

2506/107
2507/107
PISTON ENGINES
Oct./Nov. 2016
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL
DIPLOMA IN AERONAUTICAL ENGINEERING
(AIRFRAMES AND ENGINES OPTION)
(AVIONICS OPTION)

MODULE I

PISTON ENGINES

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

Answer booklet;

Mathematical table/Non programmable scientific calculator;

Drawing instruments.

Answer FIVE of the following EIGHT questions in the answer booklet provided.

All questions carry equal marks.

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) Explain **two** methods of classifying reciprocating engines, giving **two** examples in each case. *- Cylinder arrangement -> V-type, inline, Opposed, Radial* (5 marks)

(b) With the aid of a sketch, show the main parts of a crankshaft. (5 marks)

(c) With the aid of a labelled sketch, show the piston assembly of an aeropiston engine. (10 marks)

2. (a) Describe the operation of the four stroke cycle of a reciprocating engine. (12 marks)

(b) Compute the piston displacement of 14 cylinder engine given the cylinder bore and stroke as 5.5 inches each. (8 marks)

3. (a) Outline **five** factors that can decrease volumetric efficiency of a reciprocating engine. (5 marks)

(b) With the aid of a labelled schematic diagram, show the layout of a typical turbocharger system used on a six cylinder aeropiston engine. (15 marks)

4. (a) With the aid of a labelled sketch, show the parts of the main fuel metering system of a typical carburettor. (10 marks)

(b) Explain the functions of each of the four assembly units of a pressure injection carburettor. (10 marks)

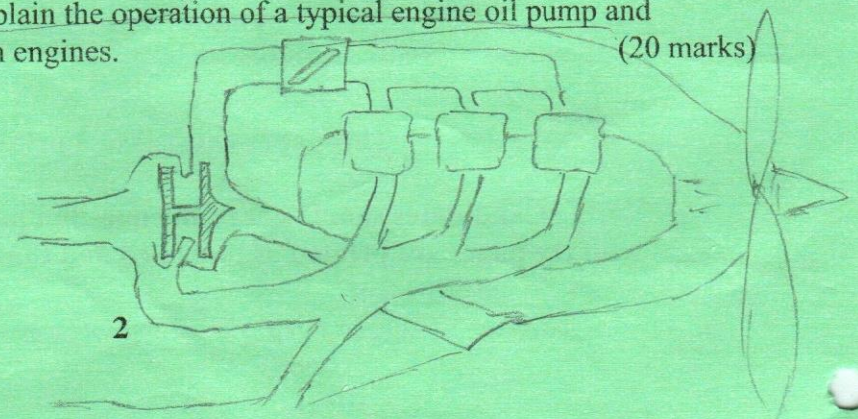
5. (a) Compare between battery and magneto ignition system operating principles. *- magneto is independent Battery dependent on battery power - magneto incorporates use of magnet* (8 marks)

(b) With the aid of a labelled circuit diagram, illustrate the components of a typical battery ignition system. (12 marks)

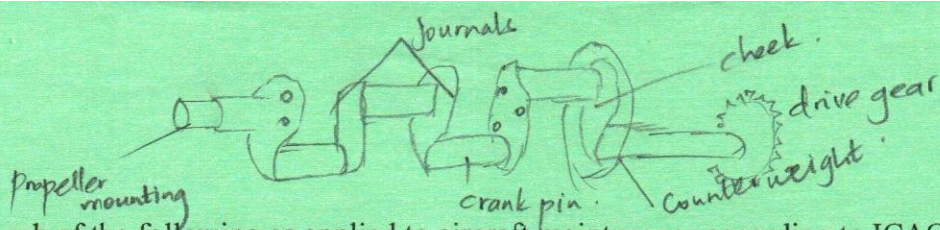
6. (a) Outline **five** types of common starters used in aircraft reciprocating engines. (5 marks)

(b) Highlight **five** probable causes for each of the following starting faults in a reciprocating engine:
(i) starter will not operate;
(ii) starter motor runs, but does not turn crankshaft;
(iii) starter drags. (15 marks)

7. With the aid of a labelled sketch, explain the operation of a typical engine oil pump and associated units for use in aeropiston engines. (20 marks)

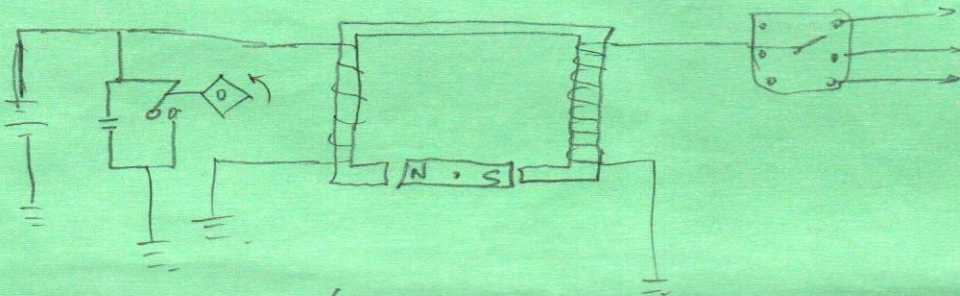
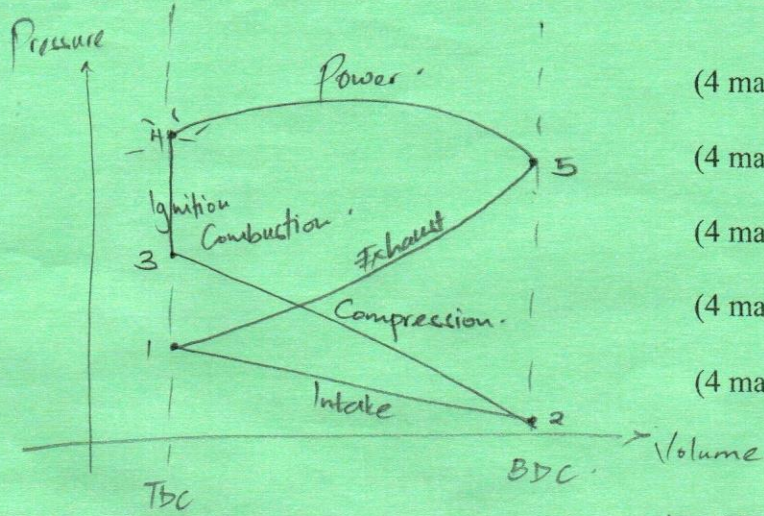


12
15
10
12
8 6
6
12
10
15
9



8. Discuss each of the following as applied to aircraft maintenance according to ICAO standards:

- (a) airworthiness directive; (4 marks)
- (b) service bulletins; (4 marks)
- (c) modifications; (4 marks)
- (d) defects arising; (4 marks)
- (e) special events. (4 marks)



Electric
Hand Cranking
Battery
Magneto.

THIS IS THE LAST PRINTED PAGE.

✓ 2 ✓ 4 ✓ 6 ✓ 8 ✓ 10 ✓ 12 ✓ 14 ✓ 16 ✓ 18 ✓ 20 ✓ 22 ✓ 24 ✓ 26 ✓ 28 ✓ 30 ✓ 32 ✓ 34 ✓ 36 ✓ 38 ✓ 40 ✓ 42 ✓ 44 ✓ 46 ✓ 48 ✓ 50 ✓ 52 ✓ 54 ✓ 56 ✓ 58 ✓ 60 ✓ 62 ✓ 64 ✓ 66 ✓ 68 ✓ 70 ✓ 72 ✓ 74 ✓ 76 ✓ 78 ✓ 80 ✓ 82 ✓ 84 ✓ 86 ✓ 88 ✓ 90 ✓ 92 ✓ 94 ✓ 96 ✓ 98 ✓ 100 ✓

