

2506/204

2507/204

**AIRFIELD SAFETY PROCEDURES II  
AND RESEARCH METHODS**

**June/July 2023**

**Time: 3 hours**



**THE KENYA NATIONAL EXAMINATIONS COUNCIL**

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

## SECTION A: AIRFIELD SAFETY PROCEDURES II

*Answer at least TWO questions from this section.*

1. With reference to airport obstacle lighting:
  - (a) (i) define airport obstacle lighting; (1 mark)
  - (a) (ii) explain the **three** types of obstacle markers. (6 marks)
  - (b) discuss the **three** categories. (6 marks)
  - (c) describe **four** types of low intensity and **three** types of medium intensity obstacle lights according to ICAO regulations. (7 marks)
  
2. Consider the following helicopter data:
  - Empty weight 1,545 lbs
  - Empty weight CG 101.4 inches aft of datum
  - Lateral balance arm 0.2 inches right of BLO
  - Maximum allowable gross weight 2,250 lbs
  - Pilot 170 lbs @ 64 inches aft of datum and 13.15 inches left of BLO
  - Passenger 200 lbs @ 64 inches aft of datum and 13.5 inches right of BLO
  - Fuel (48 gal) 288 lbs @ 96 inches aft of datum and 84 inches aft of BLO
  - (a) Construct a loading chart for the helicopter. (6 marks)
  - (b) Using the loading chart constructed in (a), determine:
    - (i) the longitudinal centre of gravity; (9 marks)
    - (ii) lateral offset moment, (5 marks)
  
3. With reference to the Kenya Civil Aviation Security Regulations:
  - (a) (i) describe the term “high risk cargo”; (1 mark)
  - (a) (ii) highlight the requirements for classification of cargo as “high risk cargo”; (4 marks)
  - (a) (iii) explain **three** purposes of regulating security operations, aircrafts and other related agencies by the authority. (3 marks)

- (b) Outline the entities that the civil aviation security regulations, 2015, apply to. (12 marks)
4. (a) Outline the procedure used for continuous improvement of the quality assurance system processes. (7 marks)
- (b) "Quality assurance audits shall be carried out at least once a year in order to review all aspects of continuing airworthiness activities." Describe **five** instances where additional maintenance audits can be carried out. (5 marks)
- (c) Prior to undergoing any significant change that could impact organizations operation, management change process will be undertaken by the quality assurance department. Describe examples that may trigger a need for such a management change process. (8 marks)

### SECTION B: RESEARCH METHODS

*Answer at least TWO questions from this section.*

5. With reference to data processing and analysis:
- (a) explain the **two** methods of classification of data; (6 marks)
- (b) factors to consider when editing data. (5 marks)
- (c) Discuss each of the following measures of dispersion:
- (i) range;
- (ii) mean deviation;
- (iii) standard deviation. (9 marks)
6. (a) Explain the problems that you may encounter as a research student in Kenya, giving measures to address each of the problems. (12 marks)
- (b) Discuss the development of a working hypothesis as part of the research process. (8 marks)
7. With reference to project report and presentation:
- (a) Describe the rules to follow when writing footnotes. (6 marks)
- (b) Outline the documentation order style under:
- (i) single volume reference; (4 marks)
- (ii) periodical reference. (3 marks)

(c) Outline the steps in writing a research report. (7 marks)

8. With reference to research methodology:

(a) explain the factors to consider when selecting a sampling procedure; (15 marks)

(b) outline **five** characteristics of a good sampling design. (5 marks)

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