EAST AFRICAN SCHOOL OF AVIATION

ENGINEERING

FINAL END OF TERM EXAMINATIONS

SUBJECT: AIRFRAME STRUCTURES & AIRFIELD SAFETY

STREAM: MOD I (AVI & AE) **Duration: 3 Hrs**

DATE: 03/04/2017 **TIME 9.00 – 12.00 PM**

INSTRUCTION TO CANDIDATES

1. This paper consists of ***FOUR* (2)** Pages
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 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 witnesses 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)**