

ASSIGNMENT 3

Textbook Assignment: "Principles of Flight," chapter 3, pages 3-1 through 3-7.

- 3-1. The study of the forces that enable an aircraft to fly is referred to by what term?
1. Thermodynamics
 2. Aerodynamics
 3. Hydrodynamics
 4. General dynamics
- 3-2. Which of the following is a definition of motion?
1. The act or process of changing place or position
 2. The act or process of achieving inertia
 3. The overcoming of force
 4. The resistance to force
- 3-3. Which of the following terms refers to Newton's first law of motion?
1. Force
 2. Action and reaction
 3. Inertia
 4. Gravity
- 3-4. Thrust must overcome inertia before an aircraft can fly. This is an example of which of the following laws of motion?
1. Newton's first law
 2. Newton's second law
 3. Newton's third law
- 3-5. Newton's law of inertia applies to bodies that are affected in which of the following ways?
1. Those that are at rest only
 2. Those moving in a straight line at a uniform speed only
 3. Those at rest and moving at a uniform speed in a straight line
 4. The willingness of an object to remain at rest or continue in motion
- 3-6. What law of motion is the "force" law?
1. Newton's first law
 2. Newton's second law
 3. Newton's third law
- 3-7. The fact that "for every action there is an equal and opposite reaction" is discussed in which of Newton's laws of motion?
1. First
 2. Second
 3. Third
- IN ANSWERING QUESTIONS 3-8 AND 3-9, REFER TO FIGURE 3-2(B) IN THE TEXT.
- 3-8. At what location is the area of least pressure?
1. To the left of the airfoil
 2. To the right of the airfoil
 3. Beneath the airfoil
 4. Over the airfoil
- 3-9. At what location is the area of increased flow?
1. Over the airfoil
 2. Under the airfoil
 3. To the left of the airfoil
 4. To the right of the airfoil
- 3-10. According to Bernoulli's principle, what happens to the speed and pressure of a fluid flowing through a tube when the fluid reaches a constriction?
1. The speed and pressure of the fluid increases
 2. The speed and pressure of the fluid decreases
 3. The speed decreases and the pressure increases
 4. The speed increases and the pressure decreases
- 3-11. Which of the following components are classified as airfoils?
1. The wings of an aircraft
 2. The rotor blades of a helicopter
 3. The propeller blades of a turboprop aircraft
 4. All of the above
- 3-12. What is the front edge or surface of an airfoil?
1. Chamber
 2. Chord line
 3. Leading edge
 4. Trailing edge

- 3-13. What is an imaginary straight line from the leading edge to the trailing edge of an airfoil?
1. Camber
 2. Chord line
 3. Span
 4. Angle of attack
- 3-14. Which of the following terms identifies the rear edge or surface of the airfoil?
1. Span line
 2. Retreating edge
 3. Chord line
 4. Trailing edge
- 3-15. What is the curve or departure from a straight line from the leading edge to the trailing edge of the airfoil?
1. Camber
 2. Chord line
 3. Angle of attack
 4. The angle of incident
- 3-16. What term is used to describe the direction of the airstream in relation to the airfoil?
1. Angle of attack
 2. Directional heading
 3. Relative wind
 4. Chord line
- 3-17. What is the angle between the chord line and the relative wind called?
1. The angle of attack
 2. The resultant angle
 3. The control angle
 4. The angle of incidence
- 3-18. The generation of lift by an airfoil is dependent upon which of the following factors?
1. The shape of the airfoil's cord
 2. The airfoil being able to create a special airflow in the airstream
 3. The airfoil being able to develop lifting pressure over the airfoil surface
 4. Both 2 and 3 above
- 3-19. As the relative wind strikes the leading edge of an airfoil, the flow of air is split. What part of the airfoil creates the low pressure area on the airfoil's surface?
1. The camber of the airfoil's upper surface
 2. The camber of the airfoil's lower surface
 3. The trailing edge of the airfoil
 4. The leading edge of the airfoil
- 3-20. What speed or pressure causes most of the lift of an airfoil?
1. The speed of the air striking the front of the airfoil
 2. The difference in air pressure on the upper and lower surfaces of the airfoil
 3. The increase in pressure over the airfoil
 4. The decrease in pressure over the airfoil
- 3-21. What is the force that is created by an airfoil?
1. Lift
 2. Drag
 3. Gravity
 4. Thrust
- 3-22. What force overcomes gravity?
1. Drag
 2. Lift
 3. Thrust
 4. Weight
- 3-23. What is the force that holds an aircraft to the ground?
1. Lift
 2. Drag
 3. Gravity
 4. Thrust
- 3-24. What is the force that is created by a propeller, jet engine, or helicopter rotor?
1. Lift
 2. Drag
 3. Gravity
 4. Thrust
- 3-25. What force overcomes drag?
1. Lift
 2. Thrust
 3. Weight
 4. Momentum
- 3-26. What is the force that acts against an aircraft in flight?
1. Lift
 2. Drag
 3. Gravity
 4. Thrust
- 3-27. Aircraft drag acts in what direction in relation to the relative wind?
1. Parallel and in the same direction
 2. Parallel and in the opposite direction
 3. Perpendicular in the same direction
 4. iPerpendicular and in the opposite direction

- 3-28. During flight, if the aircraft's lift force and weight force are equal and the thrust force is greater than the drag force, what will happen?
1. The aircraft will lose altitude and lose speed
 2. The aircraft will lose altitude and gain speed
 3. The aircraft will maintain its altitude and lose speed
 4. The aircraft will maintain its altitude and gain speed
- 3-29. Which of the following forces counteracts forward motion of the aircraft?
1. Weight
 2. Lift
 3. Drag
 4. Thrust
- 3-30. What axis is the pivot point about which an aircraft rolls?
1. Longitudinal
 2. Lateral
 3. Vertical
 4. Horizontal
- 3-31. What movement of an aircraft is associated with roll?
1. The up and down movement of the wing tips
 2. The left and right movement of the aircraft's nose
 3. The up and down movement of the aircraft's nose
 4. The fore and aft movement of the wings
- 3-32. What axes runs fore and aft through the length of the aircraft?
1. Longitudinal
 2. Diagonal
 3. Horizontal
 4. Lateral
- 3-33. What axes is the pivot point about which an aircraft pitches?
1. Longitudinal
 2. Lateral
 3. Vertical
 4. Horizontal
- 3-34. What movement of an aircraft is associated with pitch?
1. The up and down movement of the wing tips
 2. The left and right movement of the aircraft's nose
 3. The up and down movement of the aircraft's nose
 4. The fore and aft movement of the wings
- 3-35. What axes runs from the left to the right (wing tip to wing tip) through the width of an aircraft?
1. Pitch
 2. Longitudinal
 3. Vertical
 4. Diagonal
- 3-36. What axes is the pivot point about which an aircraft yaws?
1. Longitudinal
 2. Lateral
 3. Vertical
 4. Horizontal
- 3-37. What axes runs from the top to the bottom of an aircraft?
1. Diagonal
 2. Longitudinal
 3. Lateral
 4. Vertical
- 3-38. What movement of an aircraft is associated with yaw?
1. The up and down movement of the wing tips
 2. The up and down movement of an aircraft's nose
 3. The left and right movement of an aircraft's nose
 4. The fore and aft movement of an aircraft's nose
- 3-39. What force is developed by the engine of an aircraft to provide motion?
1. Lift
 2. Drag
 3. Gravity
 4. Thrust

- 3-40. When an aircraft in flight increases its angle of attack, which of the following actions is accomplished?
1. The aircraft pivots on its longitudinal axis
 2. The aircraft pivots on its lateral axis
 3. The aircraft will turn to the right
 4. The aircraft will turn to the left
- 3-41. When an aircraft in flight encounters a strong gusty, quartering wind on its nose, it tends to drift off course. On what axis does the aircraft pivot when this action occurs?
1. The pitch axis
 2. The yaw axis
 3. The lateral axis
 4. The longitudinal axis
- 3-42. The main difference between fixed-wing aircraft and rotary-wing aircraft is the way in which lift is achieved.
1. True
 2. False
- 3-43. A helicopter uses two or more engine-driven rotors for lift and propulsion.
1. True
 2. False
- 3-44. What is a symmetrical airfoil?
1. An airfoil that has a greater camber on the upper surface than on the lower surface
 2. An airfoil that has less camber on the upper surface than on the lower surface
 3. An airfoil that has a variable center of pressure
 4. An airfoil that has a fixed center of pressure
- 3-45. On an unsymmetrical airfoil, in what direction does the center of pressure move when the angle of attack changes?
1. Forward only
 2. Rearward only
 3. Fore and aft
 4. Inboard and outboard
- 3-46. What does a shifting center of pressure do to a rotor blade?
1. It causes it to move fore and aft uncontrollably
 2. It causes it to move up and down uncontrollably
 3. It causes the pitch of the blades to stabilize
 4. It causes increased lift capabilities
- 3-47. By what means is lift controlled in a helicopter?
1. By increasing and decreasing the engine speed
 2. By increasing and decreasing the rotor speed
 3. By increasing the pitch or angle of attack of the rotor blades
- 3-48. What term is used when a helicopter's main rotor is turning and no lift is being produced by the rotor blades?
1. Angle of attack
 2. Ground idle
 3. Zero thrust
 4. Flat pitch
- 3-49. Directional control of a helicopter is achieved by what means?
1. By tilting the helicopter in the desired direction
 2. By tilting the main rotor in the desired direction
 3. By increasing the pitch of the tail rotor blades
 4. By decreasing the pitch of the tail rotor blades
- 3-50. By what means is hovering achieved in a helicopter?
1. By equalizing lift and drag only
 2. By equalizing lift and thrust only
 3. By equalizing thrust and weight only
 4. By equalizing lift, drag, thrust, and weight
- 3-51. As the helicopter's rotor turns in one direction, the body of the helicopter tends to rotate in the opposite direction. What law or principle explains this action?
1. Newton's third law
 2. Newton's second law
 3. Newton's principle
 4. Bernoulli's principle

3-52. What is the purpose of a tail rotor on a single main rotor helicopter?

1. Recognizing torque
2. Reducing vibration
3. Compensating for thrust
4. Eliminating torque reaction

3-53. In what direction does a tail rotor system produce thrust to compensate for the torque reaction developed by the main rotor?

1. Opposite
2. Same
3. Vertical
4. Radial