

ESS55: Earth's Atmosphere / Homework #5 (due 5/7/2009)**Multiple Choice**

Identify the letter of the choice that best completes the statement or answers the question.

- _____ 1. A westerly wind means that the atmosphere:
- would act to decrease the rotation of the earth
 - is moving faster than the earth spins
 - is moving slower than the earth spins
 - is moving as fast as the earth rotates
- _____ 2. The large thermally driven convection cell that is driven by convective "hot" towers along the equator is the:
- Ferrel cell
 - Hadley cell
 - Ekman spiral
 - El Niño cell
- _____ 3. Air moving eastward more slowly than the earth rotates, would appear to be _____ wind to an observer on the earth.
- a counterclockwise
 - an east
 - an upward
 - a west
- _____ 4. Chicago, Illinois (latitude 42° N) is located in the _____.
- northeast trades
 - southeast trades
 - westerlies
 - doldrums
- _____ 5. The intertropical convergence zone (ITCZ) is a region where:
- the polar front meets the subtropical high
 - northeast trades meet the southeast trades
 - northeast trades converge with the subtropical high
 - the Ferrel cell converges with the Hadley cell
 - polar easterlies converge with the air at the doldrums
- _____ 6. In terms of the three-cell model of the general circulation, areas of surface low pressure should be found at:
- the equator and the poles
 - the equator and 30° latitude
 - the equator and 60° latitude
 - 30° latitude and 60° latitude
 - 30° latitude and the poles
- _____ 7. In Honolulu, Hawaii (latitude 21° N), you would most likely experience winds blowing from the:
- northeast
 - south
 - southwest
 - northwest

Name: _____

- _____ 8. Generally, along the polar front one would not expect to observe:
- temperatures on one side lower than on the other side
 - an elongated region of lower pressure
 - clouds and precipitation
 - converging surface air
 - sinking air aloft
- _____ 9. According to the three-cell general circulation model, at the equator we would not expect to find:
- the ITCZ
 - a ridge of high pressure
 - cumuliform clouds
 - light winds
 - heavy showers
- _____ 10. The wind belt observed on the poleward side of the polar front is called the:
- polar easterlies
 - prevailing westerlies
 - northeast trades
 - doldrums
- _____ 11. The majority of the United States lies within this wind belt:
- westerlies
 - easterlies
 - northerlies
 - trades
 - southerlies
- _____ 12. On a weather map of the Northern Hemisphere, the trade winds would be observed:
- north of the polar front
 - between the polar front and the subtropical highs
 - south of the subtropical highs
 - between the subpolar lows and the subtropical highs
- _____ 13. In the general circulation of the atmosphere, one would find the region called the doldrums:
- near 30° latitude
 - at the equator
 - at the poles
 - near 60° latitude
- _____ 14. The world's deserts are found at 30° latitude because:
- the intertropical convergence zone is located there
 - of the sinking air of the polar front
 - of the convergence of the prevailing westerlies and the Northeast Trades
 - of the sinking air of the subtropical highs
 - of the doldrums
- _____ 15. On a surface weather map during the month of July, one would expect to find what type of pressure system over the desert southwest of the United States?
- monsoon low
 - Pacific high
 - thermal low
 - Aleutian low

Name: _____

- ____ 16. The semi-permanent pressure systems associated with the polar front are called:
- subpolar lows
 - equatorial lows
 - polar highs
 - subtropical highs
- ____ 17. The position of the Pacific high over the north Pacific Ocean shifts _____ in winter and _____ in summer.
- northward, southward
 - southward, northward
 - eastward, westward
 - westward, eastward
- ____ 18. A thermally direct cell is one that
- is found in both the northern and southern hemispheres
 - involves heat
 - occurs on both sides of a large lake or ocean
 - is driven by energy from the sun
- ____ 19. As an air parcel aloft moves northward from the equator, it moves closer to the earth's axis of rotation. Because of the conservation of angular momentum, the air parcel's motion should:
- remain constant
 - slow and eventually reverse direction
 - slow but continue in the same direction
 - increase in speed
- ____ 20. In the Northern Hemisphere, air found to the north of the polar front is _____, while air further south is _____:
- cold, warm
 - cold, cold
 - warm, cold
 - warm, warm
- ____ 21. The average winds aloft are strongest in:
- summer
 - winter
 - fall
 - spring
- ____ 22. In the Northern Hemisphere, ocean currents in the Atlantic and the Pacific move in a generally circular pattern. The direction of this motion is _____ in the Atlantic and _____ in the Pacific.
- clockwise, counterclockwise
 - counterclockwise, counterclockwise
 - clockwise, clockwise
 - counterclockwise, clockwise
- ____ 23. At any given time, only one jet stream can be found in the atmosphere.
- true
 - false
- ____ 24. Major ocean currents that flow parallel to the coast of North America are:
- Labrador, Canary, California
 - California, Gulf Stream, Labrador
 - Kuroshio, California, Labrador
 - Labrador, Canary, Gulf Stream

Name: _____

- _____ 25. The turning of water with depth is known as:
- the Hadley Spiral
 - the Ekman Spiral
 - a gyre
 - the Ferrel Spiral
 - upwelling
- _____ 26. Upwelling is:
- the lifting of air along the polar front
 - the rising of cold water from below
 - increasing heights in an upper-level ridge
 - the rising air motion found in a low pressure center
- _____ 27. During a major El Niño event:
- Peruvian fishermen harvest a record amount of fish near Christmas time
 - extensive ocean warming occurs over the tropical Pacific
 - the Northeast trade winds increase in strength
 - California experiences severe drought conditions
- _____ 28. Upwelling occurs along the northern California coast because:
- winds cause surface waters to move away from the coast
 - of seismic activity on the ocean bottom
 - of gravitational attraction between the earth and the moon
 - water flows from the Atlantic ocean into the Pacific because they are at different levels
- _____ 29. A condition where the central and eastern tropical Pacific Ocean turns cooler than normal is called:
- El Niño
 - La Niña
 - the Southern Oscillation
 - the Ekman Spiral
- _____ 30. If the earth's surface was homogeneous (either all land or all water),
- the semipermanent highs and lows would be stronger
 - the semipermanent highs and lows would be weaker
 - the semipermanent highs and lows would disappear altogether
 - the semipermanent highs and lows wouldn't change in intensity