

## Atmospheric Variables Review #2 – ANSWERS

1. (2) – As temperature increases, pressure decreases – graph (2) illustrates the opposite of the temperature graph shown.
2. (2) – Planetary Wind Belts Chart of ESRT – At 30°N there is a “dry” belt of high pressure. This makes it a zone of diverging air (winds move away from each other).
3. (1) – As temperature increases, pressure decreases.
4. (2) – As temperature and humidity decrease, pressure increases.
5. (4) – As moisture in the air increases, air pressure decreases because water vapor is lighter than dry air molecules. Graph (4) shows this inverse relationship.
6. (1) – Sea breezes occur during the day. – Cooler air develops over the ocean creating higher pressure while warmer air is over land making it lower pressure. Wind blows from regions of high to low pressure.
7. (2) – If the pressure difference is larger, the PGF is higher – this causes faster winds.
8. (3) – The Coriolis Effect that bends the winds to the right in the Northern Hemisphere is caused by the Earth’s rotation.
9. (3) – In a high pressure system, winds blow outward and clockwise.
10. (3) – Sea breezes occur during the day. – Cooler air develops over the ocean creating higher pressure while warmer air is over land making it lower pressure. Wind blows from regions of high to low pressure. Since the water is on the right side of the diagram, the wind would blow from east to west.
11. (3) – As altitude increases, pressure decreases.
12. (3) – Wind is a vector quantity – it requires both magnitude (a number) and direction in its description.
13. (3) – Wind is slowest on an isobar map where the isobars are farthest apart.
14. (4) – For condensation to occur, the air temperature has to be cooled to the dewpoint (or below it). The only number that fulfills this rule is -7°C.
15. (1) – Clouds are an example of naturally forming condensation in which water vapor turns into water droplets.
16. (1) – When the air temperature reaches the dewpoint, the air becomes saturated, and clouds form. In this case, if the temperature is closer to the dewpoint, there is a better chance for precipitation because there is a better chance for cloud formation.
17. (2) – Typical use of the Dewpoint Chart in ESRT – Go down to 20 and across to the column labeled “5”

18. (1) – A psychrometer works based on the concept of evaporation. When water evaporates from the wet-bulb, the wet-bulb temperature drops – this is called the wet-bulb depression. The difference between the wet-bulb and dry-bulb temperatures allow one to use the charts and determine relative humidity or dew point.
19. (4) – Typical use of the Dewpoint Chart in ESRT – Go down to 4 and across to the column labeled “6” (remember  $4 - -2 = 6$  : watch math!)
20. (1) – Go to the Relative Chart – go down to 1 and then go across to find where 65% would be within the chart. The relative humidity of 65% falls under the column where the difference is 2. Then use the 1 (dry bulb) and 2 (difference) on the Dewpoint Chart.
21. (1) – The air temperature is farthest from the dewpoint at this location – there is only a small chance for clouds and precipitation to form.
22. (2) – Condensation will occur when the air is filled with water vapor (saturated) and there is a surface for the water to cling to (dust/aerosols/condensation nuclei).
23. (1) – Increasing the wind is one way to speed up evaporation of water.
24. (1) – Evaporation is a cooling process – since the towel is in the Sun, water would be evaporating from the wet towel. The process of evaporation removes heat from the towel.
25. (2) – When air rises, it expands and cools to the dewpoint forming clouds.
26. (1) – Rain is a form of precipitation (water droplets falling from clouds) – all the other 3 are forms of condensation (form when water vapor becomes liquid water droplets)
27. (4) – More surface area exposed lead to more evaporation of water.
28. (4) – Layers of the Atmosphere Chart indicates that as altitude in the troposphere increases, the air temperature decreases. Then as altitude increases in the stratosphere, temperature increases (because of the presence of ozone).
29. (1) – Read the graph line for dewpoint at 6 a.m.
30. (3) – The air can hold the most water vapor when it is warmest – this occurs at 2 p.m. according to the temperature graph line.
31. (1) – The relative humidity would be highest when the air temperature is closest to the dewpoint – the two graph lines come closest at 6 a.m.
32. (3) – In the evening, the ground is radiating energy and the heat rises away from Earth’s surface causing it to cool.
33. (4) – Read the dashed line on the graph and use the scale on the right – at 6pm the pressure is 1024 mb

