LESSON NUMBER:_____

STRAIGHT AND LEVEL FLIGHT
LEVEL TURNS (10 - 20 degrees of bank)
CONSTANT AIRSPEED CLIMBS
CONSTANT AIRSPEED DESCENTS
LEVEL OFFS
TURNING CLIMBS / DESCENTS

FAA Practical Test Standards
Altitude + / - 200 feet
Heading + / - 20 degrees
Airspeed + / - 10 KTS

Straight and Level Flight:

- **Pitch attitude:** Establish so that the aircraft is not climbing or descending. The nose of the aircraft should be in alignment with an object on the distance. There should be approximately a 3 inch gap between the top of the cowling and the horizon line.
- **Power:** Set power to cruise RPM (2100-2200)
- **Airspeed:** 90 – 120 kts. Establish with pitch / power
- **Trim:** Set to maintain desired pitch attitude
- **Rudder:** Inputs applied to maintain coordinated flight. The aircraft should not be turning. The ball should remain in the center of the Inclinometer on the Turn Coordinator.

Level Turns

- **Clearing turns**: performed
- **Bank angle:** Establish using coordinated aileron and rudder inputs to roll into a bank (10-20 degrees or standard rate)
- **Pitch attitude**: Establish and maintain level with respect to the horizon
- **Back pressure**: Apply as needed to maintain level flight in turn
- **Trim:** Set to relieve control pressures and maintain pitch
- Locate visual references
- **Maintain visual awareness** outside the aircraft (lead the turn visually) momentarily verifying airspeed, altitude, quality of turn with instruments
- **Roll out:** Lead roll out by ½ the bank angle. For a 20 degree bank lead roll out by 10 degrees
- **Back pressure**: Release, neutralize ailerons, rudder, and elevator pressures when aircraft is wings level

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Climbs:

- **Clear** area
- **Pitch attitude**: Establish nose at desired point above horizon
- **Power:** Smoothly apply full power
- **Rudder:** Coordinated (right rudder predominant)
- **Airspeed:** Pitch to establish and maintain as desired
- **Trim:** Set to maintain pitch attitude
- **Level off.** Use 10% of climb rate (VSI) to initiate level off. (500FPM @ 10% = 50 feet. Lead level off by approximately 50 feet prior to desired altitude

Descents:

- **Clear** area
- **Apply** carburetor heat
- **Power:** Reduce to 1700 RPM or as desired
- **Pitch:** Establish nose below the horizon
- **Airspeed:** Capture with pitch. Use power to maintain rate of descent
- **Trim:** Set to maintain pitch attitude
- **Altitude:** Level off 10% of vertical descent rate.

Level offs:

- **Transition:** 10% of climb/descent rate is reached
- **Pitch:** Nose to straight and level attitude
- **Power:** Reduce or increase to cruise 2100-2200RPM
- **Airspeed:** Allow to increase/decrease to cruise
- **Pitch:** Stabilize straight and level
- **Trim:** Set to maintain pitch attitude

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Turning climbs:

- **Clear** area
- **Establish** climb pitch attitude
- **Power** full
- **Establish** desired airspeed
- **Establish** bank angle
- **Roll out** on desired heading
- **Continue climb** until reaching desired altitude

Once proficiency is achieved PT will be able to execute pitch and bank attitudes simultaneously.

Turning descents:

- **Clear** area
- **Apply** carburetor heat
- **Establish** power reduction and pitch attitude
- **Establish** desired airspeed
- **Establish** bank angle
- **Roll out** on desired heading

Once proficiency is achieved PT will be able to execute pitch and bank attitudes simultaneously.

LESSON _____ STUDY QUESTIONS

Associated reading: Pilots Handbook of Aeronautical Knowledge: Chapter 2: Principles of Flight Chapter 3: Aerodynamics of Flight. FAR 91.111,91.113, 91.119 AIM 8-1-8, 8-1- 6.

1) The four forces acting on an airplane during flight are _____, _____, _____, _____.

2) The force that acts downward towards the center of the earth is called

_____.

3) The force that propels the airplane through the air is called _____.

4) Lift opposes _____ and thrust opposes _____.

5) The angle between the chord line of an airfoil and the relative wind is called the _____ of _____.

6) The relative wind always acts parallel to / perpendicular to and opposite / in line with, the aircraft flight path.

7) As the pilot increases the angle of attack to create lift, induced drag / parasite drag increases / decreases.

8) The three types of parasite drag are _____ ,_____, _____.

9) In ground effect, induced drag is increased /decreased.

10) Doubling the airspeed increases parasite drag by

a) 2 times
b) 3 times
c) 4 times
d) 6 times

11) The curvature of the upper wing surface is called the camber /chord line and aids in accelerating /decelerating air flow over the wing.

12) An airplane turns because of

a) Centrifugal force
b) Rudder and aileron
c) Rudder, aileron and elevator
d) The horizontal component of lift

13) The primary purpose of the rudder on the airplane is to counteract

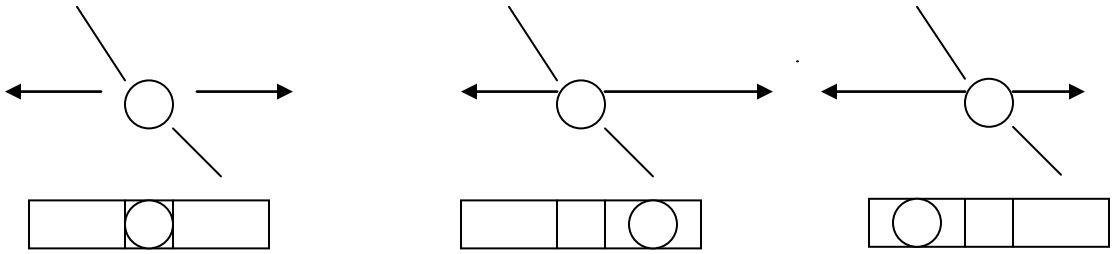
a) yaw
b) adverse yaw
c) lift
d) Centrifugal force

14) Pitch is experienced around the longitudinal / lateral axis of the aircraft.

15) Roll is experienced around the longitudinal / lateral axis of the aircraft.

16) Yaw is experienced around the horizontal / vertical axis of the aircraft.

Use the Inclinometer illustrations below to answer the following questions. The aircraft illustrations are banked to the right from the view of the pilot's seat.



A **B** **C**

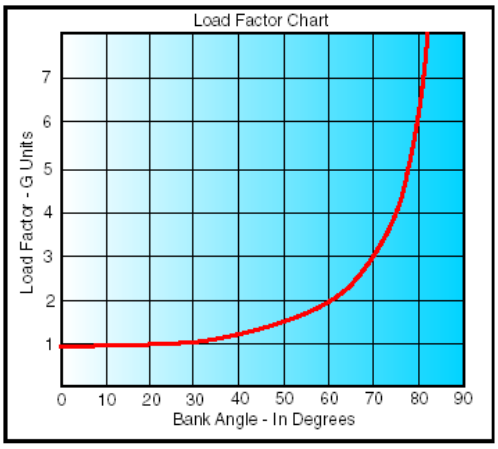
17) Illustration "A" is representative of a coordinated / uncoordinated turn because Centrifugal Force and the Horizontal Component of Lift are equal / unequal **.**

18) Illustration "B" is a slipping / skidding turn because the Horizontal Component of Lift / Centrifugal Force, is excessive.

19) Illustration "C" is a skidding /slipping turn because the Horizontal Component of Lift / Centrifugal Force, is excessive.

20) The two forces that cause load factor during a turn are _____ and _____.

Use the graph below to answer questions 21 - 23.



21) A bank angle of 10 degrees causes a load factor of _____ G units.

22) A bank angle of 60 degrees causes a load factor of _____ G units.

23) If the fully loaded weight of your aircraft is 2,300 pounds, what is the approximate weight the wings must support during a constant altitude turn with 60 degrees of bank?

a) 2300 pounds
b) 6000 pounds
c) 4600 pounds
d) 2990 pounds

24) Before Beginning maneuvers in the practice area you should make _____ _____.

25) What aircraft has the right of way over all other aircraft?

a) Balloon
b) Glider
c) Airship
d) Aircraft in distress

26) If an airship and an airplane are converging, but not head on, who has the right of way?

a) Neither; both shall alter the course to the right
b) Both; both shall alter course to the right
c) The airplane; the airship shall alter course to the left
d) The airship; the airplane shall alter course to the right

27) You are out in the practice area and spot an aircraft at your 12:00 o'clock position and it does not appear to be moving. Therefore

a) the aircraft is going away from you and you should continue on course
b) you and the aircraft on a collision course, or nearly so, and each aircraft should alter course to the right
c) you should climb and alter your course to the left
d) you should turn on your landing light and descend

28) What minimum clearance is required from the highest obstacle when flying over a congested area?

a) 500 feet vertically; 500 feet horizontally
b) 500 feet vertically; 1,000 feet horizontally
c) 1,000 feet vertically; 2,000 feet horizontally
d) 1,000 feet vertically; if the obstacle is within a horizontal radius of 2,000 feet.

29) In a sparsely populated area, the distance you must remain from any person, vessel, vehicle or structure is _____ _____.

30) No person shall operate an aircraft so close to another aircraft as to create a _____ _____.