

Due: _____ *Garrison 7th Edition*

1. Warm air can hold _____ better than can cold air, so that _____
 - a) water vapor ... as it rises, compresses, and cools, the water vapor condenses into water droplets.
 - b) liquid water droplets... as it rises, compresses, and cools, the droplets evaporate.
 - c) water vapor ... as it rises, expands, and cools, the vapor condenses into water droplets.
 - d) liquid water droplets ... as it rises, expands, and cools, the droplets evaporate.

2. Earth is "tilted" at about 23.5° relative to its orbital plane around the sun. This causes
 - a) the change in temperature and climate known as the seasons.
 - b) longer daylight hours in San Diego during the summer.
 - c) higher temperatures during summer than during winter.
 - d) all the above.

3. For Earth's heat budget to balance, energy must move from the equators to the poles. Most of the energy moving from the equator to the north pole is transported by:
 - a) conduction through the earth's mantle.
 - b) ocean currents.
 - c) CO₂, with its ability to trap heat.
 - d) water vapor, with its high latent heat of vaporization.
 - e) oxygen, with its life-giving properties.

4. The Coriolis effect causes objects moving in the northern hemisphere to veer off course
 - a) to the right, or clockwise when viewed from above.
 - b) to the left, or counterclockwise when viewed from above.
 - c) in an upward directions.
 - d) in a downward direction.
 - e) they don't veer off course - they continue straight.

5. According to the atmospheric circulation model developed in the text, air tends to
 - a) rise at 30° north and fall at 60° north.
 - b) rise at the equator and fall at 30° north.
 - c) rise at 30° north and fall at the equator.
 - d) rise at the equator and fall at 60° north.
 - e) none of the above.

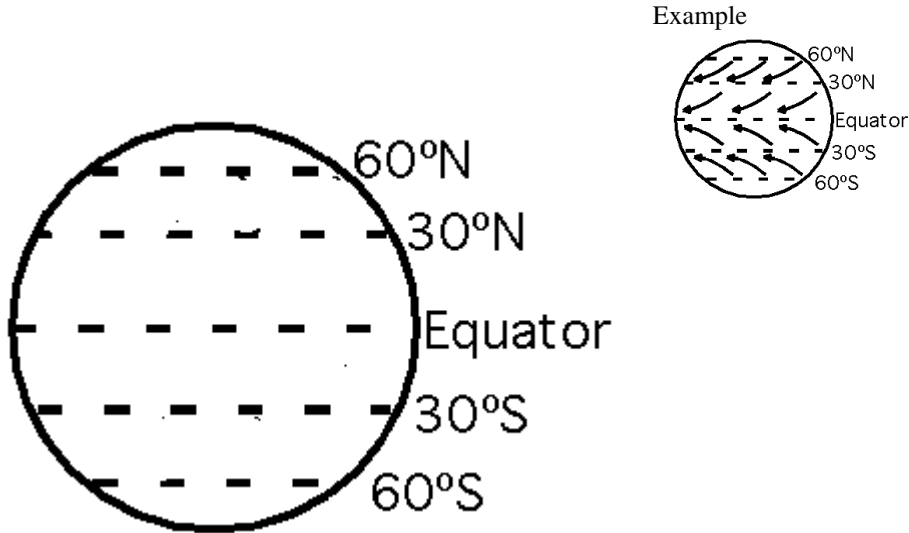
6. If you were standing on a mid-Pacific island at 15° north latitude, from which direction would you expect the wind to come? (don't forget the Coriolis effect)
 - a) north
 - b) south
 - c) northwest
 - d) northeast
 - e) southwest

7. The dependable surface winds of the earth centered at about 15° north and south latitudes are called
 - a) the prevailing westerlies.
 - b) the northerlies.
 - c) the trade winds.
 - d) the doldrums.
 - e) the ITCZ.

8. Areas of vertical air movement but weak and erratic surface wind are found on the earth at latitudes
 - a) 15° and 30°.
 - b) 45° and 60°.
 - c) 5° and 85°.
 - d) 0° and 30°.
 - e) 45° and 55°.

9. One difference between the doldrums and the horse latitudes is that
- The wind blows constantly in the doldrums whereas the wind is undependable in the horse latitudes.
 - The wind blows constantly in the horse latitudes whereas the wind is undependable in the doldrums.
 - It rains a lot in the doldrums whereas it usually does not rain in the horse latitudes.
 - It rains a lot in the horse latitudes whereas it usually does not rain in the doldrums.
 - Horses were first domesticated in the horse latitudes whereas cows were first domesticated in the doldrums.
10. A summer monsoon is a weather pattern characterized by _____ and _____.
- wind blowing from the sea to the land ... very dry air.
 - winds blowing from the land to the sea ... very dry air.
 - wind blowing from the sea to the land ... heavy rain.
 - wind blowing from the land to the sea ... heavy rain.
11. A summer monsoon is caused by
- the land being cooler than the sea, causing air to rise above the land and be replaced by sea air.
 - the land being cooler than the sea, causing air to rise above the sea and be replaced by land air.
 - the land being warmer than the sea, causing air to rise above the land and be replaced by sea air.
 - the land being warmer than the sea, causing air to rise above the sea and be replaced by land air.
12. The energy for hurricanes comes from
- static electricity.
 - the condensation of water from warm dry air.
 - the Coriolis effect.
 - the condensation of water from warm moist air.
 - periodic reversal of the earth's magnetic field.
13. Which of the following is true for hurricanes?
- Surface winds blow counterclockwise around a low-pressure center.
 - Surface winds blow counterclockwise around a high-pressure center.
 - Surface winds blow clockwise around a low-pressure center.
 - Surface winds blow clockwise around a high-pressure center.
14. Extratropical cyclones typically form
- near the meteorological equator.
 - near the thermal equator.
 - at high latitudes, at the north and south poles.
 - at high latitudes, at the junction between the polar cells and the Ferrel cells.
 - in the tropics.
15. The intertropical convergence zone (ITCZ) is a place where
- the two Hadley cells north and south of the equator meet.
 - strong solar heating leads to very dry air at the surface of the earth.
 - high winds blow constantly.
 - air sinks from high altitude.
 - all of the above.

16. Sketch the prevailing surface winds on the figure below, using the inset as an example. Note that the direction of winds in the inset is INCORRECT, so don't copy it. Also, please label the trade winds, the prevailing westerlies, and the polar easterlies.



17. Describe the three-cell atmospheric circulation model for the earth. Explain how it results in trade winds, prevailing westerlies, and polar easterlies. You will need to invoke the Coriolis effect for this.

18. What is the Coriolis effect? Explain it in the context of a rocket shot from the North Pole towards the equator.

19. Why are so many deserts found at about 30° latitude? Why are there rainforests close to the equator?

20. Explain the winter and summer monsoons of south central Asia (e.g. India and Bangladesh).

21. Explain to your grandmother how hurricanes work.

22. What is an extra-tropical cyclone, and how does it work?