

2506/206  
AIRFRAME SYSTEMS I  
June/July 2018  
Time: 3 hours



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

MODULE II

AIRFRAMES SYSTEMS I

3 hours

**INSTRUCTIONS TO CANDIDATES**

*You should have the following for this examination:*

*Answer booklet;*

*Drawing instruments.*

*Answer FIVE questions of the following EIGHT questions.*

*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. With the aid of a labelled sketch, describe the construction and operation of a variable delivery hydraulic pump. (20 marks)
2. (a) (i) Describe each of the following types of tri-cycle landing gear systems:
- (I) standard;
  - (II) center-line;
  - (III) wing and body.
- (3 marks)
- (ii) Outline **two** advantages and **two** disadvantages of the tri-cycle landing gear. (4 marks)
- (iii) Sketch **three** multiple wheel configurations. (3 marks)
- (iv) Explain **five** advantages of multiple wheel configurations over single wheel configurations. (5 marks)
- (b) With the aid of sketches, show the operational sequence of the bogie gear on touchdown. (5 marks)
3. (a) Discuss the operation of each of the following aircraft pneumatic system components:
- (i) pressure regulator;
  - (ii) oil and water trap;
  - (iii) dehydrator;
  - (iv) relief valve.
- (15 marks)
- (b) With the aid of labelled cross-section, show the construction of an aircraft pneumatic system air filter. (5 marks)
4. (a) Explain the meaning of each of the following aircraft tyre markings:
- (i) size 26 x 10.00 - 18;
  - (ii) serial number 9-211-B-025;
  - (iii) green or grey painted spots;
  - (iv) a red triangle or red spot.
- (5 marks)

- (b) Explain:
- (i) creep and its effect as applied to aircraft tires;
  - (ii) **four** ways of preventing creep; (6 marks)
- (c) (i) Highlight the normal aircraft tyre inflation procedure. (5 marks)
- (ii) Outline the remedial actions to be undertaken in the event of each of the following:
- (I) flat spot;
  - (II) rejected take-off. (4 marks)
5. With the aid of a labelled sketch, show the construction of a typical modern aircraft brake system. (20 marks)
6. (a) Explain the purpose of the aircraft nose wheel steering system. (4 marks)
- (b) With the aid of a schematic sketch, explain the operation of a hydraulic powered aircraft-steering system. (16 marks)
7. With the aid of labelled sketches, explain each of the following air conditioning systems:
- (a) brake turbine air cycle machine; (11 marks)
  - (b) piston engine turbo-charger system. (9 marks)
8. With the aid of a cross-sectional sketch, describe the construction and operation of a safety valve as applied in the aircraft pressurization system. (20 marks)

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