EAST AFRICAN SCHOOL OF AVIATION

EXAMINATIONS

FINAL EXAM

SAFETY SECTION

SUBJECT: PRINCIPLES OF FLIGHT

Stream: Flight Dispatch 25       Duration: 2Hrs
DATE: 16/05/17       TIME: 8.30 – 10.30AM

Instructions to Candidate:

1. This paper consists of **FOUR (4) pages**
2. Answer **ALL** questions in **Section A** and **ANY THREE in Section B**
3. Examination rules and regulations should be adhered to.
4. Maximum marks are indicated on each question

STUDENT’S NAME:  _____________________________________________

STUDENT’S NUMBER:  ___________________________________________
SECTION A:

1) Air density is:
   a. Mass per unit volume.
   b. Proportional to temperature and inversely proportional to pressure.
   c. Independent of both temperature and pressure.
   d. Dependent only on decreasing pressure with increasing altitude.

2) Maximum Take Of Mass (MTOM) is best defined as:
   a. Maximum permissible total mass at the start of the take off run.
   b. Maximum permissible total mass prior to taxiing.
   c. Maximum permissible total mass prior to take off.
   d. Maximum permissible total mass at the point of rotation.

3) Mach number is:
   a. The aircraft True Air Speed divided by the local speed of sound.
   b. The speed of sound in the ambient conditions in which the aircraft is flying.
   c. True Airspeed of the aircraft at which the relative airflow somewhere on the aircraft reaches the local speed of sound
   d. Is directly proportional to the True Air Speed of the Aircraft.

4) If the cross sectional area of an airflow is mechanically reduced:
   a. The velocity of the airflow remains constant and the kinetic energy increases.
   b. The velocity of the airflow remains constant and the mass flow increase.
   c. The mass flow remains constant and the static pressure increases.
   d. The Mass flow remains constant and the velocity of the airflow increases.

5) The statement “energy and mass can neither be created nor destroyed, only changed from one form to another”, refers to:
   a. Bernoulli’s theorem.
   b. The equation of kinetic energy.
   c. The principal of continuity.
   d. Bernoulli’s principle of continuity.

6) By changing the angle of attack of a wing, the pilot can control the airplane’s:
   a. Lift and airspeed, but not drag.
   b. Lift, gross weight and drag.
   c. Lift, airspeed and drag.
   d. Lift and drag but not airspeed.

7) After an aircraft has been exposed to severe weather:
   a. Snow should be removed but smooth ice may be left.
   b. All snow and ice should be removed.
c. Loose snow may be left but ice must be removed.
d. Providing the contamination is not too thick, it may be left in place.

8) In a straight level powered flight the following principal forces act on an aircraft:

a. Thrust, lift, weight
b. Thrust, lift, drag, weight
c. Thrust, lift, drag
d. Lift, drag, weight

9) Which wind-shear condition results in a loss of airspeed

a. Decreasing headwind or tailwind
b. Increasing headwind and decreasing tailwind
c. Decreasing headwind and increasing tailwind
d. Increasing headwind or tailwind

10) The distance a propeller actually advances in one revolution is:

a. Twisting
b. Effective pitch
c. Geometric pitch
d. Blade pitch

SECTION B:

1) a. Compute the Coefficient of lift required to provide lift for an aircraft given the following parameters
   Aircraft mass: 6000 kg
   Wing area: 105 square meters
   Velocity: 200 m/s
   Density of Air: 1.225 kg/m^3
   Gravitational acceleration: 10 m/s^2  

   (6 Marks)

b. Discuss the Principle of continuity, Illustrate your answer  

   (6 Marks)

c. Define the following terminologies as applicable to airfoil structures;  

   i. Taper Ratio
   ii. Angle of incidence
   iii. Mean chord Line
   iv. Centre of Pressure

   (8 Marks)
2) Discuss LIFT in relation to the principles of Flight. (20 Marks)

3)  
   a. Outline the behavior of aircrafts as it approaches STALL conditions (4 Marks)
   b. List any FOUR stall prevention, recognition and warning devices in modern Aircrafts (4 Marks)
   c. Outline any THREE effects of frost and ice as agents of aircraft contamination (6 Marks)
   d. Illustrate any THREE forces that act on a propeller in flight (6 Marks)

4)  
   a. Differentiate between Longitudinal and Lateral stability (4 Marks)
   b. Illustrate the three main axis in relation to Flight Control, state the Flight Control Device responsible for each. (8 Marks)
   c. Explain FOUR factors that affect Drag. (8 Marks)