USAF Aero Club
T-41B (Cessna R-172E) Aircraft Exam
Updated February 2017

Instructions

Complete the supplement following exam using the answer sheet provided. Do not assume information not specifically provided in the questions. You will need the Operator's Manual of the Army Model T-41B Aircraft. Questions 1 - 33 are open book. Use a separate answer sheet for the closed book exam.

I. Aircraft Systems

1. The maximum takeoff and landing weight for the T-41B in the normal category is _____ pounds. In the utility category, it is _____ pounds.

A. 2400 / 2100
B. 2500 / 2200
C. 2300 / 2000
D. 2400 / 2200

2. The engine oil capacity is _____ quarts. The minimum quantity of oil for flight is _____ quarts. Fill to _____ quarts for normal flights of less than 3 hours.

A. 9 / 7 / 8
B. 6 / 4 / 5
C. 8 / 6 / 7
D. 9 / 8 / 8

3. The T-41B with standard fuel tanks can hold _____ gallons of fuel. Total **usable** fuel in all flight conditions is _____ gallons, in level flight, it is _____ gallons.

A. 51 / 45 / 47
B. 50 / 44 / 46
C. 52 / 46 / 51
D. 52 / 44 / 47

4. To stop the flow of fuel to the engine, the pilot has to _____.

A. place the fuel selector valve to the OFF position
B. pull the fuel shutoff valve control knob full out
C. both A and B
D. None of the above

5. The T-41B is equipped with an auxiliary fuel pump. If the auxiliary fuel pump switch is on (with the master switch on) and the engine is stopped, the cylinder intake ports will _____.

A. be flooded
B. get some fuel
C. get no fuel at all
D. automatically lean the mixture through the aneroid system

6. The auxiliary fuel pump is not to be used while the engine is running during normal operation, because with the engine-driven pump functioning, a fuel/air ratio richer than that for best power is produced.

A. true
B. false

7. The low fuel warning light (one for each tank) will illuminate when the fuel level transmitter float in the respective fuel tank drops to the ____ gallon level.

A. 8
B. 9
C. 10
D. 7

8. The T-41B is equipped with a _____ volt, _____ electrical system, powered by an engine driven _____ amp alternator and a _____ volt battery.

A. 28, AC, 60, 24
B. 28, DC, 60, 24
C. 28, DC, 38, 24
D. 28, AC, 38, 24

9. The ammeter will show discharge when _____.

A. the alternator is not functioning
B. the electrical load exceeds alternator output
C. both A and B are correct
D. any electrical component is turned on

10. _____ is the speed shown on the airspeed indicator and is expressed in knots or mph.

A. IAS
B. CAS
C. TAS
D. EAS

11. The terms mph and kts stand for _____ and _____.

A. Statute miles per hour and nautical miles per hour
B. Nautical miles per hour and statute miles per hour
C. Statute miles per hour and kilometers per hour
D. Nautical miles per hour and kilometers per hour

12. The stall warning system will provide an audible warning _____ above stall in all flight conditions.

A. 5 – 10 kts
B. 5 – 10 mph
C. 0 – 5 mph
D. 0 – 5 kts

13. Approved fuel grades for the R-172E (T-41B) include _____ and _____.

A. 80/87 min grade (red) and 100 LL (blue)
B. 80/87 min grade (red) and 100/130 (green) and 100 LL (blue)
C. 100/130 (green) and 100 LL (blue)
D. 100 LL (blue) and 115/145 (purple)

14. It is a foggy day with high humidity and the weather forecaster has predicted icing in the clouds. It is a good technique to switch on the pitot heat when ready to taxi.

A. true
B. false

II. Normal Procedures

15. During engine start, continuous cranking should not exceed _____ seconds. If engine fails to start, release ignition switch and allow the starter to cool for _____ seconds.

A. 20 / 30
B. 30 / 30
C. 30 / 20
D. 20 / 20

16. Normal takeoffs are accomplished with wing flaps up, full power, and _____ rpm.

A. max
B. 2800
C. 3000
D. 2900

17. Short field takeoffs are accomplished with _____ flaps and a _____ mph climb speed.

A. 10° / 60 – 70
B. 20° / 60
C. 20° / 60 – 70
D. 10° / 70

18. Normal climbs are performed at _____ mph, _____ inches of manifold pressure, and _____ rpm.

A. 80 – 90 / 24 / 2600
B. 95 / 25 / 2800
C. 100 / 25 / 2600
D. 100 / 25 / 2800

19. The Fuel Flow Indicator is only accurate at full power.

A. True
B. False

20. During maximum performance climbs, the mixture should be set _____.

A. to 8 gal/hour
B. to 13 gal/hour
C. in accordance with the fuel flow indicated on the placard adjacent to the fuel flow indicator for the proper altitude
D. to lean for max power and then enrichened three half turns

21. The best rate of climb speed at sea level is _____ mph and at 10,0000 feet MSL is _____ mph.

A. 95 / 85
B. 95 / 87

C. 97 / 85
D. 97 / 87

22. The best angle of climb speed is _____ mph.

A. 60
B. 65
C. 75
D. 95

23. Normal landing speed is _____ mph with flaps up and _____ mph with flaps down.

A. 85 / 75
B. 80 – 90 / 70 – 80
C. 80 / 70
D. 82 / 69

24. For a short field landing, _____ flaps are used and a speed of _____ mph is maintained.

A. 30° / 60
B. 30° / 70
C. 40° / 60
D. 40° / 70

III. Limitations

25. The engine limitation is _____ rpm. A max of 10 sec engine overspeed up to _____ rpm requires a write up. Overspeeds up to _____ rpm for a max of 10 sec require inspection. Overspeeds above _____ rpm require engine removal for complete major overhaul.

A. 3000 / 3300 / 3400 / 3400
B. 2800 / 3200 / 3400 / 3400
C. 2800 / 3200 / 3400 / 3500
D. 3000 / 3200 / 3400 / 3500

26. The Never Exceed Speed in the T-41B (R-172E) is _____.

A. 158 mph
B. 182 kts
C. 182 mph
D. 158 kts

27. The Maximum Structural Cruising Speed in the T-41B (R-172E) is _____.

A. 145 kts
B. 145 mph
C. 160 mph
D. 160 kts

28. The Stalling Speed of the T-41B (2500 lbs gross weight) in the clean configuration is _____ mph CAS, and in the landing configuration (40º flaps) is _____mph CAS.

A. 64 / 53

B. 60 / 49
C. 63 / 47
D. 63 / 49

29. The normal operating range of the manifold pressure is _____ inches.

A. 18 – 25
B. 15 – 20
C. 15 – 25
D. 18 – 28

30. The minimum idling oil pressure is _____.

A. lower green marking
B. 30 psi
C. 10 psi
D. 5 – 10 psi

IV. Performance

31. Using Figure 14-6 in the T-41B Operator's Manual, calculate the takeoff ground run and distance to clear a 50 ft obstacle at the Academy Airfield using the following conditions:

- gross weight 2200 lbs
- wind 010/10
- temperature 50° F
- ALSTG 30.49

A. 720 / 1185
B. 773 / 1263
C. 570 / 975
D. 325 / 630

32. Cruising at 10,000 feet MSL (2500 rpm) in the T-41B under standard conditions at max gross weight you can expect the following combination of performance data: maximum TAS _____ knots, fuel burn of _____ gal/hour, and endurance of _____ hours.

A. 123 / 10.5 / 5.6
B. 120 / 10.2 / 4.5
C. 123 / 6.6 / 7.0
D. 117 / 9.6 / 4.5

33. While cruising you should select a combination of manifold pressure and RPM to produce no more than _____ % power.

A. 75
B. 70
C. 85
D. 80

34. Using figure 14-13 in the T-41B Operator's Manual, calculate the landing ground roll and the distance to clear a 50 ft obstacle at the Academy Airfield. Use the same conditions as in question # 31.

A. 467 / 1000
B. 363 / 784
C. 456 / 926
D. 385 / 825

35. Aerobatic maneuvers are prohibited when operating in the utility category but are allowed in the normal category.

A. true
B. false

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I. Aircraft Systems

1. The maximum takeoff and landing weight for the T-41B in the normal category is _____ pounds. In the utility category, it is _____ pounds.

A. 2400 / 2100
B. **2500 / 2200** **2-9**
C. 2300 / 2000
D. 2400 / 2200

2. The engine oil capacity is _____ quarts. The minimum quantity of oil for flight is _____ quarts. Fill to _____ quarts for normal flights of less than 3 hours.

A. 9 / 7 / 8
B. 6 / 4 / 5
C. **8 / 6 / 7** **2-38**
D. 9 / 8 / 8

3. The T-41B with standard fuel tanks can hold _____ gallons of fuel. Total **usable** fuel in all flight conditions is _____ gallons, in level flight, it is _____ gallons.

A. 51 / 45 / 47
B. 50 / 44 / 46
C. **52 / 46 / 51** **Fig 2-5**
D. 52 / 44 / 47

4. To stop the flow of fuel to the engine, the pilot has to _____.

A. place the fuel selector valve to the OFF position
B. **pull the fuel shutoff valve control knob full out** **2-46**
C. both A and B
D. None of the above

5. The T-41B is equipped with an auxiliary fuel pump. If the auxiliary fuel pump switch is on (with the master switch on) and the engine is stopped, the cylinder intake ports will _____.

A. **be flooded** **2-49 Note**
B. get some fuel
C. get no fuel at all
D. automatically lean the mixture through the aneroid system

6. The auxiliary fuel pump is not to be used while the engine is running during normal operation, because with the engine-driven pump functioning, a fuel/air ratio richer than that for best power is produced.

A. **true** **2-50**
B. false

7. The low fuel warning light (one for each tank) will illuminate when the fuel level transmitter float in the respective fuel tank drops to the ____ gallon level.

A. 8
B. **9** **2-60**
C. 10
D. 7

8. The T-41B is equipped with a _____ volt, _____ electrical system, powered by an engine driven _____ amp alternator and a _____ volt battery.

A. 28, AC, 60, 24
B. 28, DC, 60, 24
C. **28, DC, 38, 24** **2-62**
D. 28, AC, 38, 24

9. The ammeter will show discharge when _____.

A. the alternator is not functioning
B. the electrical load exceeds alternator output
C. **both A and B are correct** **2-73**
D. any electrical component is turned on

10. _____ is the speed shown on the airspeed indicator and is expressed in knots or mph.

A. IAS
B. **CAS** **7-16**
C. TAS
D. EAS

11. The terms mph and kts stand for _____ and _____.

E. Statute miles per hour and nautical miles per hour **General Knowledge**
F. Nautical miles per hour and statute miles per hour
G. Statute miles per hour and kilometers per hour
H. Nautical miles per hour and kilometers per hour

12. The stall warning system will provide an audible warning _____ above stall in all flight conditions.

A. 5 – 10 kts
B**. 5 – 10 mph** **2-122**
C. 0 – 5 mph
D. 0 – 5 kts

13. Approved fuel grades for the R-172E (T-41B) include _____ and _____.

A. 80/87 min grade (red) and 100 LL (blue)
B. 80/87 min grade (red) and 100/130 (green) and 100 LL (blue)
C. **100/130 (green) and 100 LL (blue)** **Fig 2-10**
D. 100 LL (blue) and 115/145 (purple)

14. It is a foggy day with high humidity and the weather forecaster has predicted icing in the clouds. It is a good technique to switch on the pitot heat when ready to taxi.

A. true
B. **false** **2-105 Caution/ 6-18 Caution**

II. Normal Procedures

15. During engine start, continuous cranking should not exceed _____ seconds. If engine fails to start, release ignition switch and allow the starter to cool for _____ seconds.

A. 20 / 30
B**. 30 / 30** **3-35 Caution**
C. 30 / 20
D. 20 / 20

16. Normal takeoffs are accomplished with wing flaps up, full power, and _____ rpm.

A. max
B. **2800** **3-44**
C. 3000
D. 2900

17. Short field takeoffs are accomplished with _____ flaps and a _____ mph climb speed.

A. 10° / 60 – 70
B. **20° / 60** **3-46**
C. 20° / 60 – 70
D. 10° / 70

18. Normal climbs are performed at _____ mph, _____ inches of manifold pressure, and _____ rpm.

A. 80 – 90 / 24 / 2600
B. 95 / 25 / 2800
C. **100 / 25 / 2600** **3-51**
D. 100 / 25 / 2800

19. The Fuel Flow indicator is only accurate at full power.

A. True
B. False

20. During maximum performance climbs, the mixture should be set _____.

A. to 8 gal/hour
B. to 13 gal/hour
C. **in accordance with the fuel flow indicated on the placard adjacent to the fuel flow indicator for the proper altitude** **3-51**
D. to lean for max power and then enrichened three half turns

21. The best rate of climb speed at sea level is _____ mph and at 10,0000 feet MSL is _____ mph.

A. 95 / 85
B. **95 / 87** **3-51**
C. 97 / 85
D. 97 / 87

22. The best angle of climb speed is _____ mph.

A. 60
B. 65
C. **75** **3-51**
D. 95

23. Normal landing speed is _____ mph with flaps up and _____ mph with flaps down.

A. **85 / 75** **3-60**
B. 80 – 90 / 70 – 80
C. 80 / 70
D. 82 / 69

24. For a short field landing, _____ flaps are used and a speed of _____ mph is maintained.

A. 30° / 60
B. 30° / 70
C. **40° / 60** **3-62**
D. 40° / 70

III. Limitations

25. The engine limitation is _____ rpm. A max of 10 sec engine overspeed up to _____ rpm requires a write up. Overspeeds up to _____ rpm for a max of 10 sec require inspection. Overspeeds above _____ rpm require engine removal for complete major overhaul.

A. 3000 / 3300 / 3400 / 3400
B. **2800 / 3200 / 3400 / 3400** **7-12**
C. 2800 / 3200 / 3400 / 3500
D. 3000 / 3200 / 3400 / 3500

26. The Never Exceed Speed in the T-41B (R-172E) is _____.

A. 158 mph
B. 182 kts
C. **182 mph** **7-16**
D. 158 kts

27. The Maximum Structural Cruising Speed in the T-41B (R-172E) is _____.

A. 145 kts
B. **145 mph** **7-16**
C. 160 mph
D. 160 kts

28. The Stalling Speed of the T-41B (2500 lbs gross weight) in the clean configuration is _____ mph CAS, and in the landing configuration (40º flaps) is _____mph CAS.

A. **64 / 53** **Fig 8-1**
B. 60 / 49
C. 63 / 47
D. 63 / 49

29. The normal operating range of the manifold pressure is _____ inches.

A. 18 – 25
B. 15 – 20
C. **15 – 25** **Fig 7-1**
D. 18 – 28

30. The minimum idling oil pressure is _____.

A. lower green marking
B. 30 psi
C. **10 psi** **Fig 7-1**
D. 5 – 10 psi

IV. Performance

31. Using Figure 14-6 in the T-41B Operator's Manual, calculate the takeoff ground run and distance to clear a 50 ft obstacle at the Academy Airfield using the following conditions:

- gross weight 2200 lbs
- wind 010/10
- temperature 50° F
- ALSTG 30.49

A. 720 / 1185 **Note: Headwind component = 8.5 kts**
B. 773 / 1263 **Temperature = 10 C, PA = 6,000 ft**
C. **570 / 975** **Fig 14-6**
D. 325 / 630

32. Cruising at 10,000 feet MSL (2500 rpm) in the T-41B under standard conditions at max gross weight you can expect the following combination of performance data: maximum TAS _____ knots, fuel burn of _____ gal/hour, and endurance of _____ hours.

A. 123 / 10.5 / 5.6
B. **120 / 10.2 / 4.5** **Fig 14-11**
C. 123 / 6.6 / 7.0
D. 117 / 9.6 / 4.5

33. While cruising you should select a combination of manifold pressure and RPM to produce no more than _____ % power.

A. **75** **3-53**
B. 70
C. 85
D. 80

34. Using figure 14-13 in the T-41B Operator's Manual, calculate the landing ground roll and the distance to clear a 50 ft obstacle at the Academy Airfield. Use the same conditions as in question # 31.

A. 467 / 1000
B. **363 / 784** **Note: 8.5 kt headwind, 10 C, PA = 6,000 ft**
C. 456 / 926
D. 385 / 825

35. Aerobatic maneuvers are prohibited when operating in the utility category but are allowed in the normal category.

A. true
B. **false** **7-20/21**

CLOSED BOOK EXAM (T-41B)

Write the Emergency Action Procedures for the Following:

ENGINE FIRE DURING START

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

ENGINE FIRE DURING FLIGHT

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

ENGINE FAILURE IN FLIGHT (CRUISE)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____

EMERGENCY APPROACH AND LANDING

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Fill in all the applicable blanks.

1. V_A ____MPH____ 2500 Lbs
2. V_{FE} ____MPH____ (First Extension Increment)
3. Best Glide Speed @ Maximum Gross Weight ____MPH @ 2500

CLOSED BOOK EXAM (T-41B)

Write the Emergency Action Procedures for the Following:

ENGINE FIRE DURING START (Section IV, 4-4)

1. AUXILIARY FUEL PUMP - OFF
2. THROTTLE – OPEN
3. IGNITION SWITCH – START
4. MIXTURE – IDLE CUT-OFF (if fire not extinguished)
5. IGNITION SWITCH – OFF
6. MASTER SWITCH - OFF
7. FUEL SHUTOFF VALVE - OFF
8. EXIT AIRCRAFT

ENGINE FIRE DURING FLIGHT (Section IV, 4-4)

1. MIXTURE – IDLE CUT-OFF
2. FUEL SHUTOFF VALVE – OFF
3. IGNITION SWITCH – OFF
4. MASTER SWITCH – OFF
5. GLIDE – 120 MPH
6. CABIN HEAT & AIR KNOBS – IN

ENGINE FAILURE IN FLIGHT (CRUISE) (Section IV, 4-1)

1. AIRSPEED – 85 MPH
2. FUEL SELECTOR – BOTH
3. MIXTURE – RICH
4. PROPELLOR – INCREASE
5. THROTTLE – CLOSED
6. AUXILIARY FUEL PUMP - HI
7. THROTTLE – OPEN (8-10 GAL)
8. AUXILIARY FUEL PUMP - OFF
9. IGNITION SWITCH – START

EMERGENCY APPROACH AND LANDING (Section IV, 4-3)

1. AIRSPEED – 85 MPH
2. MIXTURE – IDLE CUT-OFF
3. FUEL SHUTOFF VALVE – OFF
4. PROPELLOR – INCREASE
5. IGNITION SWITCH – OFF
6. FLAPS – AS REQUIRED
7. MASTER SWITCH - OFF
8. DOORS - UNLATCH
9. TOUCHDOWN SLIGHTLY TAIL LOW
10. BRAKES – APPLY HEAVILY

Fill in all the applicable blanks.

1. VA 127 MPH 2500 Lbs **(7-16)**
2. VFE 100 MPH (First Extension Increment) **(7-16)**
3. Best Glide Speed @ Maximum Gross Weight 85 MPH @ 2500 **(4-3)**