



**EAST AFRICAN SCHOOL OF AVIATION**  
**END OF TERM EXAMINATION**

**Subject: Airframes Structures and Airfield and Safety**

**Diploma in Aeronautical Engineering**

**Stream: MODULE 1 (Airframes & Engines and Avionics)**

**DATE: 03/04/2017**

**TIME : 9.00A.M. to 12.00P.M.**

**INSTRUCTIONS TO CANDIDATES**

1. This paper consists of **EIGHT** questions in **THREE** sections; **A**, **B**, and **C**.
2. All questions carry equal marks.
3. Answer **THREE** questions from section **A**, **ONE** from section **B** and **ONE** from section **C** in the space provided in this paper.

## SECTION A: AIRFRAMES STRUCTURES

Answer any **THREE** questions from this section.

1. (a) Explain each of the following Aircraft manuals:

- (i) Overhaul
- (ii) Structural Repair
- (iii) Illustrated parts catalogue

**(12marks)**

(b) Describe each of the following mechanical properties of materials:

- (i) ductility;
- (ii) malleability;
- (iii) toughness;
- (iv) hardness.

**(8marks)**

2. (a) Explain the purpose of each of the following as applied In an Aircraft:

- (i) water line;
- (ii) butt line;
- (iii) fuselage station;
- (iv) nacelle station.

**(8marks)**

(b) Describe **FOUR** types of repair carried out on Aircraft structures.

**(12marks)**

3. (a) With the aid of a labeled sketch explain the construction of any **ONE** control surface and state its location on the Aircraft. **(5marks)**

(b) Discuss the operation of the **THREE** primary control surface in relation to the cockpit control **(9marks)**

(c) Explain how flight control surfaces are categorized giving examples of each.

**(6marks)**

4. (a) Explain the operation of the following flight control system:

(i) Fully powered

(ii) Power assisted

**(8marks)**

(b) Highlight the reasons for use of each of the following flight control components:

(i) turn buckles;

(ii) bell cranks;

(iii) fair leads.

**(6marks)**

(c) Outline the procedure of carrying out each of the following structural repairs in an Aircraft:

(i) insertion repair, illustrate your answer

(ii) bent stringer

**(6marks)**

**SECTION B: Answer one question from this section.**

- 1 a) Differentiate between Airworthiness and maintenance documentation. (4marks)
- b) Discuss the importance of Kenya civil aviation regulations (KCARs) (6marks)
- c) Outline the requirements of an approved maintenance organization in accordance with International Civil Aviation Organization (ICAO) (5marks)
- d) State the reasons that can lead to the cancellation of an approved maintenance organization license (5marks)
- 2 a) Describe each of the following methods of providing electrical power to an aircraft when the engine(s) are not running
- i) Auxiliary power unit
  - ii) Mobile ground power unit
  - iii) Fixed power supply (6marks)
- b) Outline the inspection to be carried out on each of the following ground equipment
- i) Battery cart
  - ii) Mobile servicing platform
  - iii) Oxygen bottle trolley (14marks)

**SECTION C: Answer one question from this section.**

- i) 3. State six ways which lift can be increased on an aerofoil. (6marks)
  - ii) Explain the stalling of an aerofoil. (4marks)
  - iii) Explain five characteristics of an ideal aerofoil (10marks)
4. The table below represents data of coefficient of lift and angle of attack

Angle of attack	-2	0	2	4	6	8	10	12	14	16	18	20
Coefficient of lift	0	0.19	0.3	0.44	0.6	0.72	0.88	1.0	1.19	1.16	0.96	0.6

- a) Using the data,
- i) Draw the lift curve; (4marks)
  - ii) Explain the relationship between lift and angle of attack. (6marks)
- b) State three Newton's laws of motion (3marks)
- c) With the aid of a diagram, state Barnaul's principle and indicate three areas of its application in the aviation industry. (7marks)

1. a) Explain how flight safety can be enhanced under the following headings:

i) Fire safety;

ii) Safety around Aeroplanes;

iii) Safety around Helicopters;

iv) Foreign object damage. **(8marks)**

b) Define Aircraft accident according to Civil Aviation Act Chapter 394 of the laws of Kenya. **(3marks)**

c) Outline SIX ground tasks to be performed on passenger aircraft on each of the following:

(i) arrival

(ii) departures **(9marks)**

2. You have witnessed an Aircraft crash landing. Explain the procedure of reporting the occurrence. **(20marks)**

3. a) Describe two methods of providing electrical power to the Aircraft while on ground. **(4marks)**

b) Explain how the following tasks enhance flight safety.

i) Careful work

ii) Accurate documentation

iii) Observation **(6marks)**

