2506/107
2507/107
AIRCRAFT PISTON ENGINES
June/July 2020
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN AERONAUTICAL ENGINEERING (AIRFRAME AND ENGINES OPTION) DIPLOMA IN AERONAUTICAL ENGINEERING (AVIONICS OPTION)

MODULE I

AIRCRAFT PISTON ENGINES

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.*
*Answer **FIVE** questions 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.

Turn over

1. With the aid of a labelled sketch, describe a typical aeropiston engine valve timing. (20 marks)

2. (a) Outline **five** factors that affect the mixture strength of a carburettor in aeropiston engine. (5 marks)

   (b) Discuss each of the following aeropiston engine induction system icing:

   (i) fuel;
   (ii) throttle;
   (iii) impact. (15 marks)

3. With the aid of a sketch, describe the construction and operation of a typical aeropiston engine injector pump. (20 marks)

4. (a) Highlight **eight** qualities of an aeropiston engine lubricant. (8 marks)

   (b) With reference to oil dilution, explain each of the following:

   (i) purpose;
   (ii) over dilution;
   (iii) period of effectiveness. (9 marks)

   (c) State **three** features of aeropiston engine oil cooler. (3 marks)

5. (a) Differentiate between indicated and brake horse power. (2 marks)

   (b) Explain the factors that affect volumetric efficiency of an aeropiston engine. (14 marks)

   (c) Determine the brake thermal efficiency of a piston engine that produces 150 brake horsepower while burning 8 gallons of aviation gasoline per hour. (4 marks)

6. (a) With the aid of labelled sketches, explain the function and operation of ignition system impulse coupling. (12 marks)

   (b) With the aid of labelled typical circuit diagram, describe the induction vibration as used in the ignition system. (8 marks)

7. (a) Explain **five** fire zones in a reciprocating engine starting where each apply. (10 marks)

   (b) Highlight the requirements of a typical aeropiston engine fire detection system. (7 marks)

   (c) With the aid of a labelled sketch, show the parts of an aeropiston engine thermal switch fire detector. (3 marks)

8. (a) Highlight the procedure of performing a compression test on an aeropiston engine. (7 marks)

(b) Explain **four** causes of piston engine detonation. (8 marks)

(c) Highlight the information recorded on an engine logbook after inspection. (5 marks)

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