



**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 Off 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; **(8 Marks)**
 - i. Taper Ratio
 - ii. Angle of incidence
 - iii. Mean chord Line
 - iv. Centre of Pressure

- 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)**