# Santa Monica Flyers

## Pre-Solo Knowledge Test

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Name: _____ Date: _____

Aircraft Type to be flown solo: _____

Answer the following questions in the space provided using the FARs, AIM, Charts, the AFM/POH for the airplane to be flown solo and your textbooks. If you reference one of those sources, be sure to note it for your future reference.

**Aerodynamics**

1. What are the four forces that act on an airplane in flight?

2. Describe the following:
    a. Relative wind:

    b. Chord line:

    c. Angle of attack:

3. What causes a wing to stall?

4. Can an airplane stall at any airspeed? Any attitude? Why?

5. What is the only way to recover from a stall?

6. What causes a spin?

7. Is one wing stalled in a spin, or are both wings stalled?

8. Describe the spin recovery procedure.

   P

   A

   R

   E

9. What is adverse yaw? How do you compensate for it?

10. Why is right rudder required to keep the airplane coordinated (ball in the center) during a climb?

11. Does an increase in bank angle in level turns have an effect on the aircraft's stall speed? If so, how?

## Aircraft Flight Characteristics and Operating Limitations

*Answers are specific to the airplane to be flown in solo flight

12. What type of engine does the airplane have?

13. What is the engine's horsepower?

14. What type and grade of oil is approved for this engine?

15. How do you check the engine's oil quantity? What are the minimum and maximum oil levels?

16. What is the the total fuel capacity? How much of that is useable fuel?

17. Why is it necessary to drain the fuel sumps? When should this be done?

18. What grade(s) of fuel are approved for the airplane?

19. Does the fuel system use a fuel pump? If so, how many fuel pumps does it have?

20. What are the three pitot-static instruments? What pressure(s) does each instrument receive? (pitot, static, or both?)

| Instrument | Pressure |
|---|---|
| | |
| | |
| | |

21. Why is it important to make sure the pitot tube and static ports are not blocked during the preflight check?

22. What are the three gyroscopic instruments? How are they powered? (vacuum or electric?)

| Instrument | Power source |
|---|---|
| | |
| | |
| | |

23. How many volts is the electrical system?

24. What are the two sources of electrical power for the aircraft's electrical system? What are their purposes?

25. What is the overvoltage relay? How is it reset?

26. What is the purpose of the circuit breakers?

27. Will the engine run with the master switch turned off? Why?

28. When performing the runup, what is the maximum acceptable drop in RPM during the ignition check? What is the maximum difference between the two?

29. List and define the following V speeds:

$V_R$ _____kts _____

$V_X$ _____kts _____

$V_Y$ _____kts _____

$V_G$ _____kts _____

$V_{NE}$ _____kts _____

$V_A$ _____kts _____

$V_{FE}$ _____kts _____

$V_{S1}$ _____kts _____

$V_{S0}$ _____kts _____

30. What is the airplane's maximum demonstrated crosswind component?

31. What is the maximum allowable flap setting for takeoff?

32. What is the airplane's maximum gross weight?

33. What is the airplane's empty weight?

34. What is the airplane's useful load?

35. With full fuel, how much weight can the airplane carry?

36. What is the takeoff distance over a 50 foot obstacle on a standard day at sea level?

37. What is the landing distance over a 50 foot obstacle on a standard day at sea level?

## Federal Aviation Regulations

*Part 61 and 91. Fill in the blank portion of the regulation being referenced

38. What documents are you required to have in your possession to legally operate the airplane as a student pilot while flying solo? **(61.____)**

39. Are you required to have your logbook in your possession to operate the airplane as a student pilot while flying solo? Why? **(61.____)**

40. What endorsements are required for solo flight as a student pilot? **(61.____)**

41. What are the general limitations of a student pilot flying solo? **(61.____)**

42. Who is directly responsible for, and is the final authority as to, the **safe** operation of the aircraft? **(91.____)**

43. What must you do when unairworthy mechanical, electrical, or structural conditions occur during flight? **(91.____)**

44. What documents are required to be on board the aircraft at all times? **(AROW)**

45. How many hours are required between consuming alcohol and flying? **(91.____)**

46. What preflight action is required: **(91.____)**
    a. For flights not in the vicinity of an airport?

    b. For any flight?

47. When are you required to wear a safety belt? **(91.____)**

48. When are you required to wear your shoulder harness? **(91.____)**

49. List the right-of-way rules for aircraft in the following scenarios **(91.____)**
    a. General:

    b. In distress:

    c. Converging:

    d. Approaching head on:

    e. Overtaking:

    f. Landing:

50. What are the minimum safe altitudes? **(91.____)**
    a. Anywhere:

b. Over congested areas:

c. Over other than congested areas:

d. Over open water or sparsely populated areas:

51. If the altimeter setting is not available at the departure airport, what altitude should the altimeter be set to? **(91.____)**

52. What do the following light gun signals mean? **(91.____)**

| Color and type of signal | Aircraft on the surface | Aircraft in flight |
|---|---|---|
| Steady GREEN | | |
| Flashing GREEN | | |
| Steady RED | | |
| Flashing RED | | |
| Flashing WHITE | | |
| Alternating RED/GREEN | | |

53. What are the minimum fuel requirements for day VFR flight? **(91.____)**

54. Fill in the following basic VFR weather minimums for **daytime** flight **(91.____)**

| Airspace | Flight visibility | Distance from clouds |
|---|---|---|
| Class B | | |
| Class C | | |
| Class D | | |
| Class E (<10k MSL) | | |
| Class G (<1200 AGL) | | |
| Class G (>1200 AGL) | | |

55. What are the appropriate VFR cruising altitudes when more than 3000 feet AGL? **(91.____)**
    a. Eastbound (magnetic course of 0-179 degrees)

    b. Westbound (magnetic course of 180-359 degrees)

56. List the minimum instruments and equipment that must be operable in standard category aircraft for day VFR flight. **(91.____)**
    *The Sportcruiser has a special airworthiness certificate in the light sport category. If soloing the Sportcruiser, list the minimum instruments and equipment required by the manufacturer for day VFR flight.

## Airspace Rules and Procedures

57. List the following frequencies at KSMO
    a. ATIS -
    b. Ground -
    c. Tower -
    d. Emergency -
58. Draw a diagram of the runways at KSMO. Label each runway. Draw the traffic pattern (including the noise abatement procedure) for the southwest facing runway and label each leg of the traffic pattern.

59. Which turn direction is the standard for a traffic pattern? What is the traffic pattern altitude (TPA) at KSMO?

60. What class of airspace surrounds KSMO?

61. What is the vertical limit of the airspace surrounding KSMO?

62. What is the altitude of the floor of the LAX class B airspace over KSMO and the Malibu area?

63. List the following requirements for each airspace

| Airspace | Minimum certificate | Communication Requirement | Equipment Requirement |
|---|---|---|---|
| Class B | | | |
| Class C | | | |
| Class D | | | |
| Class E | | | |
| Class G | | | |

64. What does the color of the airport symbol on a chart indicate?
    a. Blue symbol

    b. Magenta symbol

65. What do the yellow shaded areas on a chart signify?

66. What must you do before entering class D airspace?

**Airspace Rules and Procedures**

67. Describe how wake turbulence is produced.

68. An aircraft in what configuration produces the most wake turbulence?

69. Describe the behavior of the wingtip vortices (where they move in relation to the aircraft creating them).

70. Describe the wake turbulence avoidance procedures for the following situations:
    a. Landing after large aircraft

    b. Taking off after a large aircraft

    c. Crossing the path of a large aircraft in cruise flight

71. Give at least three situations that would necessitate a go-around.

72. List the procedures for a go-around.

73. Describe the procedures for an engine loss in flight.

74. What are the following squawk codes used for?
    a. 7500

    b. 7600

    c. 7700

75. What should you do if you experience a radio failure?
    a. Can you enter class D airspace?

    b. How should you enter the pattern?

    c. How would you get clearance to land?

    d. What squawk code should you use?

76. What must you do before practicing maneuvers?

77. When practicing steep turns, stalls, and slow flight, the entry altitude must allow a recovery to be completed no lower than _____ feet AGL

Instructor _____

Instructor Signature _____

Student Signature _____

Date of logbook endorsement _____