

2507/307

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

June/ July 2019

Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

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

MODULE III

AUTOMATIC PILOT SYSTEMS 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 calculators;

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.

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 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 SYSTEMS

Answer **THREE** questions from this section.

1. (a) Describe **three** types of autopilot systems. (10 marks)
- (b) Compare between human piloting and autopiloting. (6 marks)
- (c) Explain hydraulic power supply for the automatic flight control system. (4 marks)
2. (a) Describe the operation of the amplifier and computer for the automatic flight control system. (9 marks)
- (b) Describe the construction and operation of the electrohydraulic servo actuators. (11 marks)
3. (a) Discuss the response of the aircraft heading with respect to flight guidance. (7 marks)
- (b) Discuss flight control laws as applied to fly-by-wire on modern aircrafts. (13 marks)
4. Outline the sequence of automatic landing system under each of the following headings:
- (a) approach (APP) mode; (7 marks)
- (b) localiser and glideslope armed; (5 marks)
- (c) localiser capture; (3 marks)
- (d) glideslope capture. (5 marks)
5. (a) With the aid of sketches, describe each of the following types of trim tabs:
- (i) servotab; (7 marks)
- (ii) auto-balance tab. (7 marks)
- (b) Describe how the automatic pitch trim functions on an aircraft. (6 marks)

SECTION B: AIRFIELD SAFETY AND PROCEDURES III

Answer TWO questions from this section.

6. With reference to KCAR's part VII crash and rescue, explain:
- (a) regulation (55) and sub-regulation (1), (2), (3), (4) and (5), that details the requirements for marking of break-in-points. (10 marks)
 - (b) with the aid of a labeled sketch, regulation (54) and sub-regulation (6) detailing the marking diagram for the break-in-points. (6 marks)
 - (c) regulation (54) and sub-regulation (1), (2) and (3) detailing the crash axe requirements. (4 marks)
7. (a) Highlight the information that must be recorded before and after replacing an aircraft engine. (6 marks)
- (b) Discuss the stores incoming certification process as applied in aviation, stating two advantages. (14 marks)
8. (a) Explain KCAR's requirements on quality management system for holders of each of the following:
- (i) AOC;
 - (ii) AMO;
 - (iii) ATO.
- (6 marks)
- (b) Highlight **fourteen** quality management practices with regards to aviation quality systems. (14 marks)

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