

DIPLOMA IN FLIGHT OPERATIONS/DISPATCH

PRINCIPLES OF FLIGHT

FINAL EXAM

DURATION - 2 HOURS

INSTRUCTION – Attempt ALL Questions in Section A

-Attempt any THREE questions in Section B

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 :
- Lift and airspeed, but not drag.
 - Lift, gross weight and drag.
 - Lift, airspeed and drag.
 - Lift and drag but not airspeed.
- 7) After an aircraft has been exposed to severe weather:
- Snow should be removed but smooth ice may be left.
 - All snow and ice should be removed.
 - Loose snow may be left but ice must be removed.
 - 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:
- Thrust, lift, weight
 - Thrust, lift, drag, weight
 - Thrust, lift, drag
 - Lift, drag, weight
- 9) Which wind-shear condition results in a loss of airspeed
- Decreasing headwind or tailwind
 - Increasing headwind and decreasing tailwind
 - Decreasing headwind and increasing tailwind
 - Increasing headwind or tailwind
- 10) The distance a propeller actually advances in one revolution is:
- Twisting
 - Effective pitch
 - Geometric pitch
 - Blade pitch

SECTION B:

- 1)
- a. Compute the aircraft velocity required to provide lift for an aircraft given the following parameters
- Aircraft mass: 6000 kg
 - Wing area: 105 square meters
 - Coefficient of Lift: 0.4
 - Density of Air: 1.225 kg/m³
 - Gravitational acceleration: 10 m/s²
- 6 Marks**
- b. List the ICAO standard atmosphere assumption **6 Marks**
- c. With the aid of sketches, describe FOUR types of Flaps **8 Marks**
- 2) Discuss DRAG in relation to aircraft performance. **20 Marks**
- 3)
- a. List FOUR types of propellers **4 Marks**
- b. Illustrate any FOUR forces that act on a propeller in flight **8 Marks**
- c. Define and illustrate the following terminologies as applicable to propellers:
- i. Blade Angle
 - ii. Propeller slippage
 - iii. Helix angle
- 8 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 LIFT. **8 Marks**

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