

2506/107

2507/107

AIRCRAFT PISTON

ENGINES

Oct./Nov. 2018

Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

**DIPLOMA IN AERONAUTICAL ENGINEERING
(AIRFRAMES & ENGINES OPTION)
(AVIONICS OPTION)**

MODULE I

AIRCRAFT PISTON ENGINES

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

Answer booklet;

Drawing instruments.

*Answer **FIVE** of the following **EIGHT** questions.*

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.

1. (a) List **four** types of oil filters used in aeropiston engines. (2 marks)
- (b) With the aid of a labelled diagram, explain the construction and operation of aeropiston engine oil cooler. (18 marks)
2. (a) Outline **two** main functions of engine cowling. (2 marks)
- (b) Discuss each of the following with reference to aeropiston engine cooling system:
- (i) cylinder baffle and deflector system; (7 marks)
- (ii) cylinder temperature indicating system; (6 marks)
- (iii) engine cooling inspection. (5 marks)
3. (a) With the aid of a labelled cross-sectional sketch, show the parts of a typical aircraft engine spark plug. (8 marks)
- (b) Highlight the procedure for replacing a single ignition lead cable for a six cylinder aero piston engine. (12 marks)
4. (a) With the aid of a labelled sketch, show the valve operating mechanism for a radial engine. (10 marks)
- (b) With the aid of sketches, describe the **three** main types of bearings used in aeropiston engines under the following heading:
- (i) types; (3 marks)
- (ii) application; (4 marks)
- (iii) subjected loads. (3 marks)
5. (a) Describe the safety precautions to be observed during aeropiston engine ground run. (15 marks)
- (b) Explain **five** functions of aeropiston engine monitoring instruments. (5 marks)
6. (a) Describe each of the following defects in engine parts:
- (i) scuffing;
- (ii) pitting;
- (iii) scoring;
- (iv) scratches;
- (v) stains. (5 marks)
- (b) Explain the procedure for performing dye penetrant inspection on engine parts. (15 marks)

7. (a) Explain **four** types of fire extinguishers applicable to aeropiston engines. (8 marks)
- (b) Outline **six** checks to be carried out on fire extinguishers bottles. (3 marks)
- (c) With regards to aviation fuels, explain each of the following:
- (i) calorific value;
 - (ii) AVGAS;
 - (iii) AVTUR. (3 marks)
- (d) Discuss impulse coupling with respect to aeropiston engine starting systems. (6 marks)
8. (a) With the aid of a labelled schematic sketch, show the basic components of fuel injection system. (5 marks)
- (b) State **six** advantages and **four** disadvantages of fuel injection system over carburetor fuel system. (5 marks)
- (c) Highlight the procedure for carburetor removal during maintenance. (10 marks)

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