parasite drag. (7 marks)
6. (a) (i) Differentiate between aerostat and aerodyne. (2 marks)
- (ii) With the aid of a chart, show the classification of aircrafts. (9 marks)
- (b) (i) With the aid of a sketch, show the control about the three axes of an aircraft. (6 marks)
- (ii) Outline the **three** methods of thrust generation on a fixed wing aircraft. (3 marks)

SECTION C: AIRFIELD SAFETY AND PROCEDURES

Answer ONE question from this section.

7. (a) Explain the checks to be carried out prior to fuelling an aircraft. (8 marks)
- (b) With the aid of sketches, show the common tie-down points on a typical aircraft. (8 marks)
- (c) Outline **four** functions of hydraulic ground power units with reference to aircraft ground handling. (4 marks)
8. Discuss **four** major considerations for human factor programs with reference to the PEAR model. (20 marks)

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