AVIA 123 – Chapter 13 Study Guide

Chapter 13 – Icing

1. Icing refers to any deposit of coating of ice on an __________ 13-2

2. Two types of icing are critical to operations of aircraft – __________ icing and __________ icing. Induction icing includes __________ icing, and icing on __________ and __________ 13-2

3. __________ Icing occurs when moist air in the carburetor cools to less than ___0°C due to adiabatic expansion (air flow speed increase reduces __________ and __________ in the carburetor Venturi) and fuel __________ 13-2

4. A 1996 AOPA study revealed that __________ icing was a factor in ___% of accidents involving icing. 13-2

5. Carburetor icing occurs when __________ _______ converts directly from gaseous state to ______ state (ice). High relative __________ can cause carburetor icing even in temperatures well above freezing. Figure 13-2 13-3

6. Jet engines can experience induction icing by __________ because reduced pressures at the intakes also reduces temperature through _________ cooling 13-3

7. Structural icing refers to the accumulation of ice on the __________ of the aircraft during the flight through __________ or __________ precipitation when the skin __________ of the aircraft is at or near ___0°C 13-3

8. Structural icing can interfere with propeller __________, jam __________ ________, cover ________, and reduce ________ through the windscreen 13-3

9. Structural icing on pitot-static systems can cause instrument errors in the __________ indicator, __________, and __________ speed indicator (VSI/VVI) 13-3

10. Ground icing occurs due to freezing __________, freezing __________, and wet __________. The symbols for freezing precipitation are __________ and __________ 13-4

11. At night, under clear skies, __________ _______ loss can reduce aircraft skin temperature to the __________. After dew forms, if the temperature goes below ________, dew will freeze 13-4

12. Accumulations of ice, snow or frost can reduce aircraft performance by as much as ___% and can increase drag by as much as ___%.

13. A hard frost can increase stalling speed by ___% to ___%. Aircraft coated with ______ are vulnerable to low-level wind shear and __________ especially at ____ speeds 13-5
14. Frost can prevent an aircraft from _______ _____ at normal takeoff speeds. 13-5

15. Rime ice has __________ trapped in the ice whereas clear ice has doesn’t have many ice bubbles. 13-6

16. Clear ice tends to form when the aircraft passes through water droplets that are at temperatures of _____0 to minus_____0 C. 13-6

17. Mixed ice is a combination of _____ ice and _____ ice and occurs at minus____ to minus_____0 C 13-7

18. Icing intensities, accumulation indications and 13-7
   a. _______ – ice is perceptible
   b. _______ – ice may cause problem within one _______
   c. _______–short periods of accumulation causes icing______ if no action taken
   d. _______ – Deice/anti-ice _____ to reduce icing hazard

19. Pilot Actions to reduce icing hazards are _______ ________, ________Change and ________Change. 13-7

20. Moderate icing accumulates at a rate such that even________duration encounters can create significant problems that require ________ and ________ efforts – and also require a ________or ________ change. 13-7

21. Icing occurrence, type, and severity depend on three basic parameters:
   a. __________________________
   b. __________ __________ ____________
   c. __________ _____ 13-10

22. Liquid Water Content refers to the measure of _______ ______in a given cloud area
Icing frequently occurs in areas of _______ - _______ water droplets. Smaller droplets
can freeze more quickly than larger _______ - _______ ______ (SLD) 13-11

23. Winter _______ and associated _______provide optimum conditions for widespread ______13-13

24. When air from a substantial moisture source crosses a ____ ______range, serious _______ is possible, especially during the _______ _____ of the year 13-15

25. The most frequent low-level icing occurs in the ________, especially in the Columbia _________, and in the Northeast where cold is often trapped near the surface while _________ and warmer, moist air crosses those areas ______ 13-16

26. Information on Structural Icing conditions is provided to aviators in ________, ______and_______ 13-19