

2107/306  
AIRCRAFT PROPULSION  
June/July 2018  
Time: 3 hours



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

AIRCRAFT PROPULSION

3 hours

**INSTRUCTIONS TO CANDIDATES**

*You should have drawing instruments for this examination.  
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. With the aid of sketches of the magneto system, explain the:
- (a) operation of the magnetic circuit;
  - (b) construction of the primary circuit. (20 marks)
2. With respect to the aeropiston engine exhaust system:
- (a) Highlight **three**:
    - (i) causes of failures;
    - (ii) precautions to be observed during maintenance. (6 marks)
  - (b) Highlight the procedure for performing engine inspections. (10 marks)
  - (c) Explain **two** main areas where failure is most likely to occur in the exhaust and stack. (4 marks)
3. (a) Highlight **twelve** precautions to be taken before, during and after propeller installation. (9 marks)
- (b) With the aid of a labelled sketch, explain the operation of a typical aircraft gas turbine engine water injection system. (11 marks)
4. Assuming all pre-start and fire checks have been carried out, highlight the turbo propeller engine run procedure. (20 marks)
5. (a) Explain the effects and purpose of each of the following propeller mode selections:
  - (i) reverse pitch;
  - (ii) feathering. (4 marks)
- (b) Outline **five** advantages of constant speed propeller. (5 marks)
- (c) With the aid of labelled sketch, describe the construction and operation of a single acting propeller. (11 marks)
6. Explain the operation of each of the following gas turbine engine ice protection systems:
  - (a) hot air;
  - (b) electrical. (20 marks)
7. With the aid of labelled sketches:
- (a) Show a typical turbo fan engine cooling and ventilation system. (8 marks)

~~(b)~~ Explain the airflow through the normally aspirated aero-piston engine induction system at each of the following throttle pistons:

(i) cold air;

(ii) alternate.

(12 marks)

8. (a) Highlight the aircraft gas turbine engine oil trouble shooting procedure for excessive oil consumption. (5 marks)
- (b) With the aid of a labelled block diagram, show a typical layout of gas turbine engine lubrication system. (15 marks)

**THIS IS THE LAST PRINTED PAGE.**