

Diamond Star DA40 Pre-Solo Written Exam

Name _____

Operating Limitations

1. What type of engine is in the DA40? _____
2. What is the maximum takeoff power produced? _____
3. What is the specified maximum continuous power? _____
4. What are the specified maximum and minimum quantities of oil to be used in the DA40? _____
5. What type and grade of oil must be used during the engine's first 50 hours of operation? _____
6. What type and grade of oil must be used after the engine's first 50 hours of operation? _____
7. What is the DA40's maximum rated takeoff weight? _____
8. What is the wingspan of the DA40? (Keep in mind the effect this may have on hangar accommodations.) _____

9. Fill in the following:

a. Oil Pressure Normal Range _____

b. Oil Pressure Maximum _____

c. Oil Pressure Minimum _____

d. Oil Temperature Maximum _____

e. Cylinder Head Temperature (CHT) Maximum _____

f. Fuel Pressure Maximum _____

g. Fuel Pressure Minimum _____

h. Voltage Maximum _____

i. Voltage Minimum _____

j. Voltage Normal Range _____

10. What is the maximum takeoff weight? _____

11. Maximum ramp weight? _____

12. Maximum landing weight? _____

13. Maximum allowable weight in the baggage compartment? _____

14. What is the significance of the utility category for the DA40?

15. What are the airplane's center of gravity limits?

Fore: _____ Aft: _____

16. What is the fuel capacity of the DA40?

Total: _____ Useable: _____

17. What is the maximum allowable difference between tanks? Why?

18. What is (are) the approved fuel type(s) for the DA40?

Emergency Procedures

Airspeeds for emergency procedures:

	1874 lbs	2205 lbs	2535 lbs
Engine failure after takeoff (flaps T/O)			
Engine failure during cruise (best glide)			
Engine failure on landing (emergency landing)			
Flaps UP			
Flaps T/O			
Flaps LDG			

19. While attempting to start the engine, you notice smoke and flames around the cowl and in front of the aircraft. What do you do?

20. In cruise at 7,000 feet, you engine begins to run very roughly. What do you do?

21. On a normal cockpit check at altitude, you observe that your oil pressure indicator is reading 24 PSI. What do you do?

22. You are cruising at altitude when you notice a strange smell and observe smoke originating from under the instrument panel. What do you do?

23. What is the procedure for an over-voltage indication?

24. If, during an emergency landing, the A/C ended up upside down on its roof, how would you evacuate the aircraft?

Normal Operating Procedures

Airspeeds for normal operation at 2535 lbs:

V _{so}		V _s	
V _y		V _x	
V _r		V _{no (V_c)}	
V _{fe}	T/O:	V _{ne}	
	LDG:		
Approach 2407 lbs	T/O:	V _a	
	LDG:		

Performance and Weight and Balance

You and two friends have decided to go white water rafting on the Ottawa River for a weekend and want to fly down in the DA40 Diamond Star. Based on the following conditions, answer the following questions using the DA40 performance charts and weight and balance information.

Trip Stats: London (CYXU) to Ottawa (CYOW)	
Magnetic Track	080 degrees Magnetic
Distance	280 nm
Altimeter Settings	30.04 "Hg
Cruising Altitude	7000 feet
Temperature at Altitude	+18° C
Magnetic Variation	12° West
London (CYXU) Elevation	912' ASL
London Airport Temperature	+30°C
Ottawa (CYOW) Elevation	374' ASL
Winds En Route: CYXU to CYOW	
Winds at CYXU	130° Magnetic @ 15 knots
Winds at 7000 feet	110° True @ 25 knots
Winds at CYOW	100° Magnetic @ 12 knots

25. What will be your take-off distance over a 50' obstacle at CYXU (Runway 15)?

26. What is the Density Altitude at 7000 feet? _____

27. What will be your rate of climb to 7000 feet? _____

28. What is the recommended Power Setting for Best Power at 65%?

_____ "Hg _____ RPM

29. What will be your TAS and GS at 7000 feet? _____

30. How long will it take to get to CYOW? _____

31. How much fuel do you need to take (including day VFR reserve) for this trip?

32. Complete the Weight and Balance below.

Is the aircraft within Weight and C of G tolerances? Yes No

Are you able to complete the trip? Yes No

Weight and Balance Information: CYXU to CYOW	
Aircraft Empty Weight	1711 lbs
Aircraft Empty Moment	164771.4 lb-in
Oil Quantity	6 Quarts
Pilot	185 lbs
Passenger 1	175 lbs
Passenger 2	160 lbs
Baggage	125 lbs

33. What will be your Landing Distance over a 50' Obstacle at CYOW (Runway 14)?

Your DA 40		CALCULATION OF LOADING CONDITION
Mass {lb}	Moment {in.lb}	
		1. Empty mass (from Mass and Balance Report)
		2. Oil not added Lever arm: 1.00 m (39.4 in)
		3. Front seats Lever arm: 2.30 m(90.6 in)
		4. Rear seats Lever arm: 3.25 m (128.0 in)
		5. Baggage Lever arm: 3.65 m (143.7 in)
		6. Total mass and total moment with empty fuel tanks (Total of 1.-5.)
		7. On-board usable fuel (0.72 kg/liter) (6.01 lb/US gal) Lever arm: 2.63 m (103.5 in)
		8. Total mass and total moment with full fuel tanks (Total 6. plus 7.)

Description of the Airplane and its Systems

34. How do you operate the alternate air supply? _____

35. The air intakes on the front cowl of the DA40 supply air for six items. They are:

36. How many fuel tanks are there in the DA40? _____

37. How many compartments does each tank have? _____

38. How much fuel does each tank hold? _____

39. How many fuel pumps are there in the DA40? _____

40. What is the specific purpose of each pump? _____

41. How many fuel vents are there, and where are they located?

42. What quantity will the electric fuel gauges indicate if the airplane is fully fueled?

Explain why this occurs.

43. The DA40 has a _____ volt DC system power by a _____ ampere alternator.

44. Explain how the governor controls the pitch of the propeller.

45. How does the loss of engine oil pressure affect the pitch of the propeller and why?

46. How should the front panels of the G1000 be cleaned and why?
