

2507/307

**AUTOMATIC PILOT SYSTEM AND
AIRFIELD SAFETY AND PROCEDURES III**

Oct./Nov. 2019

Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

**DIPLOMA IN AERONAUTICAL ENGINEERING
(AVIONICS OPTION)**

MODULE III

**AUTOMATIC PILOT SYSTEM AND AIRFIELD SAFETY
AND PROCEDURES III**

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 TWO sections; A and B.

Answer THREE questions from section A and TWO questions from section B in the answer booklet provided.

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
all the pages are printed as indicated and that no questions are missing.**

SECTION A: AUTOMATIC PILOT SYSTEM

Answer **THREE** questions from this section.

1. (a) Explain the operation of the autopilot in "altitude hold mode". (10 marks)
- (b) Describe each of the following flight control laws:
- (i) Alternate Law 1 (ALT 1);
 - (ii) Alternate Law 2, (ALT 2).
- (10 marks)
2. Discuss the sequence of events:
- (a) after selecting the yaw damper to 'engaged mode'; (14 marks)
 - (b) for an aircraft fitted with Mach trim system with increase in speed. (6 marks)
3. (a) Outline **six** functions of the engine fuel control management system. (6 marks)
- (b) Outline **six** inputs and **four** outputs signals of the engine thrust management system. (5 marks)
- (c) Explain **five** system requirements for the process of the thrust computation. (5 marks)
- (d) List **four** advantages of thrust management system. (4 marks)
4. With the aid of a labelled block diagram, describe how the autopilot controls rolling and pitching movements in modern aircrafts. (20 marks)
5. (a) With the aid of a labelled sketch, show the main source of signals of an electronic engine control for thrust management system. (8 marks)
- (b) Explain the reasons why aircrafts are fitted with automatic throttle. (4 marks)
- (c) Highlight **four** reasons for installing an aircraft with a yaw damper. (4 marks)
- (d) Describe the operation of a Mach trim system in an aircraft. (4 marks)

SECTION B: AIRFIELD SAFETY AND PROCEDURES III

Answer *TWO* questions from this section.

6. With regards to KCAR's part VII on crash and rescue:
- (a) Highlight the equipment requirements under regulation (66) and sub-regulation (3) 'Life rafts to be provided under this regulation shall be stored so as to facilitate ready use in emergency and be equipped'. (8 marks)
 - (b) Explain the regulation (46) and sub-regulation (1), (2), (3), (5) and (6) detailing the exits requirements. (12 marks)
7. (a) Explain **two** objectives of following the stores procedures in the aviation industry. (4 marks)
- (b) With reference to stores procedures, discuss each of the following:
- (i) SRN's;
 - (ii) JAA form 1. (16 marks)
8. (a) Discuss the principles of quality improvement and management in the aviation industry. (14 marks)
- (b) Explain why quality management is key to the aviation industry. (6 marks)

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