

2507/307

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

Oct/Nov. 2021

Time: 3 hours



**THE KENYA NATIONAL EXAMINATIONS COUNCIL**

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

**MODULE III**

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

**3 hours**

**INSTRUCTIONS TO CANDIDATES**

*You should have the following for this examination:*

*Answer booklet;*

*Drawing instruments;*

*Mathematical tables/Non-programmable scientific calculator.*

*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. With reference to flight guidance director modes:
  - (a) highlight **six** possible sources of information on modern aircrafts; (3 marks)
  - (b) explain how failures are indicated to enhance safety and reliability; (7 marks)
  - (c) describe the approach mode (PDA). (10 marks)
  
2. With the aid of labelled circuits, explain each of the following signal processing circuits:
  - (a) integrating operation amplifier; (8 marks)
  - (b) an example of integrating servo-mechanism; (6 marks)
  - (c) summation point. (6 marks)
  
3. With the aid of a labelled thrust management block diagram, explain the operation of the flight management computer as applied to autopilot subsystems. (20 marks)
  
4. Outline the procedure of carrying out automatic landing between the time the autopilot approach mode is engaged and before engaging the flare manoeuvre if the aircraft is fitted with a single autopilot. (20 marks)
  
5.
  - (a) Outline the procedure of testing the autopilot disconnect warning system functionality. (7 marks)
  - (b) Highlight the procedure of testing the auto-pilot VOR 1 mode functionality. (13 marks)



## SECTION B: AIRFIELD SAFETY AND PROCEDURES

*Answer TWO questions from this section.*

6. With reference to KCARs Part VII crash and rescue, discuss the applicable regulations under each of the following:
- (a) emergency equipment - all aircraft; (5 marks)
  - (b) exits. (15 marks)
7. (a) Explain **six** essentials for quality culture in an organization. (6 marks)
- (b) Explain how manufacturers set quality control standards in practice. (4 marks)
- (c) With respect to stores and approved procedures, highlight the basic rules. (10 marks)
8. (a) Outline the rules and regulations which govern airworthiness directives and service bulletins according to the KCARs. (6 marks)
- (b) With reference to KCARs accident investigation rules and regulations, explain each of the following:
- (i) choice of facility; (7 marks)
  - (ii) non-disclosure of records. (7 marks)

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