2506/204
2507/204
AIRFIELD SAFETY PROCEDURES II
AND RESEARCH METHODS
Oct. / Nov. 2023
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

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

MODULE II

AIRFIELD SAFETY PROCEDURES II AND RESEARCH METHODS

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:
Answer booklet;
Mathematical tables/Non-programmable scientific calculator;
Drawing instruments.
*This paper consists of **EIGHT** questions in **TWO** sections; **A** and **B**.*
*Answer **FIVE** questions taking at least **TWO** questions from each section.*
All questions carry equal marks.
Maximum marks for each part of a question are indicated.
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.

Turn over

SECTION A: AIRFIELD SAFETY PROCEDURES II

*Answer at least **TWO** questions from this section.*

1. (a) With reference to the Kenya Civil Aviation Security Regulations, describe each of the following:

   (i) disruptive passenger; (3 marks)

   (ii) contingency plan. (5 marks)

   (b) (i) Define the term "Act of unlawful interference". (1 mark)

   (ii) List **eleven** acts of unlawful interference as per the regulation. (11 marks

2. (a) Differentiate between quality assurance (QA) and quality control (QC). (4 marks)

   (b) Explain **eight** quality assurance management principles. (16 marks)

3. (a) (i) Describe an "Apron" with reference to Aerodrome procedures. (2 marks)

   (ii) Outline **eight** general principles for the allocation of aircraft parking stands at a large airport. (8 marks)

   (b) Illustrate a typical layout of an airport. (10 marks)

4. (a) With reference to weight and balance, highlight the steps followed in determining the center of gravity using lever method. (4 marks)

   (b) The following data refers to a light aircraft:

   - Airplane empty weight and EWCG 1340 lbs @ 37.0
   - Maximum gross weight 2,300 lbs
   - CG limits +35.6 to +43.2
   - Front seats (2) +35
   - Rear seats (2) +72
   - Fuel 40 gal @ +48
   - Baggage (maximum) 60 lbs @ +92

The pilot has prepared a blank loading chart as shown in table 1.

Table 1

Item	Weight (2300 max)	ARM	Moment	CG (+35.6 to +43.2)
Airplane		37		
Front seats		35		
Rear seats		72		
Fuel		48		
Baggage		92		

For this flight :

- the 140 lb pilot and a 115 lb passenger are to occupy the front seats;
- a 212 lb and 97 lb passengers are in the rear seats;
- there will be 50 lb of baggage;
- the flight is to have a maximum range, so maximum fuel is carried.

(i) Complete table 1, and determine the center of gravity position of the aircraft. (7 marks)

(ii) Comment on your answer in (i). (2 marks)

(iii) Determine the change in the center of gravity position if the 212 lb rear passenger and the 115 lb front passenger swap seats. (4 marks)

(iv) Determine the new CG position after the seat swap and comment on your answer. (3 marks)

SECTION B: RESEARCH METHODS

*Answer at least **TWO** questions from this section.*

5. With reference to research methodology, discuss each of the following random sampling designs:

(a) systematic; (10 marks)

(b) Stratified. (10 marks)

6. Explain the sections of the main text of a research report. (20 marks)

7. (a) Highlight **four** possible motives for carrying out research. (4 marks)

(b) Describe **eight** types of research. (16 marks)

8. (a) Explain the rules followed by researchers when working with percentages during data processing. (5 marks)

(b) Discuss each of the following data processing operations.

(i) coding; (8 marks)

(ii) editing. (7 marks)

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