

1. On a given constant pressure surface in the middle troposphere, a warm column of air has \_\_\_\_\_ than a cooler column of air. At a constant altitude in the middle troposphere, a warm column of air has \_\_\_\_\_ than a cooler column of air.
  - a. higher heights, lower pressures
  - b. higher heights, higher pressures
  - c. lower heights, lower pressures
  - d. lower heights, higher pressures
2. Which of the following pressure levels lies at the highest altitude?
  - a. 850 millibar
  - b. 500 millibar
  - c. 1000 millibar
  - d. 700 millibar
3. Which of the following best describes a traditional constant pressure chart at a mandatory level?
  - a. A map of isobars at a given elevation above the ground
  - b. A map of isobars at varying elevations above the ground
  - c. A map of heights above sea level with varying pressures
  - d. A map of heights above sea level at a given pressure
  - e. Both b and d are correct.
4. You are a pilot, flying at a constant altitude of 25,000 feet. You are watching your on-board barometer closely. You fly from cold air into warm air. The air pressure indicated on your barometer should \_\_\_\_\_.
  - a. increase
  - b. decrease
  - c. remain the same
5. The mid-latitude jet stream in the Northern Hemisphere is farther \_\_\_\_\_ and \_\_\_\_\_ in the winter than in the summer.
  - a. south, stronger
  - b. north, stronger
  - c. east, weaker
  - d. west, stronger
6. Television weathercasters always talk about the “jet stream” on the six o'clock news and how important it is for the development of low-pressure systems that routinely affect the viewing area. But they rarely tell you where it can be found. Where in the world is the jet stream?
  - a. In the mid-latitudes, at about 1000 mb.
  - b. In the tropics at about 500 mb.
  - c. In the mid-latitudes at about 200-300 mb.
  - d. In the tropics at about 200-300 mb.
7. On the cold, poleward side of the polar front, \_\_\_\_\_ heights are typically observed at the 300-mb level, while \_\_\_\_\_ 300-mb heights are observed on the warmer, equatorward side of the polar front.
  - a. lower, higher
  - b. lower, lower
  - c. higher, lower
  - d. higher, higher
8. The standard height of the 500-mb surface is approximately \_\_\_\_\_.
  - a. 1500 meters
  - b. 3000 meters
  - c. 5500 meters
  - d. 7500 meters
9. The standard height of the 300-mb surface is approximately \_\_\_\_\_.
  - a. 3000 meters
  - b. 5500 meters
  - c. 7500 meters
  - d. 9000 meters
10. The average height of the 300-mb surface is \_\_\_\_\_ at the North Pole than at the equator.
  - a. higher
  - b. lower
  - c. the same
11. Pressure \_\_\_\_\_ with increasing altitude in cold air columns than in warm air columns.
  - a. increases more rapidly
  - b. decreases more rapidly
12. High heights on a constant pressure surface can be treated as if they were \_\_\_\_\_ on a nearby constant height surface.
  - a. low pressures
  - b. high pressures
  - c. fast winds
  - d. slow winds
13. On an upper-air constant pressure surface, a dip in the height lines toward the equator is called a \_\_\_\_\_, while a bulge in the height lines toward the poles is a \_\_\_\_\_.
  - a. trough, ridge
  - b. ridge, trough
  - c. jet streak, jet stream
14. To approximately locate the jet stream on a map of height contours at the 300-mb level, look for \_\_\_\_\_.
  - a. places where the height lines spread apart
  - b. places where the height lines have their highest values
  - c. places where the height lines have their lowest values
  - d. places where the height lines are closest together
15. Which of the following statements about the mid-latitude jet stream is not generally true?
  - a. It migrates toward the equator in the summer months.
  - b. It doesn't always wrap continuously around the globe.
  - c. It's found around 250 mb or 300 mb.
  - d. Its wind speeds typically exceed 300 m.p.h.
16. If you were planning to visit Bombay, India, which of the following months would offer the best weather (i.e., dry conditions and comfortable temperatures), on average, based on general circulation principles?
  - a. September
  - b. June
  - c. April
  - d. August

17. All of the following are characteristics of an El Niño except \_\_\_\_\_.
- a change in upwelling patterns off the west coast of South America
  - a migration of warmer water eastward across the equatorial Pacific Ocean
  - a relaxation in trade winds over the equatorial Pacific Ocean
  - increasing surface pressure, on average, off the coast of Peru
18. \_\_\_\_\_ helps keep sea levels in the western Pacific Ocean several inches higher, on average, than in the eastern Pacific.
- The subtropical jet stream
  - The trade winds
  - El Niño
  - The Walker Circulation
19. Monsoon most closely means \_\_\_\_\_.
- warm
  - rain
  - seasonal
  - flood
20. The Asian monsoon \_\_\_\_\_.
- is related to seasonal changes in the position of the ITCZ
  - helps keep most of India dry in winter
  - has helped produce the world record for most rain in one year
  - All of the first three answers are correct.
  - Only two of the first three answers are correct.
21. During an El Niño, \_\_\_\_\_ tends to decrease in the eastern tropical Pacific.
- sea-surface temperature
  - air pressure
  - the frequency of showers and thunderstorms
  - Two of the first three answers are correct.
22. The overall tendency during non El Niño years is for \_\_\_\_\_ in the eastern equatorial Pacific Ocean.
- gently sinking air
  - rapidly rising air
  - upwelling of nutrient-rich water
  - All of the above answers are correct.
  - Only two of the first three answers are correct.
23. The thermal equator marks the average position of the \_\_\_\_\_.
- Northern Hemisphere trade winds
  - Southern Hemisphere trade winds
  - Hadley Cells
  - ITCZ
24. In order to be classified as a hurricane, a tropical storm must attain sustained wind speeds of at least \_\_\_\_\_.
- 25 mph
  - 39 mph
  - 74 mph
  - 100 mph
  - 125 mph
25. Hurricanes do not form at the equator because \_\_\_\_\_.
- frictional forces are too large
  - the Coriolis effect is too small
  - the Coriolis effect is too large
  - the pressure gradient force is too large
26. Which of the following is not a favorable condition for hurricane formation?
- Sea-surface temperatures greater than 80°F
  - Upper-level divergence
  - The mid-latitude jet stream overhead
  - Presence of an easterly wave
  - Small vertical wind shear
27. A hurricane requires which of the following to form?
- Warm sea-surface temperatures
  - A boost from the jet stream
  - A contribution from the Coriolis effect
  - All of the above are correct.
  - Only a and c are correct.
28. The \_\_\_\_\_ of a hurricane is its center, with typically light winds and clear to partly cloudy skies, while the \_\_\_\_\_ of a hurricane is around its center, with typically violent winds, heavy rains and the largest storm surges.
- eye, eye wall
  - eye wall, spiral bands
  - eye, spiral bands
  - eye wall, eye
29. It is often stated that hurricanes weaken rapidly once over land due to the effects of friction. While this is a factor, it is not the most important factor in the weakening of a hurricane. Which of the following is more important in the weakening of a hurricane over land?
- Presence of buildings and trees
  - Lack of warm water
  - Higher air temperatures over land
30. A hurricane's strongest winds and heaviest rain are found in the \_\_\_\_\_.
- overrunning zone
  - eye
  - spiral bands
  - eye wall
  - squall lines
31. Peak hurricane months in the Atlantic basin are \_\_\_\_\_.
- August, September and October
  - September, October and November
  - June, July and August
  - July, August and September

32. The principal source of energy for a hurricane is the \_\_\_\_\_.
- a. lifting of warm, humid air by cold and warm fronts
  - b. strong vertical wind shear
  - c. mid-latitude jet stream providing upper-level divergence
  - d. release of latent heat
33. What's the relationship between hurricanes and typhoons?
- a. Hurricanes develop in the tropics, while typhoons are extratropical.
  - b. Hurricanes are much stronger than typhoons.
  - c. Typhoons are much smaller in size than hurricanes.
  - d. They are the same thing, but just develop in different regions.
34. Of the following, which would you not expect to observe as the eye of a hurricane passes directly over your location?
- a. high winds
  - b. some sunshine
  - c. very low sea-level pressure
  - d. dry weather
35. Maximum hurricane wind speeds are closest to \_\_\_\_\_.
- a. 100 mph
  - b. 200 mph
  - c. 300 mph
  - d. 400 mph
36. Which of the following is a reasonable estimate of the sea-level pressure in the eye of a powerful hurricane?
- a. 700 mb
  - b. 800 mb
  - c. 900 mb
  - d. 1000 mb