

2507/307

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

Oct./Nov. 2017

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;

Drawing instruments.

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

*Answer **THREE** from section **A** and **TWO** questions from section **B**.*

All questions carry equal marks.

Maximum marks for each part of a question are as shown.

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) Outline **six** functions of the autopilot, stating the equipment on which the data inputs are based on. (6 marks)
- (b) List **three** reasons why autopilot system is fitted with the fly-through override provision. (3 marks)
- (c) With the aid of a labelled block diagram, show the piloting law principle. (11 marks)
2. (a) Discuss each of the following with respect to aircraft flight control inputs:
 - (i) flight control operation;
 - (ii) manual controls;
 - (iii) autopilot controls;
 - (iv) attitude controls. (8 marks)
- (b) Highlight the sequence of events for correction for an aircraft in autopilot if a signal error tends to displace the aileron occurs. (12 marks)
3. (a) With the aid of a labelled sketch, show a typical series actuator used in aircraft flight control trimming system. (8 marks)
- (b) Outline **five** characteristics of a series actuator used in aircraft flight control trimming systems. (5 marks)
- (c) With the aid of a labelled sketch, show a typical parallel actuator for autopilot trimming systems. (7 marks)
4. Explain the function of each of the following in automatic landing system:
 - (a) approach (APP) mode; (7 marks)
 - (b) localizer and glideslope armed; (5 marks)
 - (c) localizer capture; (3 marks)
 - (d) glideslope capture. (5 marks)
5. (a) Explain **two** reasons why autopilot was introduced as an aid to the pilot flying the aircraft. (6 marks)
- (b) Explain the function of each component of an inner (closed) loop system in an aircraft. (14 marks)

SECTION B: AIRFIELD SAFETY AND PROCEDURES III

Answer TWO questions from this section.

6. (a) Outline **five** requirements for:
- (i) issuance of certificate of airworthiness to an aircraft;
 - (ii) conditions for validity of a certificate of airworthiness. (10 marks)
- (b) As an engineer in charge of the National Airline, outline **ten** steps you would take to improve quality standards. (10 marks)
7. Discuss each of the following stores used in the aviation industry:
- (a) quarantine stores; (10 marks)
 - (b) bonded stores. (10 marks)
8. (a) Explain the meaning of each of the following terms as applied to flight safety:
- (i) fatal accident;
 - (ii) operator;
 - (iii) precautionary landing. (3 marks)
- (b) Highlight the information contained in an incident or forced landing notification. (7 marks)
- (c) Explain **five** ways of preserving evidence after an accident for the purposes of investigation by the appropriate authority. (10 marks)

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