

MET 200: Atmospheric Processes and Phenomena

Review questions and study guide for Quiz #3

Also review quiz 3 available at

<http://www.soest.hawaii.edu/MET/Faculty/businger/courses/notes101/05QZ3.pdf>

The lectures that will be covered in the quiz include:

10/11 Atmospheric optics Chapter 19

10/16 Hurricane formation and structure Chapter 15

10/18 Hurricanes near Hawaii, impacts and forecasting Chapter 15/ Lecture notes

10/23 The simple science of flight Lecture notes

10/25 Air masses/air-mass modification/Fronts Chapter 11/12

10/30 Hurricane Sandy, Midlatitude cyclones and their hazards Chapter 12

11/1 High Winds over the Pacific and Ocean Hazards Lecture notes

1. What are the physical mechanisms used to explain the myriad atmospheric optics discussed in class?
2. What is the difference between Mie and Rayleigh scattering? How does each effect the distribution of color in the scattered light?
3. What is the difference between a glory, corona, and halo?
4. Briefly, what are the key features in the structure of a hurricane?
5. What is the primary energy source for hurricanes?
6. What are the five prerequisites for the formation of the hurricane discussed in class? How do each of these relate to the creation of low central surface pressure?
7. How do the five prerequisites relate to the climatology of hurricanes? E.g., Where do they commonly form and during what times of the year?
8. Why are hurricane impacts relatively rare around Hawaii? Two aspects of the environment around Hawaii are not conducive to tropical storms, what are these two?
9. What is the triple threat associated with hurricanes? Which threat claims the most lives?
10. How does storm motion influence the distribution of the hazards in a hurricane landfall?
11. What are the two aspects to hurricane forecasting? How is the NWS doing in each of these aspects?
12. What is the formula for lift on a wing?
13. How does the weight of a bird or plane relate to its cruising speed?
14. If a skater pushes off of the ice to maintain speed, what does a bird push off of (of course the air, but dig a little deeper for the answer I am looking for)?
15. What is finesse?

16. What conditions promote air mass formation?
17. What are some common ways in which air masses are modified?
18. What air masses interact in winter storms over the US mainland and over Hawaii?
19. What is a front and how do fronts evolve in a winter storm (e.g., life cycle)?
20. What is a shear line and why does Hawaii see more shear lines than cold fronts?
21. What does it mean for a hurricane to undergo tropical to extratropical transition?
22. What is the distribution of hazards in a midlatitude cyclone?
23. What factors promote formation of very large open ocean waves?
24. What happens to waves when they propagate out of the storm area and what happens when these wave reach shallower coastal waters?
25. Rapid deepening in midlatitude cyclones (bombs) tends to occur off the East Coast of North America and Asia, why?

There may be some questions that involve obtaining solutions from some of the simple algebraic equations introduced in class.