EAST AFRICAN SCHOOL OF AVIATION EXAMINATION

ENGINEERING SECTION

DIPLOMA IN AERONAUTICAL ENGINEERING

AIRFRAME II & SAFETY PROCEDURES

TREAM: MODULE II (AE) **Duration: 3 Hrs.**

DATE: 10/4/2017 **TIME: 9.00 – 12.00 PM**

INSTRUCTIONS TO CANDIDATE:

1. *This paper consists of **THREE (3)** printed pages.*
2. *Answer **ALL** questions*

1. (a) With aid of a labelled sketch explain the operation of an aircraft hydraulic system fitted with an engine driven pump. **(10 marks)**
   (b) Outline FOUR major characteristics that MUST be considered when selecting aircraft hydraulic fluid for a particular system. **(4 marks)**
   (c) Discuss THREE common types of hydraulic fluids used in aeroplanes. **(6 marks)**

2. (a) Outline FOUR requirements of a basic environmental control system. **(8 marks)**
   (b)State TWO ways of obtaining high pressure air to pressurize the aircraft cabin. **(4marks)**
   (c)Explain**FOUR** methods of controlling cabin pressure **(8 marks)**

3. (a) Describe **FOUR** methods of fire detection used in aircraft **(12 marks)**
   (b) Outline **FOUR** sequence of operation provided on the flight deck as a means of discharging the fire bottle. **(4 marks)**
   (c) State the **FOUR** physical indication that will show engine fire extinguisher bottle has been fired. **(4 marks)**

4. (a) Explain the following terms as applied to aircraft structural repair :
   (i) Bend allowance
   (ii) Set back
   (iii) Bend angle
   (iv) Mold point
   (v)Bend tangent line. **(5marks)**

(b)Compute the bend allowance for a sheet of aluminium alloy with a bend of 75 degrees and a radius of 3/8 inches when the thickness is 0.063 inches. **(5marks)**

(c) Compute the developed width of a piece of aluminium alloy 2117T3which is to be formed **(10marks)**

5. (a) With the aid of labelled sketches explain the operation of the following flying control systems:
   (i) Powered
   (ii)Power-assisted **(16 marks)**

(b)Explain the meaning of the following terms as applied to flying control system:
   (i) Reversible
   (ii) Irreversible **(4 marks)**

6 .(a) Outline any **FOUR** advantages of using compressed air over hydraulic or electrical system **(8 marks)**

(b) With aid of labelled sketches explain the operation of the following aircraft pneumatic system components:

(i) Relief value
(ii) Check value
(iii) Orifice restrictor
(iv) Variable restrictor **(12 marks)**

7. (a) Givedetailed sequence of operation when the hydraulic landing gear is selected
(i) Up
(ii) Down **(10 marks)**

(b) Outline any **FOUR** incidents that would necessitate landing gear retraction checks to be carried out **(4 marks)**

(c) Explain any **SIX** specific inspections to be performed when making a retraction check on an aircraft undercarriage. **(6 marks)**

8. (a) Differentiate between the terms “stress” and “strain” as applied to aircraft structures. **(2 marks)**

(b Describe each of the FOUR major stresses to which all the aircraft structures are subjected to. Illustrate your answers**.** **(8 marks)**

(c) With the aid of labelled sketches, describe the main structural members of each of following semi monocoque fuselage;

(ii Tailcone

(ii) Vertical stabilizer **(10marks)**