

nicholas chao invitational (dynamic B)

name + team #: KEY

section 1: multiple choice (20 pts)

1) Who classified a system of stream order we use today? (1 pt)

- a. Leopold
- b. Strahler**
- c. Witherspoon
- d. Potter

2) Nick C River has no tributaries; what is Nick C River's Strahler order? (1 pt)

- a. 1**
- b. 2
- c. 3
- d. 4

3) Nick C River and another stream with the same order flow into Nguyen River. What is Nguyen River's Strahler order? (1 pt)

- a. 1
- b. 2**
- c. 3
- d. 4

4) Nguyen River and Griffin creek are both tributaries of DN River; if DN River's order is 2, what does Griffin creek's order have to be? (1 pt)

- a. 0
- b. 1**
- c. 2
- d. 3

5) Assume that all of the aforementioned streams are in the midwest. As you get on a plane to escape this dreaded place, what is the most common drainage pattern you fly over? (1 pt)

- a. Radial
- b. Contorted
- c. Dendritic**
- d. Centripetal

6) A channel can become braided if (choose best answer) (1 pt):

- a. The sediment load is low and the stream has low discharge
- b. The sediment load is high and the stream has high discharge**
- c. The sediment load is low and the stream has high discharge
- d. The sediment load is high and the stream has low discharge

7) What are the four processes that help streams reach dynamic equilibrium? (1 pt)

- a. degradation, aggradation, widening, planform change**
- b. erosion, transportation, deposition, weathering
- c. climate, slope, geology, altitude
- d. hydraulic action, corrosion, corrosion, attrition

8) Which of the aforementioned processes do humans try to “fix”? (1 pt)

- a. slope
- b. transportation
- c. corrosion
- d. planform change**

9) What two waterfalls are in Niagara? (1 pt)

- a. American Falls and Angel Falls
- b. Angel Falls and Canadian Horseshoe falls
- c. Cumberland Falls and American Falls
- d. American Falls and Canadian Horseshoe falls**

10) What are the best conditions for an aquifer? (1 pt)

- a. Low permeability, low porosity
- b. Low permeability, high porosity
- c. High permeability, low porosity
- d. High permeability, high porosity**

11) Which of the following would be a good aquifer material? (1 pt)

- a. granite
- b. schist
- c. sandstone**
- d. wood

12) Which of the following sorts sediment clast sizes from lowest to highest? (1 pt)

- a. pebble, sand, silt, clay
- b. pebble, silt, sand, clay
- c. clay, sand, silt, pebble
- d. **clay, silt, sand, pebble**

13) Oxbow lakes are formed from (1 pt):

- a. volcanic activity
- b. **cutoff meanders**
- c. tectonic activity
- d. glacial activity

14) In waterfall formation, the pool created by the erosion of soft rock is known as (1 pt):

- a. waterfall
- b. wetlands
- c. **plunge pool**
- d. forebay

15) Knickpoints are directly influenced by all of the following EXCEPT (1 pt):

- a. tectonic activity
- b. glacial activity
- c. **humidity**
- d. lithology

16) A knickpoint that occurs at the head of a channel is called a (1 pt):

- a. **headcut**
- b. delta
- c. moraine
- d. esker

17) Groundwater flows from: (1 pt)

- a. **recharge areas to discharge areas**
- b. discharge areas to recharge areas

18) Groundwater moves _____ from recharge areas to discharge zones. (1 pt)

- a. quickly
- b. **slowly**

19) Which of the following is not a Karst feature? (1 pt)

- a. polje
- b. ponor
- c. influent stream
- d. cenote
- e. **all of the above are karst features**

20) Which of the following is not a point source pollutant? (1 pt)

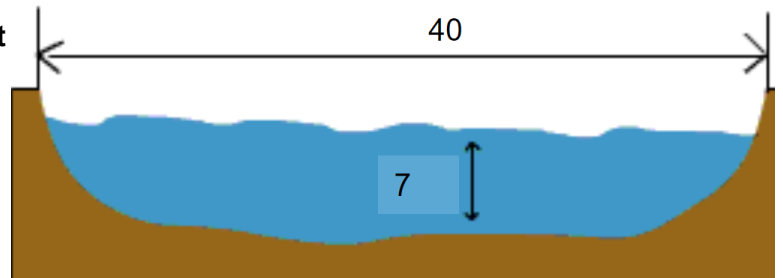
- a. smokestacks from the bomb factory
- b. animal waste from the nick farm
- c. **urban runoff from losertown**
- d. oil spill from the nick factory

section 2: math (10 pts)

1) *measurements are in ft, each worth 2 pts*

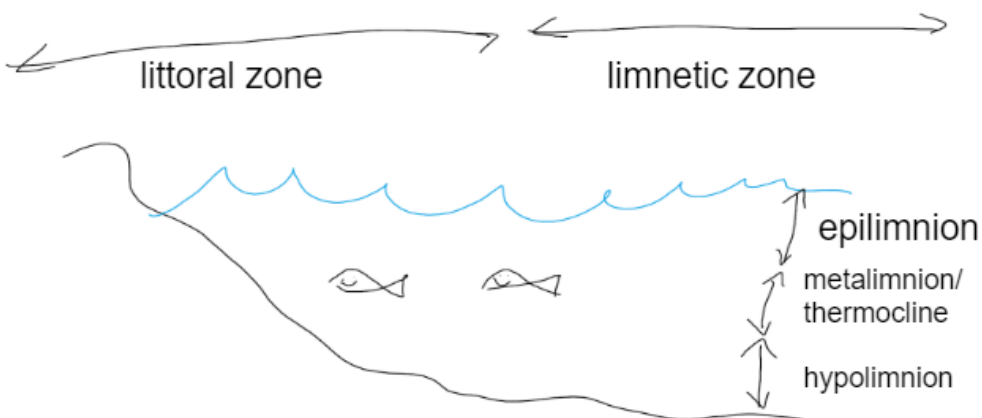
- a. calculate the area of the stream cross section: **280 ft²**
- b. calculate the wetted perimeter: **54 ft**
- c. calculate the hydraulic mean depth **7ft**
- d. calculate the hydraulic radius **5.19 ft**
- e. given that the velocity is 10 ft per second, calculate the discharge

2800 ft³ / s

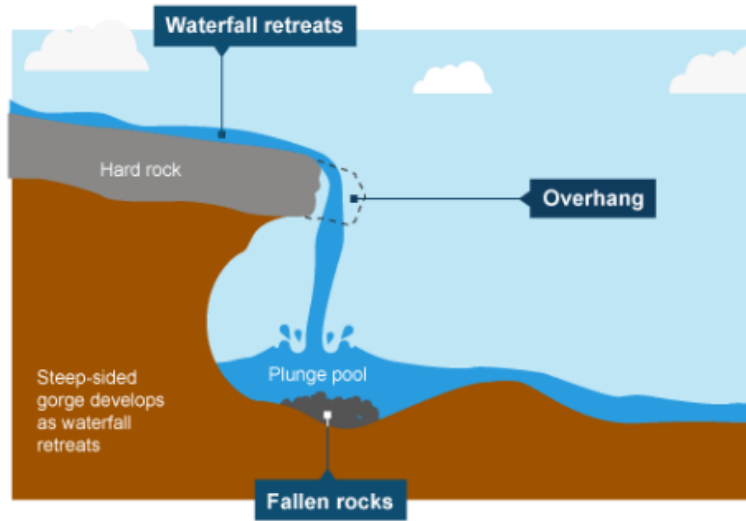
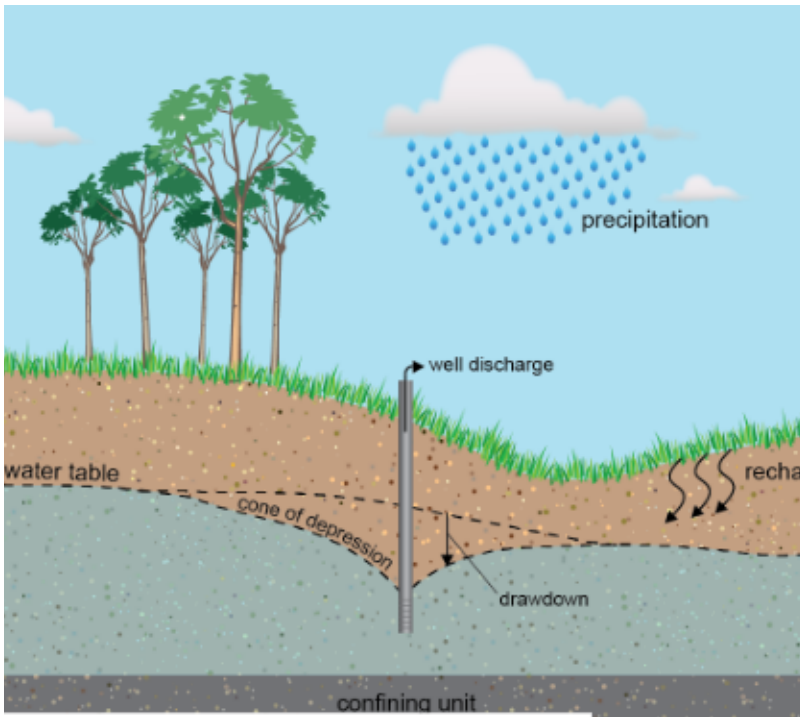
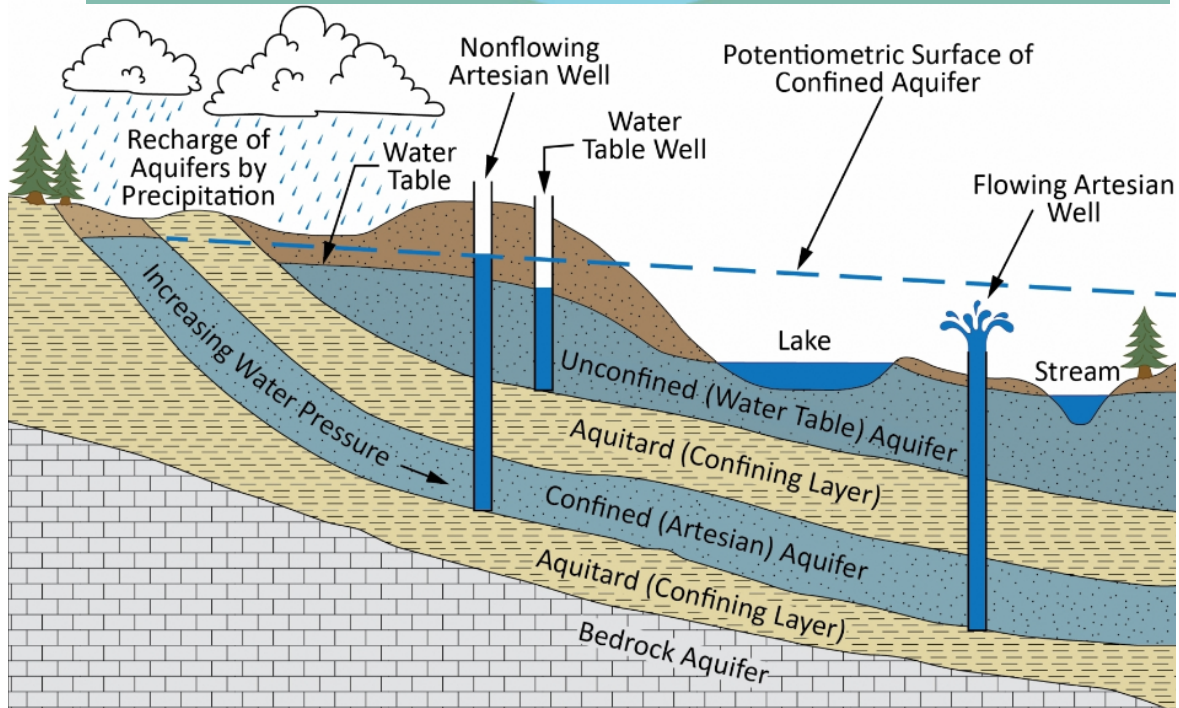
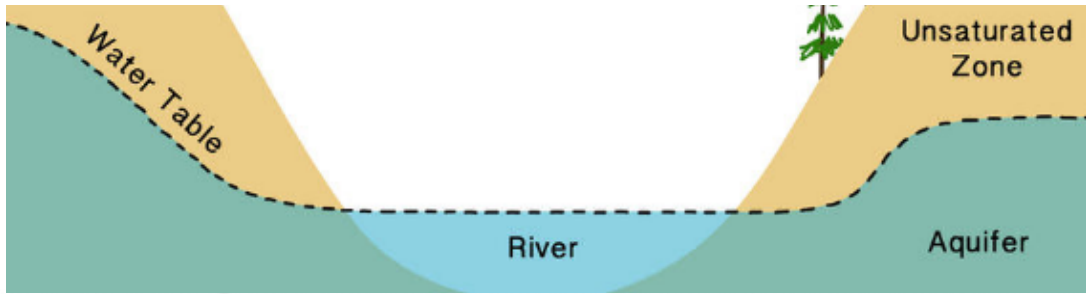


pay attention to units !!

section 3: diagram labeling (28 pts)



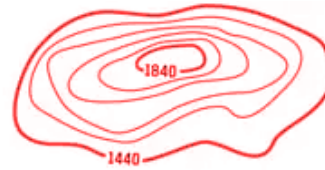
(above) label two of the limnologic lake zones and the temperature zones



section 4: topo jaja (7pts)

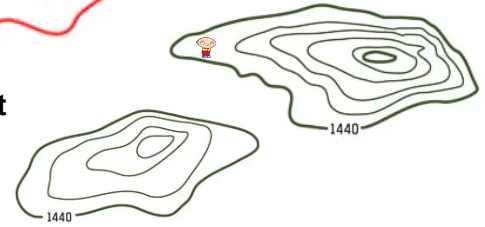
1) What is the contour interval in the map to the right?

80 ft



2) Which of the two maps on the right shows a steeper topography? **1st**

3) Which of the two maps on the right would be better for farming? **2nd**

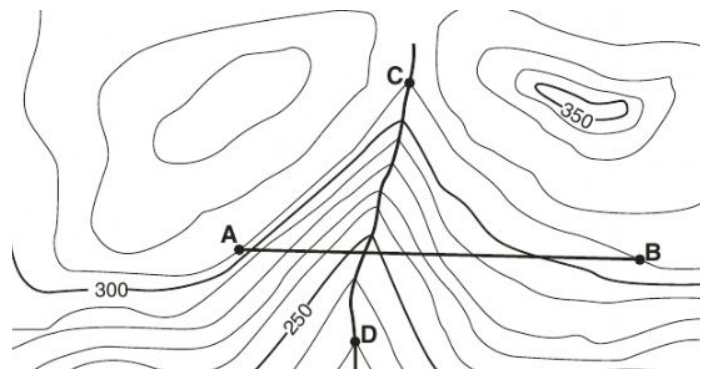


4) Say the contour interval is 50 ft; Nathan says that on the map, Stewie's elevation has to be 1490 ft. Is he correct? Why or why not? **nah cause stewies not on a contour line and also cause we dont know if the topography is going up or down**

5) In the map at the bottom below, the contour lines are forming a "V" shape. We can assume that there is a **river** here.

6) What elevation is point A?

310 ft



section 5: short answer (22 pts)

1) describe the differences between braided and anastomosing channels (3pts):

while both are interweaving, anastomosing channels are semi-permanent channels separated by floodplains rather than channel bars.

2) during which season(s) does lake turnover occur in dimictic lakes and why? (2pts)

lake turnover occurs in dimictic lakes during the fall and spring because the surface water cools, which causes it to be more dense so it sinks.

3) what river system is lake mead a part of and why is it drying up? why is this important? (5 pts)

lake mead is a part of the colorado river system, which is drying up due to a historic drought. this is important as this system provides water and power to millions by the reservoir and hoover dam.

4) describe the formation of oxbow lakes (3 pts):

an oxbow lake forms as a river erodes through the neck of one of its meanders. since the river is always trying to find the shortest course, when the meander grows too wide the river cuts through and leaves an oxbow lake on the side.

5) contrast lake overturn and lake turnover (3 pts):

lake overturn refers to limnic eruption, and lake turnover is the natural mixing of the layers within a lake due to seasonal changes.

6) the Kansas River flows into the Missouri River and therefore has, in comparison, a smaller drainage area. Would you expect the effect of climatic conditions to be greater on the Kansas River or Missouri River? Which River would have a wider range in quality? (in terms of the river as whole, not like a single specific section) (2 pts)

kansas river to both questions (according to local hydrological report); the smaller drainage area means that even small changes have greater effect to the kansas river than to the missouri river. Example: A single kansas thunderstorm would drastically increase the kansas river, whereas it would be sort of spread out and the effects lessened in the missouri.

7) kansas' water supply mainly comes from underground wells and has a hardness average of 299 ppm. Would this water be considered hard? If so, what minerals would you expect to be present? (2 pts)

hard, calcium and magnesium ions

8) compare and contrast bogs and fens (2pts):

Although both bogs and fens are similar types of wetlands as they are both considered peatlands, what sets them apart from each other is the source of their water supply. Fens typically are fed by a steady source of ground water whereas bogs are usually enclosed depressions filled by rain water.

tiebreakers:

(refer to image, right) what are these structures called? what is their intended purpose? use as much detail as you can in your answer (3 pts):

groins, interrupts water flow and limits the movement of sediment. often made out of wood, concrete, or stone. slows down the process of erosion, prevents ice-jamming

