Cessna Citation 500/501 Pilot's Technical Examination

Version 0.2 2003-09-28

Candidate	Name	
	Licence class	Private/Commercial/ATP
	Licence number	
Examiner	Name	
	Licence number	
	Capacity	
Centre		
Date		200 -- --
Mark	(Pass mark is 70%)	/100 = %

Instructions: *This is an open-book exam, for which you will need access to up-to-date Citation 500 Pilot's Operating Handbook and technical manuals. For each question, mark the block on the answer sheet corresponding to the most correct answer. The quiz forces you to work through the handbooks. However, you must also remember most of these facts for use during flight!*

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Section A: Engines

1. The engines are:

    a. Pure jets.
    b. Turboprops.
    c. High-bypass fans.
    d. High-pressure turbines.

2. The two engine RPM parameters N_1 and N_2 are, respectively:

    a. Fan and high-pressure turbine RPM.
    b. Gas producer and low-pressure turbine RPM.
    c. Fan and low pressure turbine RPM.
    d. Accessory gearbox and high-pressure turbine RPM.

3. The combustion chamber is a reverse-flow type to:

    a. Decrease the amount of airflow through the engine.
    b. Reduce combustion temperatures.
    c. Reduce engine size.
    d. Increase combustion temperature.

4. The maximum allowable transient ITT (2 s maximum) during start is:

    a. 580°C
    b. 670°C
    c. 680°C
    d. 700°C

5. The maximum allowable continuous N_1 is:

    a. 95%
    b. 97%
    c. 99%
    d. 110%

6. The ignition system does ***not***:

    a. Provide spark ignition at all times during normal operation.
    b. Provide spark ignition when starting.
    c. Provide spark ignition when ice protection is selected.
    d. Provide spark ignition when manually selected.

7. Oil brands:

    a. May not be mixed at all.
    b. May be mixed but only in an emergency.
    c. May be mixed provided they are both natural oils.
    d. May be mixed provided they are both synthetic oils.

8. The green light above each ignition switch indicates that:

    a. The igniter plugs are firing.
    b. The engine combustion is sustainable.
    c. The igniter unit is receiving electrical power.
    d. Both *a* and *b*.

9. The oil level is best checked:

    a. Before the first flight of the morning.
    b. Within half an hour after flight.
    c. While the engine is turning.
    d. During routine maintenance checks.

10. The starting sequence is:

    a. Fully automatic.
    b. Semi-automatic, as the pilot has to introduce fuel at the right time.
    c. Manual, with the pilot having to control ignition and fuel and to turn off the starter motor at the right RPM.
    d. Fully automatic if an optional FADEC is installed.

11. The ITT gauge shows:

    a. The exhaust gas temperature.
    b. The temperature measured between the low-pressure and high-pressure turbines.
    c. The exhaust gas temperature, modified to estimate the actual ITT.
    d. A calculated ITT.

Section B: Thrust reversers

12. Thrust reversers are provided:

    a. On all C500s and C501s.
    b. As an optional extra.
    c. Only if a drag chute is installed.
    d. Only if no drag chute is installed.

13. Thrust reversers can be used:

    a. In flight and on the ground.
    b. Only for full-stop landings.
    c. For full-stop and touch-and-go landings.
    d. With a drag chute.

14. Thrust reversers are deployed by:

    a. An electrical system.
    b. A hydraulic system.
    c. A hydraulic system under electrical control.
    d. A cable-driven manual system.

15. Once the pilot has inadvertently deployed the reversers at a power setting above idle or advanced throttles during reverser retraction:

    a. The reversers can be freely used.
    b. The throttle system must undergo maintenance.
    c. The engines must be shut down and re-started before flight.
    d. The reversers cannot be stowed.

16. If the thrust reverser is selected in flight:

    a. A squat switch will preclude deployment.
    b. The Master Warning will flash.
    c. The reverser will deploy, leading to an asymmetric condition.
    d. Both *a* and *b*.

Section C: Fire protection

17. Pressing the LH or RH ENG FIRE PUSH button results in:

    a. Shutdown of fuel supply, hydraulics and electrics to and from that engine and arming the extinguishers.
    b. Shutdown of fuel supply, hydraulics and electrics to and from that engine and discharging the extinguisher into that engine.
    c. Discharging the extinguisher into the engine.
    d. A fire alarm.

18. During an electrical failure with the battery switch on EMER, the fire protection system:

    a. Works normally.
    b. Works normally, except that the warning lights do not illuminate.
    c. Is inoperative.
    d. Can be activated through a manual override lever.

Section D: Pneumatic and vacuum

19. Vacuum is generated:

    a. By two pumps on the accessory gearbox of each engine.
    b. By an electrical vacuum pump.
    c. By venting bleed air overboard through an ejector.
    d. By a vacuum pump on the left engine only.

20. The compressed air bottle in the nose compartment:

    a. Provides pressure for emergency wheel brakes.
    b. Provides pressure for landing gear blow-down.
    c. Blows out if it becomes over-pressurised.
    d. All of the above.

Section E: Flaps and flight controls

21. Speedbrakes may be used:

    a. Only on the ground.
    b. On the ground and in flight up to 176 KIAS.
    c. On the ground and in flight when the flaps are up.
    d. In all flight and ground operations.

22. The following flap settings are recommended for takeoff:

    a. 0° for all takeoffs.
    b. 15° for all takeoffs.
    c. 0° for some takeoffs, and 15° for others.
    d. 15° for some takeoffs, and 40° for others.

23. The following flap settings can be selected:

    a. 0°, 15° and 40°.
    b. 0° and from 15° to 40°.
    c. From 0° to 15° and 40°.
    d. From 0° to 40°.

24. Stall warning is provided by:

    a. An audible horn.
    b. A red light on the instrument panel.
    c. Both *a* and *b*.
    d. By aerodynamic buffeting.

25. On the optional angle of attack system, a reading of 1 means:

    a. The angle of attack for best lift/drag ratio.
    b. The stalling angle of attack.
    c. The angle of attack is 0°.
    d. The aircraft is in level flight.

Section F: Landing gear

26. The landing gear is operated:

    a. Electrically.
    b. Hydraulically.
    c. Hydraulically, with electric control circuits.
    d. Through a suitable system of linkages.

27. The gear horn will sound, and cannot be silenced by the *Horn Silence* button when the gear is not locked down and:

    a. A low power setting is used on both engines.
    b. A low power setting is used on both engines and 15° of flaps are selected.
    c. A low power setting is used on one engine, and 15° of flaps are selected.
    d. A low power setting is used on one engine, and 30° of flaps are selected.

28. The landing gear is kept up by:

    a. Hydraulic pressure.
    b. Mechanical uplocks.
    c. Pneumatic pressure.
    d. Electric solenoids.

29. If the landing gear mechanism burns out while the landing gear is in transit, the pilot can:

    a. Raise and lower the gear manually.
    b. Allow the gear to free fall and lock down it manually.
    c. Blow the gear down using air pressure.
    d. Both *b* and *c*.

Section G: Brakes

30. When the brakes are being applied by both pilots:

    a. The right-seat pilot has control.
    b. The left-seat pilot has control.
    c. The pilot who applied brakes first has control.
    d. The pilot who applies most force has control.

31. The brake fluid reservoir is situated:

    a. On the hydraulic power pack.
    b. In the tailcone area adjacent to the oxygen filler panel.
    c. In the nose compartment on the right side of the front pressure bulkhead.
    d. Under the floorboards, forward of the main spar.

32. The park brake:

    a. Is self-adjusting.
    b. Can lose pressure if the temperature changes in cycles.
    c. Can simply be pulled out to engage the brakes.
    d. Operates with air pressure.

33. The emergency brake:

    a. Works with a compressed air bottle.
    b. Cannot provide deliberate asymmetric braking.
    c. Is activated with a hand lever below the instrument panel.
    d. All of the above.

Section H: Pitot-static system

34. Static vent heating can be felt during the preflight inspection:

    a. With the back of the hand.
    b. Quickly, to avoid burnt skin.
    c. Only in contrast to the surrounding metal.
    d. Only at a distance of a few mm, to avoid burnt skin.

Section I: Ice and rain protection

35. When engine anti-ice is selected:

    a. The inboard wing leading edge is heated.
    b. The engine intake lip is heated.
    c. The engine compressor stator is heated.
    d. All of the above.

36. Windshield anti-ice operates through:

    a. Heating elements embedded into the glass panes.
    b. An electric heater and fan blower below the window.
    c. Engine bleed air.
    d. Engine bleed air and an electric heater.

37. If the electrical system fails:

    a. Windshield ice protection must be turned on, as far as possible.
    b. Windshield ice protection must be turned off, as far as possible.
    c. Windshield ice protection must be turned on under all circumstances.
    d. Windshield ice protection must be turned off under all circumstances.

38. In heavy rain, the pilot should:

    a. Turn on the windshield wipers.
    b. Select windshield alcohol.
    c. Select maximum airflow over the windshield.
    d. Turn off all airflow over the windshield.

39. The windshield alcohol system:

    a. Provides roughly ten minutes of windshield de-icing under emergency conditions.
    b. Must be used for all icing flight conditions.
    c. Provides rain dispersion during heavy rain.
    d. Lubricates the windshield wipers.

Section J: Pressurisation

40. The outflow valve in the rear pressure bulkhead:

    a. Relieves at around 8 PSI.
    b. Is spring-loaded to the closed position.
    c. Is forced open by pneumatic pressure from the regulator.
    d. All of the above are correct.

41. The pilot is alerted to an extreme cabin pressure drop by:

    a. A slight tingling sensation in the earlobes.
    b. A bluish shade in the fingertips.
    c. An annunciator on the instrument panel.
    d. An audible alarm bell.

42. Activating the EMER DUMP switch during flight:

    a. Dumps cabin pressure by shutting off bleed air input.
    b. Dumps cabin pressure by shutting off bleed air input and opens the outflow valve to dump cabin pressure..
    c. Leaves bleed air supply intact, but opens the outflow valve to dump cabin pressure.
    d. Engages electric heat to compensate for loss of hot bleed air.

43. The maximum comfortable climb and descent rate for most passengers is:

    a. 200 fpm
    b. 500 fpm
    c. 1000 fpm
    d. 1500 fpm

44. The ideal setting for the pressurisation controller on takeoff is:

    a. Just above airfield elevation.
    b. 500’ above airfield elevation.
    c. Cruising level.
    d. Just above cruising level.

45. When the EMER PRESS ON indicator illuminates, the pilot should reset the system to normal operation by turning the source selector to:

    a. EMER, then selecting either LH, RH or BOTH.
    b. LH, RH or BOTH.
    c. LH or RH.
    d. BOTH.

46. During level flight at maximum differential pressure, selecting a lower cabin altitude:

    a. Causes the cabin pressure to increase.
    b. Causes the cabin pressure to decrease.
    c. Has no effect on cabin pressure.
    d. Causes the aircraft to descend.

Section K: Oxygen

47. The oxygen pressure in the bottle is indicated by a gauge:

    a. On the bottle.
    b. On the filler panel.
    c. In the cockpit.
    d. Both *b* and *c*.

48. When checking the oxygen bottle, the pilot notices that the green disk is not visible.

    a. The bottle is empty.
    b. The bottle is full, and should indicate 1800 to 2000 PSI.
    c. The bottle is full, and should indicate 4000 PSI.
    d. The bottle could be half full.

49. Oxygen is used:

    a. For all operations above 13 500'.
    b. Only for high-altitude ferries.
    c. Only during emergencies.
    d. Both *b* and *c*.

50. Passenger oxygen masks will drop when:

    a. Cabin pressure altitude exceeds approximately 13 500'.
    b. When selected by the pilot.
    c. When selected by the passengers.
    d. Both *a* and *b*.

Section L: Cabin and environmental

51. Cabin air is cooled by:

    a. Circulation of pressurisation air over air-to-air heat exchangers in the wing roots.
    b. A vapour cycle air conditioning system.
    c. An air cycle machine in the pressurisation air supply lines.
    d. Both *a* and *b*.

52. When an overtemperature condition is indicated in the air conditioning duct, the pilot should:

    a. Turn off the air conditioner.
    b. Select manual cooling and decrease the selected temperature.
    c. Select manual heating and increase the selected temperature.
    d. Retain the automatic mode and decrease the selected temperature.

Section M: Electrical

53. On early serial numbers, the two AC inverters:

    a. Are used one at a time to drive both buses together.
    b. Are both used together to simultaneously drive both AC buses.
    c. Both drive separate AC buses that can be operated off one inverter if the other fails.
    d. Both drive separate AC buses of which only one can be used if either inverter fails.

54. On later serial numbers, the two AC inverters:

    a. Are used one at a time to drive both buses together.
    b. Are both used together to simultaneously drive both AC buses.
    c. Both drive separate AC buses that can be operated off one inverter if the other fails.
    d. Both drive separate AC buses of which only one can be used if either inverter fails.

55. When an inverter failure annunciator is illuminated (FD AC PWR FAIL, RAD AC PWR FAIL or AC FAIL), the cause is:

    a. A low voltage condition.
    b. A high voltage condition.
    c. A dead inverter.
    d. Any of the above.

56. With Inverter 1 turned off, Inverter 2 turned on and the crossover switch in XOVER, the pilot can expect to see:

    a. FD AC PWR FAIL
    b. RAD AC PWR FAIL
    c. AC FAIL
    d. FD AC PWR FAIL and RAD AC PWR FAIL

57. The hot battery bus is connected to the battery:

a. At all times.
b. When the battery switch is on BATT or EMER.
c. When the battery switch is on BATT.
d. When the battery switch is on EMER.

58. The emergency bus is connected to the battery:

a. At all times.
b. When the battery switch is on BATT or EMER.
c. When the battery switch is on BATT.
d. When the battery switch is on EMER.

59. The emergency bus:

a. Powers only a few essential items until the battery is depleted.
b. Powers only a few essential items and recharges the battery.
c. Powers all the buses, using the AC inverters.
d. Powers all the annunciators and engine instruments.

60. The generator switches should be switched off:

a. During shutdown.
b. During startup with the internal battery.
c. During startup with external power.
d. All of the above.

61. The starters are disengaged:

a. By releasing the start button.
b. Automatically when the engine is running stably.
c. By pressing the Starter Disengage button.
d. Either *b* or *c*.

62. The maximum generator charge current is:

a. 325 A.
b. 400 A.
c. 325 A, except at very high altitudes.
d. 400 A, except at very high altitudes.

63. The nominal battery voltage is:

a. 12 V
b. 14 V
c. 24 V
d. 28 V

64. The nominal generator charging voltage is:

a. 12 V
b. 14 V
c. 24 V
d. 28 V

65. A popped circuit breaker:

a. Should not be reset in flight.
b. Should be reset in flight.
c. May be reset in flight, except if it is a subpanel feeder breaker.
d. Could be reset in flight, provided that it protects an essential item and is not a subpanel feeder breaker.

66. The battery switch should be on during an external power start:

a. To assist the GPU.
b. To absorb power spikes.
c. To take over the start in the event of a GPU failure.
d. Both *b* and *c*.

Section N: Fuel

67. The fuel tanks are:

a. Bladders in the wings.
b. Metal tanks in the wings.
c. A wet wing, forward of the spar.
d. A wet wing, from leading to trailing edge.

68. Useable fuel capacities (in US Gallons) are:

a. 272 or 282 USG total, depending on serial number.
b. 272 or 282 USG per side, depending on serial number.
c. 544 or 564 USG per side, depending on serial number.
d. None of the above.

69. Crossfeed is provided to:

a. Facilitate fuel feeding during normal operation.
b. Prevent fuel imbalance in normal operation.
c. Prevent fuel imbalance during single-engine flight.
d. Provide fuel for the heater.

70. Transfer pumps:

a. Use electrical power to transfer fuel into the sump.
b. Transfer fuel from the sump using return flow.
c. Use return flow to transfer fuel into the sump.
d. Must be turned on after startup.

71. Fuel to the engine can be shut off in flight by:

a. Turning off the firewall shutoff valve.
b. Pressing the Engine Fire button.
c. Closing the manual shutoff in the wing root.
d. Both *a* and *b*.

72. After an engine failure, the electric boost pump should be turned on to:

a. Balance the fuel load.
b. Maximise the probability of a spontaneous restart.
c. Lubricate the engine-driven fuel pump.
d. Balance the electrical load.

73. The main ejector pumps:

a. Eject fuel when mass must be reduced for emergency landings.
b. Are driven by high-pressure fuel flow returning from the engines.
c. Are driven electrically.
d. Are driven by the engine accessory gearbox.

74. Fuel anti-ice additives must ***not*** be added:

a. To all fuel that does not already include it.
b. Directly into the tanks after refuelling.
c. To Avgas.
d. During refueling.

75. Avgas 100LL can be used:

a. In limited quantities.
b. Only at low altitudes.
c. Only with the electric fuel boost pumps operating.
d. All of the above.

76. The IN TRANSIT light means:

a. Fuel is in transit through the crossfeed.
b. The aircraft is in transit between climb and cruise.
c. The crossfeed valve is moving between one position and another, or is not synchronised with the selector.
d. Fuel is in transit between tanks to move the centre of gravity.

77. The FUEL FILT BYPASS annunciator means:

a. The fuel is not flowing through the filter.
b. There is a serious pressure drop across the filter, and the fuel may shortly start bypassing the filter.
c. The pilot has selected the bypass to route fuel around the filter.
d. Both *a* and *b*.

78. The total number of fuel drains per wing is:

a. Three.
b. Four.
c. Five.
d. Six.

79. The fuel quantity measurement system uses:

a. Floats in each tank.
b. Capacitance probes and temperature compensators in each tank.
c. An optical turbidity meter in each tank.
d. A bridge-type densitometer in each tank.

80. The low-fuel warning system uses:

a. Floats in each tank.
b. Capacitance probes and temperature compensators in each tank.
c. An optical turbidity meter in each tank.
d. A bridge-type densitometer in each tank.

Section N: Hydraulics

81. The following systems (if installed) are hydraulically driven:

a. Flaps, landing gear, speedbrakes, thrust reversers.
b. Flaps, landing gear, thrust reversers.
c. Landing gear, speedbrakes, thrust reversers.
d. Landing gear, speedbrakes.

82. The hydraulic system:

a. Maintains a constant pressure at a low flow rate during normal flight.
b. Maintains a constant flow rate at a low pressure during normal flight.
c. Only builds up pressure as required.
d. Both *b* and *c*.

83. Hydraulic fluid brands:

    a. May be mixed freely.
    b. May be mixed provided they are both natural fluids.
    c. May be mixed provided they are both synthetic oils.
    d. May not be mixed at all.

Section O: Weight and Balance

84. Maximum operating weights (in pounds) for unmodified aircraft with early serial numbers are:

	Ramp	Takeoff	Landing
a.	11 000	10 850	10 400
b.	11 650	11 500	11 000
c.	12 000	11 850	11 350
d.	12 500	12 350	11 850

Section O: True or False

85. Differential ailerons are employed.
86. Engine anti-ice must not be selected before there is an accumulation of at least several mm of ice.
87. Oil quantities must be checked before the first start of the day.
88. Oxygen is not needed during high altitude flight, as the differential pressure rating is high enough even for high altitude flight.
89. A negative-ground power source is required to keep air conditioning operational when the engines are not running.
90. Avgas can be used in cruise at FL220.
91. A C500 can use at least 20 000 litres of Avgas between overhauls.
92. The electric boost pump must be left on if the engine is shut down in flight.
93. During normal starts, fuel can be turned on when N_1 reaches 8%.
94. The battery switch is normally ON when using a power cart for starting.
95. The generator switches must be left on during battery starts.
96. The master warning only flashes when a red annunciator is illuminated.
97. Deicing boots should be scrubbed regularly.
98. The nosewheel should be inflated to 120 kPa.
99. Specified landing distances assume full thrust reverser usage.
100. Engine synchronisation must be turned on for landing.