

2506/107

2507/107

AIRCRAFT PISTON ENGINES

Oct./Nov. 2017

Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

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

MODULE I

AIRCRAFT PISTON ENGINES

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

Drawing instruments;

Mathematical table/ Non-programmable Scientific calculator.

This paper consists of EIGHT questions.

Answer FIVE questions in the answer booklet provided.

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.

1. ✓ (a) With respect to aeropiston engine, state the:
- (i) means of compression;
 - (ii) engine working fluid;
 - (iii) propulsive working fluid.
- (3 marks)
- (b) Explain the term heat engine as applied to aeropiston engine. (2 marks)
- (c) With the aid of sketches:
- (i) show the basic parts of an aeropiston engine;
 - (ii) outline the functions of each part in c(i).
- (15 marks)
2. Draw a labelled sketch of a radial engine valve operating mechanism. (20 marks)
3. With reference to aeropiston engine operation:
- (a) Define:
- (i) compression ratio;
 - (ii) manifold pressure.
- (2 marks)
- (b) Explain the importance of a(i) and (ii). (6 marks)
- (c) Highlight the troubleshooting procedure for each of the following induction system faults:
- (i) engine fails to start;
 - (ii) low power.
- (12 marks)
4. + With the aid of labelled sketches, explain how each of the following is achieved in the float carburettor:
- (a) metering; (10 marks)
 - (b) idling. (10 marks)
5. ✓ With the aid of labelled diagrams of the magneto system, explain the:
- (a) operation of the magnetic circuit; (12 marks)
 - (b) construction of the primary circuit. (8 marks)

6. In relation to the aeropiston engine lubrication system:
- (a) explain **five** effects of aircraft lubricating oil; (10 marks)
 - (b) outline **five** effects of a defective oil dilution valve; (5 marks)
 - (c) with the aid of a labelled diagram, illustrate the single pressure relief valve. (5 marks)
7. ✓
- (a) Outline **three** negative effects of excessive heat in an aeropiston engine. (6 marks)
 - (b) Explain each of the following aeropiston engine cooling methods:
 - (i) air;
 - (ii) liquid.(14 marks)
8. ✓ With reference to aeropiston engine exhaust system:
- (a) Highlight:
 - (i) **three** causes of failure; ✓
 - (ii) **three** precautions to be observed during maintenance. (6 marks)
 - (b) Highlight the procedure for performing inspections. (10 marks)
 - (c) Explain **two** main areas where failure is most likely to occur. (4 marks)

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