

2506/107

2507/107

**AIRCRAFT PISTON
ENGINES**

Oct./Nov. 2019

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:

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) Differentiate between each of the following as applied to:
- (i) viscosity index and specific gravity;
 - (ii) flash point and fire point;
 - (iii) cloud and pour point. (6 marks)
- (b) Describe the operation of an aeropiston oil cooler. (3 marks)
- (c) Highlight the sequence of oil flow through each of the internal parts of an aeropiston engine. (11 marks)
2. Discuss each of the following with reference to aeropiston engine:
- (a) manifold pressure; (5 marks)
 - (b) detonation and pre-ignition; (11 marks)
 - (c) compression ratio. (4 marks)
3. Discuss each of the following with reference to aeropiston engine maintenance practices:
- (a) engine service limits;
 - (b) attrition factors;
 - (c) sudden speed reduction;
 - (d) metal particles detection. (20 marks)
4. (a) Outline six limitations of a simple float carburettor used on aeropiston engine. (6 marks)
- (b) With the aid of a labelled sketch, explain the operation of an aeropiston pressure injection carburettor. (14 marks)
5. (a) Outline five inspections carried out before installing spark plugs on aeropiston engine. (5 marks)
- (b) Highlight the servicing procedure of aeropiston engine ignition system. (8 marks)
- (c) Explain the function of each component in a high tension magneto system. (7 marks)

6. (a) With the aid of labelled sketches, highlight the procedure for performing dye-penetrant inspection on aeropiston engine components. (16 marks)
- (b) Explain the difference between ultra-sound and eddy current non-destructive testing. (4 marks)
7. With the aid of a labelled sketch, explain the construction and operation of a direct cranking electric starter. (20 marks)
8. (a) Describe four failures likely to occur on each of the following aeropiston exhaust system:
- (i) muffler and heat exchanger;
 - (ii) exhaust manifold and stack;
 - (iii) internal muffler.
- (12 marks)
- (b) Explain the operation of a non-supercharged induction system of an updraft mounted carburettor. (8 marks)

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