Answer Key for Environmental Geology Lab 3

1. The porosity in the zone of aeration has both air and water; whereas, the porosity in the zone of saturation is completely saturated with water.

2. The water table is the boundary between the zone of aeration and zone of saturation.

3. Porosity is the % of open space in a geologic materials and permeability is how quickly water can travel through a geologic material.

4. (1) is the left most figure from Figure 1(pg. 1) which is an aquifer
(2) the second rightmost figure from Figure 1 which is an aquitard

5. No because water from confined aquifers will rise to the piezometric surface because this water is under pressure and therefore can rise above the level of a normal water table. Also, pumping in an unconfined aquifer can form

6. Gravel, Sand, Fractured Bedrock (including Limestone)

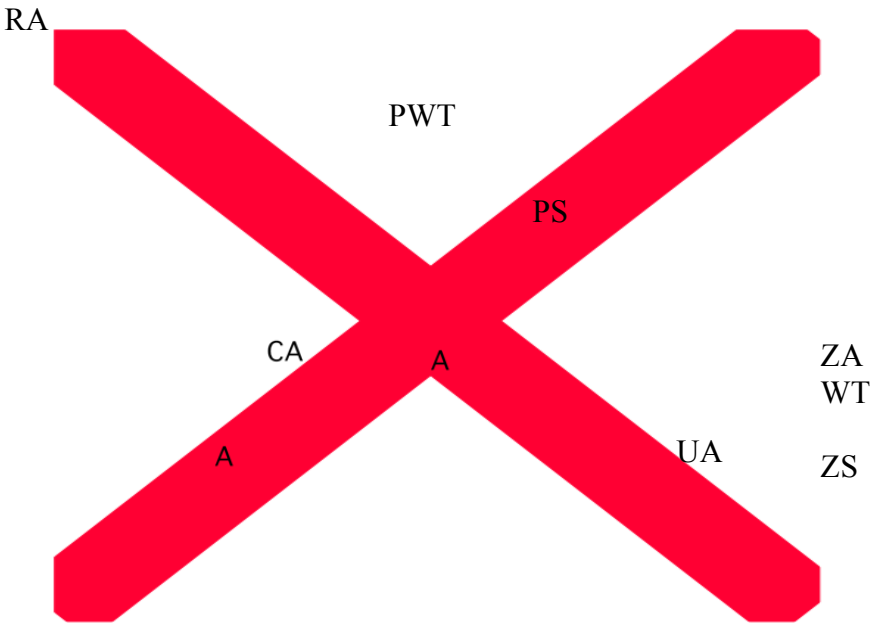
7. Mud, Shale, Unfractured Bedrock

8. Yes because fracture limestone aquifers have low porosity and yet have very high permeability

9. No because by definition aquifers have a high permeability.

10. The biggest problem with drilling a well into fractured bedrock is that if the well does not intersect a fracture no water will be obtained in the well.

11. See below



12. Point Source

13. Arrow on Figure 3 that generally is directed from west to east

14. Indicate on Figure 3

15. Storage Drum = 602 ft; Endangered Well C = 592 ft

16. ΔH = 602 ft - 592 ft = 10 ft

17. 3100 ft

18. $(\Delta H / \Delta L)$ = rise / run = $\frac{\text{(Elevation of Drum - Elevation of Well C)}}{\text{Horizontal Distance Drum to Well C}}$

$(\Delta H / \Delta L)$ = (602 ft - 592 ft) / 3100 ft = 10 ft / 3100 ft = 0.0032

19. V = K $(\Delta H / \Delta L)$ = 100 ft / day X 0.0032 = 0.32 ft / day

20. time = distance / velocity = 3100 ft / 0.32 ft / day = 9610 days

21. 26.3 years

22. True

23.

At TAMIU North of Lake Casa Blanca	On the surface
Near the Pescadito Gas Field	Below the surface

24. Up

25. 864,00 liters / day

26. 288 families

27. No because this amount of water can barely support a small town much less a larger city like Laredo.