Chapter 8 Quiz

1. The surface pressure in a High can get higher over time if horizontal convergence in the system is _____ than horizontal divergence. MORE

2. Where isobars are curved, the centripetal force interacts with the horizontal pressure gradient force and the Coriolis Effect to produce winds that follow the same curved paths as the isobars. This is known as the _____ wind. GRADIENT

3. The gradient wind describes in simplest terms the circulation around centers of high and low pressure at altitudes above about 1000 m (3300 ft). Viewed from above the Northern Hemisphere, air flows _____ around a high-pressure center. CLOCKWISE

4. The deflection of horizontally moving air due to the effect of the Earth's rotation is greatest at the poles where the Earth's surface makes one complete 360-degree spin around the rotational axis in 24 hours. The deflection is totally absent at the equator because the Earth's rotation does not cause any turning of the Earth's surface around a vertical axis at that location. Hence, the Coriolis effect is zero at the equator and _____ as latitude increases. INCREASES

5. The pressure gradient force arises from a change in air pressure with distance. This force accelerates air away from regions of higher air pressure and toward regions of lower air pressure. The pressure gradient force is strongest where isobars are CLOSEST

6. Because Earth is rotating, horizontal winds everywhere except at the equator are deflected to the right or left relative to Earth's surface. This so-called Coriolis Effect arises because the air is moving over a surface which itself is continually turning because of Earth's rotation. In the Northern Hemisphere, the Coriolis Effect causes wind blowing toward the west to turn toward the NORTHWEST

7. A force is a push or pull on an object; it has both magnitude and direction. Your weight, for example, is a force. The magnitude is read from a weight scale and the direction of that force is always _____ because it is the force of attraction between your mass and the mass of Earth. DOWNWARD

8. The atmosphere is a continuous fluid. As surface winds spiral out of the center of a High, more air arrives by descending from above. The descending air, in turn, is replaced by air flowing into the system at higher altitudes. As Figure 8.19 illustrates, a High (anticyclone) exhibits horizontal divergence of surface winds and horizontal _____ of upper air winds. CONVERGENCE

9. The scales of atmospheric circulations from smallest to largest are: MICRO MESO SYNOPTIC PLANETARY

10. Fluid friction arising from large irregular motions within the atmosphere is _____ viscosity. EDDY

11. Hydrostatic equilibrium is the balance between the upward vertical pressure gradient force and the downward force of _____. Imbalances lead to convective motions.

12. The Coriolis Effect varies with wind speed. If there is no air motion relative to the Earth's surface (calm conditions), there is no Coriolis Effect. As wind speed increases, the Coriolis Effect INCREASES

13. The combined effects of the horizontal forces described in this chapter causes Northern Hemisphere surface winds in Lows (cyclones) to spiral counterclockwise and _____ as viewed from above. INWARD

14. The sense of the Earth's rotation is counterclockwise as viewed from above the North Pole and clockwise as viewed from above the South Pole. This reversal in the sense of the Earth's rotation means that the deflection due to the Earth's rotation reverses between the Northern and Southern Hemispheres. Hence, air moving horizontally in the Northern Hemisphere turns to the _____ relative to the Earth's surface, whereas in the Southern Hemisphere, moving air turns toward the opposite direction. RIGHT

15. The figure displaying the evolution of straight, balanced, horizontal flow shows the influence of the Coriolis Effect on air subjected to a horizontal pressure gradient force when neighboring isobars are straight and parallel in the Northern Hemisphere. At altitudes above the friction layer, the Coriolis balances the horizontal pressure gradient force and the air flows along a path that is _____ to the isobars. This is called the geostrophic wind. PARALLEL