

Quiz #3 [Chapt. 9-11a (air masses)]

1. Give a technical weather definition for the **Horse Latitudes**.
Horse latitudes are a series of high pressure cells between the trades and the westerlies.
2. What are the four modes of heat transfer?
Radiation, Conduction, Flow/turbulence/mixing, Latent heat transfer
3. Compare/Contrast land vs. sea in terms of **atmospheric stability** resulting from diurnal [day and night cycle] effects.

	<u>Day</u>	<u>Night</u>
Land:	<i>Unstable</i> <i>Ground warmer than air</i>	<i>Stable</i> <i>Air warmer than ground</i>
Sea:	<i>Stable</i> <i>Air warmer than water</i>	<i>Unstable</i> <i>Water warmer than air</i>

4. How does friction affect the angle that wind crosses an isobar?
Wind friction acts directly opposite of wind flow and deflects it away from being parallel to the isobars; ie. decreases the influence of Coriolis. Minimal friction allows wind to flow parallel to the isobars.
5. Describe/diagram
global air circulation
based on temperature alone,
as if the earth were not rotating.
Diagram in handout.
6. List the 5 weather zones from the equator to the poles and give their general wind directions.
 - 1 Equator ITCZ [doldrums] no wind or squally; wind going upward.
 - 2 Trade winds; winds easterly NE/SE depending on hemisphere.
 - 3 Horse lat.; also known as mid-highs; subtropical anticyclonic belt; wind outward clockwise.
 - 4 Westerlies; wind westerly.
 - 5 poles; Polar anticyclone; wind easterly NE/SE depending on hemisphere.
7. What is albedo?
The quality of a substrate to reflect vs absorb radiant heat. The more albedo, the more heat is reflected and the less heat is absorbed.
8. What are the three forces that determine what wind does as it passes from one isobar to the next?
Pressure gradient, Coriolis force, Friction [of what?]
9. What *specifically* is the mechanism which creates the doldrums? (ie. how does it work in terms of atmospheric circulation?)
Convergence of the trade belts at the equator and due to equatorial heat causes air to convect straight upward and then outward toward the poles.
10. Describe the three ways clouds can form.
Lifting of moist air by: 1. Mountains [orographic] 2. Weather front 3. Convective instability.

11. What do the following forecasting indicators indicate?

Cirrus unchanging

Fair weather

Clear evening skies

Cold night, temperature drop overnight

Altostratus increasing

Stormy weather coming [front]

Wind backing into the South

Trough approaching

Heavy dark clouds from W

Rain momentarily

Strong W winds in the afternoon

Diurnal weather - lavnamhbwita

Define the following cloud formations in terms of appearance and what kind of weather they predict:

12. Cirrus

High, fleecy, wispy, gauzy; fair weather unless they increase by getting thicker and lower

13. Cumulonimbus

Dark, billowy, wet looking. Rain, maybe thunderstorms if they are in tall columns.

14. Altostratus

Mid-altitude layered clouds; drizzly rain if they lower and darken but just overcast otherwise.

15. Cumulus

Billowy white fluffy clouds; fair weather as long as they stay white and fluffy.

16. What is an **air mass**?

A large body of air having uniform characteristics and formation based on its area of origin and conditions it has experienced in its travels.

17. Name and describe air masses with the following hypothetical symbols: (It's not necessary that they actually exist.)

a. (mPw) *maritime Polar; moist and cold but air is warmer than substrate [stable].*

b. (cTk) *continental Tropical [sub]; dry and warm but kuhler than substrate [unstable]*

18. Compare and contrast the symbols *k* and *w* and *m* and *c*.

k = air colder than substrate; unstable.

w = air warmer than substrate; stable

m = maritime formation of air mass; moist

c = continental formation of air mass; dry

19. How does the ITCZ relate to the sun's declination and how does that affect weather in the Tropics?

It follows the declination with a lag of about 2 months and brings wet squally weather as it passes over. A warm wet period will occur each time this happens and be determined by the latitude of the location.

20. At about 3000 ft altitude, what direction are the clouds moving? (the same as the wind is not an answer)

Parallel to the isobar.