

RANK _____

NUMBER CORRECT _____

SAFECON 2005

National Intercollegiate Flying Association

Manual Flight Computer Test

NAME _____

CONTESTANT NUMBER _____

SCHOOL _____

INSTRUCTIONS: You will be given sixty (60) minutes to complete the following test. The test is made up of thirty-five (30) multiple choice questions and five (5) fill-in questions. Electronic calculators, instructional manuals, and electronic flight computers are **NOT** allowed. No aids of any type may be affixed or added in any manner to your flight computer. Raise your hand now if your computer has been altered in any way.

Mark your answers on the answer sheet provided. Only the answer sheet will be graded. In the case of ties, faster completion time takes precedence.

STOP!

DO NOT TURN THE PAGE

UNTIL TOLD TO DO SO

1. You are descending from a cruise of 12,500 feet MSL to Death Valley Airport (-300 feet MSL), at 125 kts groundspeed and 800 feet per minute. How far out must you start down?
 - A. 14 minutes or 29 nautical miles
 - B. 15 minutes or 31 nautical miles
 - C. 16 minutes or 33 nautical miles
 - D. 17 minutes or 35 nautical miles

2. When filled up, your Mooney's projected weight will be 2830 pounds, 130 pounds over its max. ramp weight. Your current CG is 71.00 inches with a forward limit of 70.2 inches. Where will you remove 130 lbs from the aircraft to move the CG to the forward limit?
 - A. 16.6 inches
 - B. 87.6 inches
 - C. 166 inches
 - D. 54.4 inches

3. You are departing from Camas Municipal Airport, WA heading north to Seattle-Tacoma International Airport, WA. To check your groundspeed you use the few sections of land (1 section of land = 1 statute mile) that exist. If you cross 5 sections of land in 3 minutes and 36 seconds, how fast are you going?
 - A. 43.2 knots
 - B. 72.4 knots
 - C. 83.5 knots
 - D. 89.9 knots

4. In question 3, you were heading north towards Seattle. At 17.8 nautical miles from the center of Mt. St. Helens at 7400 feet MSL, you realize that you have forgotten about the temporary flight restriction (TFR) up to 13,000 ft MSL within a 5 nautical mile radius around the center of Mt. St. Helens. If you maintain the calculated groundspeed from question 3 and a rate of climb of 700 feet per minute, will you be able to climb high enough to clear the TFR?
 - A. Yes, by 3.1 nautical miles
 - B. No, by 1.9 nautical miles
 - C. No, by 5.2 nautical miles
 - D. Yes, by 8.1 nautical miles

5. Tom, a former Navy pilot, one day recalls his training at Cecil Field. He remembers using an airfield to the northwest that was 5300 feet long with a 750 foot section marked off for practice carrier ops. He then wonders, what percentage of the field was not used?
 - A. 86%
 - B. 84%
 - C. 88%
 - D. 82%

6. One day you get the opportunity to jump into an Antonov Colt. You find the altimeter and the airspeed indicator are stuck at 630 meters and 160 km/hr, respectively. What are these readings in feet and knots?
 - A. 207.0 feet, 88 knots
 - B. 1920.0 feet, 101 knots
 - C. 192.0 feet, 101 knots
 - D. 2070.0 feet, 88 knots

7. You want to take your three nephews flying. They have all three been learning about the metric system and other weights in school. They give their weights as follows:

Nephew 1 = 36 kilograms
Nephew 2 = 12 imperial gallons of Avgas
Nephew 3 = 40.5 liters of oil

What is the combined weight of your three nephews?

- A. 215.2 pounds
- B. 227.3 pounds
- C. 236.7 pounds
- D. 245.9 pounds

8. – 10.

John wants to fly directly from The Dalles, OR to Seattle, WA. However, the only problem is that there is a 12,000 foot mountain the way, Mt. Adams. There are calm winds aloft. He plans on flying the 118 nautical mile, true course of 324° route as follows:

1st Fly 20 nautical miles on the original true course.
2nd Fly on a true course of 310° for 93 km. This puts you abeam Mt. Adams
3rd Fly on a true course of 345° to regain his original course.

8. How far will John miss Mt. Adams by?

- A. He will only miss it by 1.17 nautical miles
- B. He will miss the mountain by 11.7 nautical miles
- C. He will miss the mountain by 7.0 nautical miles
- D. He will only miss it by 3.10 nautical miles

9. Will he rejoin his course prior to getting to Seattle? If so how far from Seattle will he rejoin his course?

- A. No, he will need at least a correction to a true heading of 356°
- B. Yes, he will rejoin his course 14 nautical miles from Seattle
- C. Yes, he will rejoin his course 20 nautical miles from Seattle
- D. Yes, he will rejoin his course 7 nautical miles from Seattle

10. For calculation, you use a straight line distance from The Dalles to Seattle, a groundspeed of 118 km/hr, and an assumption of an extra 5.2 minutes to deviate. What is the total time enroute?

- A. 101.5 minutes
- B. 107.5 minutes
- C. 111.5 minutes
- D. 116.5 minutes

11. You are 18.0 nautical miles from an airport (0 feet MSL) that is reporting a ceiling of 3300 feet. You are cruising at a groundspeed of 156 km/hr at 7500 feet MSL. You see that the cloud deck begins at 5.0 nautical miles away from the airport, in your direction. What rate of descent will you have to maintain to be 500 feet below the cloud deck before going under the clouds?

- A. 323 feet per minute
- B. 362 feet per minute
- C. 452 feet per minute
- D. 508 feet per minute

12. Tyra crosses the 023° radial at 13:03:42 and then crosses the 042° radial at 13:06:24. If she maintained a groundspeed of 190 statute miles per hour, how far from the VOR was she?
- 9.6 nautical miles
 - 13.2 nautical miles
 - 20.1 nautical miles
 - 23.4 nautical miles
13. John travels 202 kilometers on a True Heading of 132° and finds that he is 4.3 nautical miles off course to the left. Assuming calm winds aloft, what true heading does John need to parallel his original course?
- 134.4°
 - 129.6°
 - 132.9°
 - 131.1°
14. In question 13, if John has 318 km left in his flight, but he wants to regain his original course with 25 nautical miles left, what will his true heading have to be?
- 127.8°
 - 136.2°
 - 133.7°
 - 130.3°
15. At 25 nautical miles from the airport, John's groundspeed is 180 km/hr at 7500 ft MSL. He wants to level at pattern altitude (1900 ft MSL) 5 nautical miles from the airport. If he wants to descend at 500 feet per minute, in how many nautical miles should he begin his descent?
- He should have started his descent 13.6 nautical miles ago
 - In 1.9 nautical miles
 - In 5.2 nautical miles
 - In 3.6 nautical miles
16. – 19.
- Tim has an aircraft with a basic empty weight of 1900 pounds (CG of 70 inches). Tim (180 pounds) has three friends he wants to take flying with him: Tiffany (120 pounds), John (270 pounds), and Genie (130 pounds). The fuel on board is 40 U.S. gallons of AVGAS and the baggage weighs 160 pounds.
16. If Tiffany and Tim are up front (40 inches), John and Genie are in back (80 inches), the fuel is onboard (70 inches), and the baggage is the back (100 inches), what is the total weight and CG?
- 3000 pounds, 69.9 inches
 - 3000 pounds, 67.5 inches
 - 3100 pounds, 71.7 inches
 - 2900 pounds, 66.9 inches
17. If your buddy John switches places with Tiffany, what happens to the CG?
- The CG shifts aft 2.0 inches
 - The CG shifts aft 1.1 inches
 - The CG shifts forward .8 inches
 - The CG shifts forward 2.0 inches

18. Use the information from #17 for this calculation. If you burn 30 U.S. Gallons of AVGAS on this flight, what is your CG on touchdown?
- A. 72.03 inches
 - B. 71.13 inches
 - C. 68.97 inches
 - D. 67.77 inches
19. John and Genie get out of the airplane to visit friends. Tim fills up the tanks (40 U.S. Gallons of AVGAS) and Tiffany returns to the front seat. What is the departure CG?
- A. 67.12 inches
 - B. 71.61 inches
 - C. 68.35 inches
 - D. 72.82 inches
20. One day you are flying an Airbus A380 and an FAA Inspector is onboard giving you a line check. The inspector remembers you from a previous conversation and asks if you remember the time between radials equation. You do and he asks, "If I am 49 nautical miles from a VOR and I cross the 210° radial at 14:26:34 and the 219° radial at 14:28:28, what is my groundspeed?"
- A. 231 kilometers per hour
 - B. 256 kilometers per hour
 - C. 429 kilometers per hour
 - D. 566 kilometers per hour
21. The Concorde is traveling at Mach 2.2, and the outside air temperature is -76° F. What is this true airspeed in statute miles per hour?
- A. 1250 statute miles per hour
 - B. 1440 statute miles per hour
 - C. 1560 statute miles per hour
 - D. 1820 statute miles per hour
22. Referring to question #21, if the Concorde could maintain this for the entire 36,400 kilometer journey around the world (with calm winds everywhere), how long would this journey take?
- A. 12 hours and 54 minutes
 - B. 13 hours and 42 minutes
 - C. 15 hours and 36 minutes
 - D. 17 hours and 6 minutes
23. What are the winds aloft if the true airspeed is 109 statute miles per hour, the groundspeed is 109 kilometers per hour, on a true course of 90°, and the wind correction angle is 6°L?
- A. 075° at 37 knots
 - B. 105° at 42 knots
 - C. 285° at 43 knots
 - D. 255° at 39 knots

24. Maintaining a groundspeed of 140 knots, you first turn to a true heading of 213° and find that you are drifting 5°L. You then turn to a true heading of 162° and find that you are drifting 6°R. What are the winds aloft?
- A. 243° at 39 knots
 - B. 110° at 40 knots
 - C. 190° at 41 knots
 - D. 010° at 39 knots

25. – 30.

You are flying for a corporation that has many corporate aircraft. On two separate days in two separate aircraft (a G IV and King Air), you are asked to fly from Madison, WI (800 feet MSL) to Rapid City, SD (2200 feet MSL). You fly in a standard atmosphere unless otherwise stated. Route 1 is with the G IV and route 2 is with the King Air and are as follows:

Route 1

MSN to RAP direct (602 nautical miles)

True Course = 287°

G IV burns 2000 pounds of Jet A per hour and travels at Mach .77 (-45° C)

Route 2

Leg 1 (MSN to DSM), Leg 2 (DSM to RAP) 294 nautical miles and 422 nautical miles respectively

True Course = Leg 1 (248°) and Leg 2 (322°)

King Air burns 750 pounds of Jet A per hour and travels at 230 knots, true airspeed

Des Moines, IA (600 feet MSL) is a landing airport

25. Without any calculations, you assume a time and distance to climb and descend for Route 1 total 25 minutes and 125 nautical miles, how long does it take to complete this route? Zero wind.
- A. 63.5 minutes
 - B. 77.4 minutes
 - C. 88.5 minutes
 - D. 102.3 minutes
26. Without any calculations, you assume the fuel burn in Route 2 is the average over the entire leg. You also assume, for each climb and descent, the time and distance it takes are 20 minutes and 75 nautical miles, how much fuel is burned during Route 2? Zero wind.
- A. 2340 pounds
 - B. 2190 pounds
 - C. 2080 pounds
 - D. 1840 pounds
27. Using the above information, if it costs (non-fuel costs) \$80 per minute to operate the G IV and \$40 per minute to operate the King Air, which is cheaper to operate on their respective routes?
- A. The G IV by about \$450
 - B. The G IV by about \$790
 - C. The King Air by about \$410
 - D. The King Air by about \$780

28. You plan the flight for the King Air on Route 2 as follows: The King Air climbs at 900 feet per minute to FL240 with a true airspeed of 180 knots and descends at 1500 feet per minute from FL240 with a true airspeed of 260 knots. The winds aloft are calm. What is the distance in cruise for the entirety of Route 2?
- A. 504.4 nautical miles
 - B. 421.2 nautical miles
 - C. 274.8 nautical miles
 - D. 146.4 nautical miles
29. You plan the flight for the G IV on Route 1 as follows: The G IV climbs at 2000 feet per minute to FL380 with a true airspeed of 270 knots and descends at 2000 feet per minute from FL380 with an average true airspeed of 420 knots. The winds aloft are calm. What is the distance in cruise for Route 1?
- A. 478.3 nautical miles
 - B. 392.7 nautical miles
 - C. 324.2 nautical miles
 - D. 280.2 nautical miles
30. If the King Air burns 1250 pounds per hour in climb and the G IV burns 3200 pounds per hour in climb, which will burn more fuel during its climb(s)?
- A. The King Air by 172 pounds
 - B. The King Air by 85 pounds
 - C. The G IV by 210 pounds
 - D. The G IV by 445 pounds

FOR ALL WRITE IN QUESTIONS, ANSWER TO THE NEAREST TENTH! (i.e. – one decimal place for all answers). WRITE YOUR ANSWERS ON THE ANSWER SHEET!

31. 100 feet per second = _____ statute miles per hour
32. 220 kilograms of AVGAS = _____ Imperial Gallons of AVGAS
33. 99,000 feet = _____ statute miles
34. Mach .54 at -20° C = _____ kilometers per hour, true airspeed
35. 424 quarts of oil = _____ pounds of oil

**NIFA SAFECON 2005
COMPUTER ACCURACY EXAM
Answer Key**

Possible Correct	35
Column 1 Incorrect -	_____
Column 2 Incorrect -	_____
Total Correct	_____

Contestant # _____

Name: _____

Elapsed Time: _____ ; _____
min sec

School: _____

MARK YOUR CHOICE COMPLETELY: SAMPLE (A) ● (C) (D)

- | | |
|---------------------|---------------------------------------|
| 1. (A) (B) (●) (D) | 19. (A) (B) (●) (D) |
| 2. (A) (●) (C) (D) | 20. (A) (B) (●) (D) |
| 3. (A) (●) (C) (D) | 21. (A) (●) (C) (D) |
| 4. (●) (B) (C) (D) | 22. (A) (B) (●) (D) |
| 5. (●) (B) (C) (D) | 23. (●) (B) (C) (D) |
| 6. (A) (B) (C) (●) | 24. (A) (B) (C) (●) |
| 7. (A) (B) (C) (●) | 25. (A) (B) (●) (D) |
| 8. (A) (●) (C) (D) | 26. (●) (B) (C) (D) |
| 9. (A) (●) (C) (D) | 27. (●) (B) (C) (D) |
| 10. (A) (B) (C) (●) | 28. (A) (●) (C) (D) |
| 11. (A) (B) (C) (●) | 29. (A) (●) (C) (D) |
| 12. (A) (B) (C) (●) | 30. (A) (●) (C) (D) |
| 13. (●) (B) (C) (D) | 31. <u>68.1</u> statute MPH +/- 0.7 |
| 14. (A) (●) (C) (D) | 32. <u>67.2</u> imp. Gallons +/- 1.0 |
| 15. (A) (●) (C) (D) | 33. <u>18.8</u> statute miles +/- 0.5 |
| 16. (●) (B) (C) (D) | 34. <u>618.0</u> km / hour +/- 5.0 |
| 17. (A) (B) (C) (●) | 35. <u>794.0</u> pounds +/- 10.0 |
| 18. (A) (B) (C) (●) | |

Column 1 Incorrect = _____

Column 2 Incorrect = _____

**NIFA SAFECON 2005
COMPUTER ACCURACY EXAM
Answer Sheet**

Possible Correct	_____
Column 1 Incorrect -	_____
Column 2 Incorrect -	_____
Total Correct	_____

Contestant # _____

Name: _____

Elapsed Time: _____ ; _____
min sec

School: _____

MARK YOUR CHOICE COMPLETELY: SAMPLE (A) ● (C) (D)

- | | |
|---------------------|-------------------------------|
| 1. (A) (B) (C) (D) | 19. (A) (B) (C) (D) |
| 2. (A) (B) (C) (D) | 20. (A) (B) (C) (D) |
| 3. (A) (B) (C) (D) | 21. (A) (B) (C) (D) |
| 4. (A) (B) (C) (D) | 22. (A) (B) (C) (D) |
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| 10. (A) (B) (C) (D) | 28. (A) (B) (C) (D) |
| 11. (A) (B) (C) (D) | 29. (A) (B) (C) (D) |
| 12. (A) (B) (C) (D) | 30. (A) (B) (C) (D) |
| 13. (A) (B) (C) (D) | 31. _____ statute MPH |
| 14. (A) (B) (C) (D) | 32. _____ imperial Gallons |
| 15. (A) (B) (C) (D) | 33. _____ statute miles |
| 16. (A) (B) (C) (D) | 34. _____ kilometers per hour |
| 17. (A) (B) (C) (D) | 35. _____ pounds of oil |
| 18. (A) (B) (C) (D) | |

Column 1 Incorrect = _____

Column 2 Incorrect = _____