

# Meteorology I Pre test for the Second Examination

## MULTIPLE CHOICE

1. A primary reason why land areas warm up more rapidly than water areas is that
  - a) on land, all solar energy is absorbed in a shallow layer.
  - b) evaporation is usually greater on land.
  - c) land absorbs more solar energy.
  - d) land is a better emitter of energy
  - e) heat from earth's interior warms the land.
2. The heat transport carried out by air and oceanic circulations serves to
  - a) limit the production of clouds.
  - b) increase solar radiation.
  - c) keep the tropics from becoming warmer.
  - d) keep the poles from becoming colder.
  - e) both c) and d).
3. Which of the following statements is true?
  - a) Land heats more slowly than water.
  - b) Land cools more slowly than water.
  - c) Land tends to cool to a warmer temperature than water.
  - d) a, b, and c
  - e) none of these is true
4. In the course of an average 24-hour period, the ocean will warm
  - a) less than 1°C
  - b) about 3°C
  - c) about 5°C
  - d) about 7°C
  - e) about 10°C
5. The Coriolis effect influences the wind by
  - a) starting the air motion
  - b) increasing the wind speed
  - c) decreasing the wind speed
  - d) changing the direction of the wind
6. Horizontal variations in air pressure cause a force which makes the wind blow. These pressure variations are caused by
  - a) greenhouse effect
  - b) non-circular shape of earth
  - c) warm temperatures in the stratosphere
  - d) uneven heating of the earth's surface
  - e) earth's rotation

7. Circulations in the earth's atmosphere are fundamentally caused by
- a) frontal storm systems
  - b) ocean currents
  - c) heating of the ozone layer
  - d) gravity
  - e) temperature contrasts between different locations
8. When density remains constant and the temperature is lowered, the pressure of a confined gas (i.e. in a sealed tank) will:
- a) increase
  - b) decrease
  - c) remain the same
  - d) there is no way of knowing whether the pressure will increase or decrease
9. The force that generates wind is:
- a) Coriolis force
  - b) gravity
  - c) centrifugal force
  - d) friction
  - e) none of these
10. Be able to draw the General Circulation Model from memory, the cross sectional as well as the face on view. Know the names of winds, and places where the winds do not blow.
11. The Coriolis effect occurs because of the characteristic of the earth:
- a) its magnetic field
  - b) its rotation
  - c) its atmosphere
  - d) its dense core
  - e) none of these
12. The effect of friction on the wind alters its
- a) speed and direction
  - b) density
  - c) heat content
  - d) viscosity
  - e) speed only
13. The geostrophic wind concept is most like the real atmospheric winds
- a) near the surface
  - b) in a cyclone
  - c) near the equator
  - d) in an anticyclone
  - e) at high altitudes
14. As seen by an observer on earth, the Coriolis effect is an illusion; no deflection can actually be measured.
- a) true
  - b) false
  - c) true but only near the poles
  - d) false but only near the poles
15. Instead of the air flowing straight out of a high pressure system, it spirals out in a clockwise direction. The cause of the clockwise spiraling motion is
- a) pressure gradient force
  - b) Coriolis force
  - c) turbulence
  - d) inertia
  - e) centripetal force

16. The primary force which causes all winds is

- a) Coriolis effect
- b) geostrophic force
- c) pressure gradient force
- d) centrifugal force
- e) inertia force

17. The geostrophic wind describes a situation where the air moves

- a) upward      b) very slowly      c) very fast
- d) parallel to the isobars      e) from pole to equator

18. The wind speed normally increases with height in the layer of air next to the ground. This illustrates the fact that

- a) pressure decreases with height
- b) the lowest part of the atmosphere is turbulent
- c) temperature decreases with height
- d) density decreases with height
- e) friction is present only close to the ground

19. A primary factor causing monsoon circulations is

- a) greater temperature changes over continents compared to oceans
- b) Coriolis effect
- c) ocean currents
- d) mountain ranges
- e) waves in the westerlies

20. Most of the earth's deserts are located in the

- a) doldrum belt
- b) subsidence areas of subtropical highs
- c) tradewind belt
- d) areas along the polar front
- e) boundary between liquid and frozen oceans

21. Surface high pressure zones are usually associated with

- a) diverging winds
- b) descending air
- c) clear or nearly clear weather
- d) all of the above      e) none of the above

22. Taken as a whole, the large scale or general circulation patterns of the atmosphere exist

- a) because of the earth's rotation
- b) as nature's method of balancing heat energy differences
- c) as a cause of temperature contrasts
- d) as a result of the different landforms on earth's surface
- e) as a result of earth's motion through space

23. Which of these winds is not influenced very much by the Coriolis effect?
- a) jet stream
  - b) Northeast trades
  - c) mid latitude westerlies
  - d) sea breeze
24. Large scale wind circulation systems that reverse with the seasons are called
- a) tropical cyclones
  - b) typhoons
  - c) tropical anticyclones
  - d) meridional cells
  - e) monsoons
25. Most of the United States is situated in which zone of prevailing winds?
- a) trade winds
  - b) subpolar easterlies
  - c) westerlies
  - d) doldrums
  - e) none of these
26. The prevailing winds that blow from the horse latitudes toward the doldrums are called:
- a) westerlies
  - b) trade winds
  - c) polar easterlies
  - d) subtropical northerlies
  - e) none of these
27. Another name for the subtropical high is:
- a) doldrums
  - b) subpolar calm
  - c) trades
  - d) horse latitudes
  - e) prevailing westerlies
28. The Sahara and Australian deserts (among others) are associated with which pressure belt?
- a) equatorial low
  - b) subtropical high
  - c) subpolar low
  - d) polar high
29. A Santa Ana (or Chinook or Foehn) wind is a:
- a) wind associated with a blizzard
  - b) cold, damp wind blowing off snow fields
  - c) wind that is peculiar to the China mainland
  - d) very dry, warm wind coming down a mountain slope
  - e) none of these

30. Dust devils

- a) are most common in the tropics
- b) form from the bottom up
- c) can last for days
- d) are associated with convective clouds
- e) do not occur over vegetated surfaces

31. Santa Ana winds

- a) are essentially valley breezes
- b) bring cold air
- c) owe their existence to the cold California current
- d) are caused by cyclonic air movements over the Great Plains
- e) none of these

32. In areas that experience monsoons

- a) winters are fairly dry
- b) low pressure dominates in winter
- c) subsiding dry air dominates in summer
- d) a and c
- e) none of these

33. Approximately what percent of the global population lives in areas affected by monsoons?

- a) 3%
- b) 12%
- c) 35%
- d) 34%
- e) 48%

34. The term "Hadley cell" applies to

- a) the whole atmosphere
- b)  $0^{\circ}$  to  $30^{\circ}$  latitude
- c)  $30^{\circ}$  to  $60^{\circ}$  latitude
- d)  $60^{\circ}$  to  $90^{\circ}$  latitude
- e) the poles and the equator

35. The primary force causing ocean currents is

- a) temperature differences between cold water below and warm water above
- b) the earth's elliptical orbit around the sun
- c) the major winds
- d) the Coriolis effect
- e) the earth's rotation about its axis

36. The property which primarily controls how much water can be present as a gas is

- a) water's specific heat
- b) number of particulates present
- c) availability of latent heat
- d) amount of dry air gases present
- e) temperature of the air

37. Relative humidity indicates the
- a) nearness to saturation for the air
  - b) probability of precipitation
  - c) actual amount of water in the air
  - d) chance of cloud formation
  - e) chance for evaporation of water
38. During a clear, relatively calm day, the relative humidity will tend to \_\_\_\_\_ from sunrise to early afternoon.
- a) increase
  - b) decrease
  - c) remain nearly steady
39. Evaporation is a process which tends to keep temperatures cooler where it occurs. This is because evaporation
- a) reduces the absorption of solar energy
  - b) increases the reflection of solar energy
  - c) increases the outgoing radiation
  - d) uses energy to change the phase of water instead of warming it
  - e) increases the specific heat
40. Relative humidity depends on the water vapor present in the air and the
- a) pressure
  - b) altitude
  - c) latitude
  - d) temperature
  - e) dew point
41. The actual amount of water vapor in the air is greatest for which of the following combinations of temperature and relative humidity?
- a) 20°C, 50%
  - b) 5°C, 100%
  - c) 5°C, 50%
  - d) 0°C, 100%
  - e) 20°C, 100%
42. When water vapor condenses, the heat involved
- a) is absorbed from the surrounding air
  - b) is retained by the drop that forms
  - c) is released to the nearby air
  - d) is absorbed from the sun
  - e) is absorbed by the water vapor
43. Sinking or subsiding air cannot form clouds due to the
- a) warming temperatures
  - b) removal of water vapor
  - c) release of latent heat
  - d) loss of particulates
  - e) formation of unstable layers
44. When the dry and wet bulb temperatures measured by a psychrometer are equal, all but one of the following is true. Which one is false?
- a) dew point is equal to the dry bulb
  - b) water vapor content is a maximum
  - c) relative humidity is 100%
  - d) a rise in temperature would cause condensation
  - e) the air is saturated

45. The two changes of state that are the most important part of the water cycle for the atmosphere would be

- a) melting, freezing
- b) melting, sublimation
- c) evaporation, condensation
- d) condensation, freezing
- e) condensation, melting

46. As the temperature of air is reduced to its dew point, which of these is most likely to occur?

- a) condensation      b) freezing      c) melting
- d) evaporation      e) supercooling

47. We are likely to have our highest relative humidity:

- a) during mid-afternoon      b) about midnight
- c) about sunrise      d) at noon      e) none of these

48. The dew point is the temperature at which:

- a) water in the liquid state changes to vapor
- b) hailstones are formed
- c) water vapor condenses to a liquid
- d) cumulus clouds change to cumulonimbus clouds
- e) none of these

TRUE/FALSE

49. Air pressure is exerted in all directions.

50. The ultimate cause of the sea breeze is the unequal heating of land and water.

51. A southwest wind blows toward the northeast.

52. The most important force causing the air's motion is due to the earth's rotation.

53. The sea breeze is a simple thermal circulation that does not involve a pressure gradient.

54. The primary cause of wind is not atmospheric pressure but atmospheric pressure differences.

55. The pressure, temperature and density of any gas are all related to one another by a simple equation.

56. Continents have no significant influence on global precipitation patterns.

57. A sea breeze is usually best developed early in the morning.

58. For much of South and Southeast Asia, winter is a period characterized by relatively dry conditions.

59. The existence of jet streams was first determined by Ben Franklin as the result of his kite experiments.

60. The bora and mistral are local names given to chinook winds.

61. The region where the trade winds meet is sometimes called the doldrums.

62. Major El Nino events primarily affect the weather of the eastern Pacific.

**ANSWER KEY FOR TEST -**

- |             |           |
|-------------|-----------|
|             | 32. (a)   |
| 1. a        | 33. (e)   |
| 2. e        | 34. (b)   |
| 3. (e)      | 35. (c)   |
| 4. (a)      | 36. e     |
| 5. d        | 37. a     |
| 6. d        | 38. b     |
| 7. e        | 39. d     |
| 8. b        | 40. d     |
| 9. e        | 41. e     |
| 10. drawing | 42. c     |
| 11. (b)     | 43. a     |
| 12. a       | 44. d     |
| 13. e       | 45. c     |
| 14. b       | 46. a     |
| 15. b       | 47. c     |
| 16. c       | 48. c     |
| 17. d       | 49. True  |
| 18. e       | 50. True  |
| 19. a       | 51. True  |
| 20. b       | 52. False |
| 21. d       | 53. False |
| 22. b       | 54. True  |
| 23. d       | 55. True  |
| 24. e       | 56. False |
| 25. c       | 57. False |
| 26. b       | 58. True  |
| 27. d       | 59. False |
| 28. b       | 60. T     |
| 29. d       | 61. True  |
| 30. (b)     | 62. True  |
| 31. (e)     |           |