

2506/204
2507/204
**AIRFIELD SAFETY PROCEDURES II
AND RESEARCH METHODS**
March/April 2024
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;

Drawing instruments;

Mathematical tables/Non programmable calculator.

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

Answer FIVE questions by choosing at least TWO questions from each section.

All questions carry equal marks.

Maximum marks for each part of a 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
both pages are printed as indicated and that no questions are missing.**

SECTION A: AIRFIELD SAFETY AND PROCEDURES II

Answer at least TWO questions from this section.

1. With reference to the Kenya Civil Aviation (Security) Regulations, highlight ten:
 - (a) Acts of unlawful interference as per the regulation. (10 marks)
 - (b) Matters that form the National Civil Aviation Security Programme. (10 marks)

2. With reference to flight safety, explain the:
 - (a) Key voluntary occurrence reporting principles. (16 marks)
 - (b) Importance of tools control and accountability. (4 marks)

3. Consider the data tabulated in table 1, determine the alert using statistical reliability method, for Mamba Airline Boeing 738 hydraulic system. (20 marks)

Nov 2020 to De 2021 -Mamba Boeing 738 Hydraulic system reports

Month	Piraps (monthly)	Piraps (3 months cumulative totals)	Flight Hours (monthly)	Flight Hours (3 months cumulative totals)	Pirap Rate per 1,000 hr (3 months running average) (x)
Nov	42	-	2400	-	-
Dec	31	-	-	-	-
Jan	58	131	2350	7070	19
Feb	46	135	2300	6070	19
Mar	56	162	2550	7210	22
Apr	26	130	2000	7450	17
May	42	128	2700	7910	16
Jun	65	133	3100	8450	16
Jul	76	185	2690	8730	21
Aug	74	217	2700	8680	25
Sep	58	210	3000	8580	24
Oct	54	186	2650	8360	22
Nov	35	147	2610	8260	18
Dec	46	135	2330	7590	18

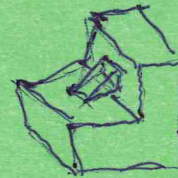
Table 1

4. Consider the following load reading during an aircraft weighing process:
 - Aft reading 794 lbs
 - Forward left reading 382.5 lbs
 - Forward right reading 380 lbs
 - Forward arm from datum 55.16 in
 - Aft arm from datum 179.92 in
 - Ballast location from datum (+13) and (+ 341.63) in
 - manufacturers Cof G from datum 117.84 m

Determine the ballast weight required to obtain more favourable Cof G position. (20 marks)



SECTION B: RESEARCH METHODS



Answer at least *TWO* questions from this section.

5. With reference to researchers in the third world countries:
- (a) (i) Explain **six** challenges;
(ii) Outline probable mitigation for each challenge in 5a(i). (15 marks) 5-16
- (b) Explain the objectives of revising and editing the project work after completion of literature review. (5 marks)
6. With reference to research methodology
- (a) Discuss systematic sampling designs. (10 marks)
- (b) Compare applied methods with fundamental methods. (2 marks)
- (c) Highlight the techniques used to conduct field research. (8 marks)
7. With reference to data analysis:
- (a) Describe the principles of tabulation; (12 marks)
- (b) Explain each of the following types of measures;
- (i) Central tendency;
(ii) Dispersion;
(iii) Asymmetry;
(iv) Relationship. (8 marks)
8. (a) With reference to a research problem, explain each of the following:
- (i) The components; (5 marks)
- (ii) Statement of the problem; (5 marks)
- (iii) Understanding the nature of the problem. (5 marks)
- (b) Outline the documentation order style under each of the following:
- (i) single volume reference; (2 marks)
- (ii) periodical reference. (3 marks)

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