Dynamic Planet Trial Test 2K14

Welcome to the Solon DP trial test! As a forewarning, if you can't tell by the number of sheets of paper, this test is very long. Your usage of sentences is not required except in explanation problems. The test follows the exact same structure as the topics presented in the trial test rules. This will give you an idea of what questions you may run into as well as what areas you appear to struggle in. Please make sure you write your name, date, and team number on every page.

Contact me at dontactuallyeverbotherme@gmail.com if you have questions or concerns.

Timing of this test:

Each person will get a minimum of 50 minutes on the exam. However, you're allowed to work for 100 minutes on the exam. Each minute over the limit will result in the deduction of 2 points.

Tiebreakers:

Time will serve as first tiebreaker, then followed by the number of bonus points earned.

Name: _____ Team Number: _____ Date:_____

Score Page

Time Started: _____ Time Ended: _____

Minutes Elapsed: _____ Time Penalty: _____

Question A: _____/15

Question B: _____/15

Question C: _____/15

Question D: _____/15

Question E: _____/25

Question F: _____/10

Question G: _____/15

Question H: _____/15

Question I: _____/10

Question J: _____/15

Question K: _____/10

Question L: _____/15

Bonus Points: _____

Raw Score: _____ - Penalty _____ = Final Score: _____/175

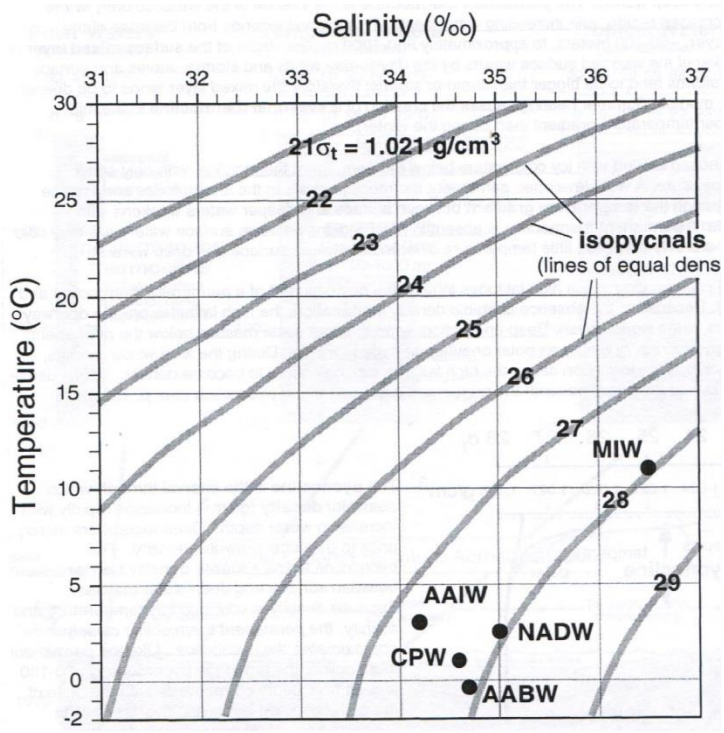
Rank: _____

Name: _____ Team Number: _____ Date:_____

A. Seawater

a. Name 3 substances that can be found dissolved in seawater. (3)

b. Identify the density of MIW and AAIW in g/cm^3. (4)



MIW:

AAIW:

c. List the top 5 ions in seawater and their respective ppms. (5)

d. Where do most dissolved solids in seawater come from? (1)

e. Explain residence time. (2)

Name: _____ Team Number: _____ Date:_____

B. Energy

a. Where does the energy for oceans mostly come from? (2)

b. Identify what kind of energy is outputted from waves. (1)

c. Give a description of the water cycle. (4)

d. Draw a 3 level trophic pyramid involving 3 marine organisms of your liking. Then write the net transfer efficiency as in a percentage beside each level. (6)

e. Convert 1 Calorie to joules. (2)

C. Water temperature, pressure, and ocean layers

a. Define permanent thermocline and pycnocline. (2)

b. How does temperature affect viscosity? (1)

c. Draw a temperature profile for high latitude waters. (3)

d. Draw a temperature profile for mid latitude waters in the summer. Label the seasonal thermocline, permanent thermocline, and pynocline. Label the 3 layers and their relative depths. (9)

D. Seafloor Physiography

a. Draw a passive continental margin separated from an active continental margin by an oceanic ridge. Label both that and the ocean basin. Identify and include features such as seamount, abysmal plain, trench, rift valley within your drawing. (10)

b. What rock is most commonly found in oceanic basins? (1)

c. Fill in the following chart, identify with yes or no for the headings followed with a question mark. (4)

Continental Margin	Plate Tectonic Type	Plate Boundary?	Volcanism?	Seismic Activites?
Passive				
Active				

E. Tectonic plate motion and processes
   a. Draw a sketch illustrating each of the 3 types of plate boundaries. Be sure to label each type, identify if seafloor is created or destroyed at that boundary, and give an example of a location where that boundary occurs. (15)
   b. In your sketch, show and label the following: (10)
      i. Shallow/deep earthquakes
      ii. Trench
      iii. Normal/Reverse Polarities
      iv. Volcanoes
      v. Lithosphere
      vi. Asthenosphere
      vii. Continental Oceanic Crust
      viii. Relative Directions of Motion
      ix. Old/young sea floor
      x. Mantle

Do the drawing on the following blank page.

Name: _____ Team Number: _____ Date:_____

F. Formation of reefs and atolls

a. Who came up with the theory of the formation of atolls? (1)

b. Draw a map view of the following. Identify the structure it surrounds, conditions for formation, as well as areas in the world where it can be found.

i. Fringing Reef (3)

ii. Barrier Reef (3)

iii. Atolls (3)

G. Waves

a. Identify 3 things wave size depends on. (3)

b. Draw the change in wave motion as waves move from deep water into intermediate and shallow depths. (3)

c. What causes the change in wave motion? (1)

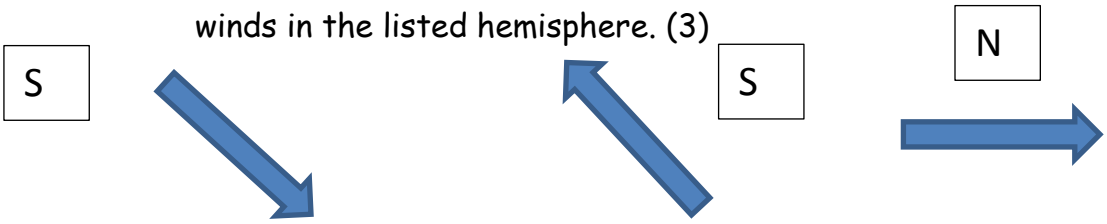
d. In deep water, calculate the celerity if the wavelength is 10 meters, the period is 5 seconds, and the depth is 50 meters. (3)

e. In shallow water, calculate the celerity if the wavelength 10 meters, the period is 5 seconds, and the depth is .5 meters. (3)

f. At what ratio of height to wavelength do waves break in the surf? (2)

H. Surface currents

a. Draw the direction of the Ekman transport for the following prevailing winds in the listed hemisphere. (3)



b. Explain Ekman transport and what two components cause it. (6)

c. True or false, the critically acclaimed novel Wide Sargasso Sea references a location within a gyre. (2)

d. State which direction the subtropical gyre rotates in the S Atlantic (1)

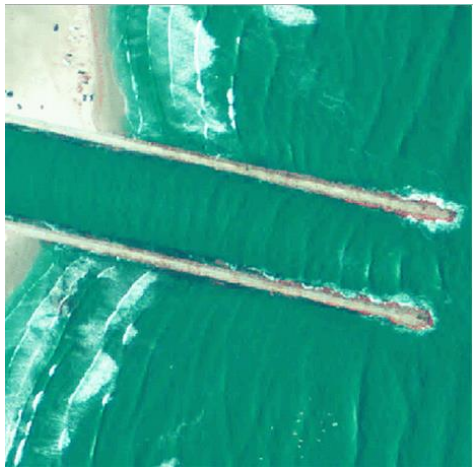
e. Explain western intensification. (3)

I. Coastal Currents

a. At what depth limit is sand lost from beaches due to longshore drift? (1)

b. True or false, rip currents are the same thing as rip tides. (1)

c. Identify the following forms of protection against longshore erosion. (4)



d. Draw the direction of the longshore current in the following image. (4)

Name: _____ Team Number: _____ Date:_____

J. Tides

a. Who came up with the dynamic theory of tides? (2)

b. Explain why coasts along the Gulf of Mexico experience diurnal tides. (3)

c. What is the amphridromic point? (2)

d. Draw 2 diagrams, each showing the positioning of the moon and Earth to detail spring and neap tides. Shade in half of the circles to indicate which side is facing away from the sun. (6)

e. What happens to the tidal range at the 2 positions? (2)

K. Coastal features and processes

a. Identify the following coastal features (4)

b. List 3 reasons for shoreline retreat. (3)

c. Describe how each can affect shoreline retreat. (3)

L. Oceanography Tools

a. Identify what the following tools are used to measure: (4)

i. Thermometer -

ii. Secchi Disk -

iii. Fathometer -

iv. Hydrometer -

b. What is HiSeasNet used for? (1)

c. Identify the following acronyms of sensors or samplers (3)

i. CDT -

ii. WTS -

iii. ZPS –

d. Identify what tool oceanographers would need in order to obtain samples of ocean water at 50, 100, 250, and 500 meters depth simultaneously and explain how it's used. (5)

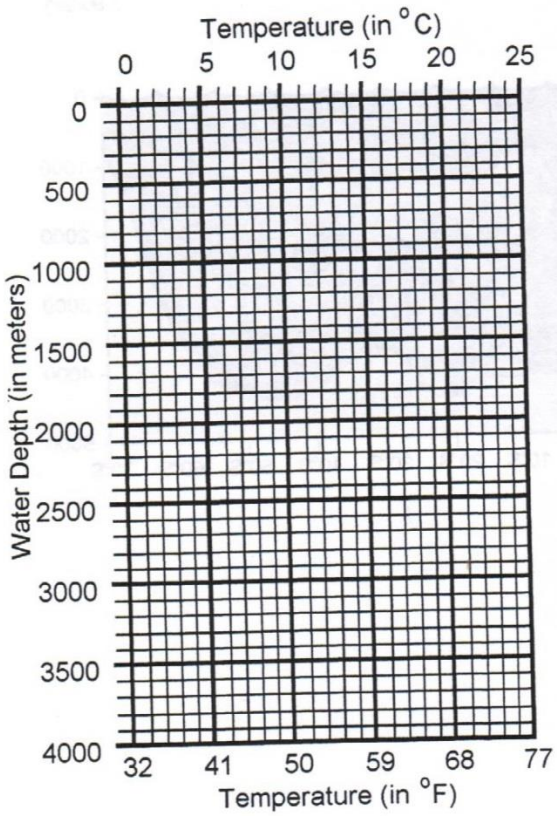
e. True or False. There is something called the JZ Bacteriological Bottle. (2)

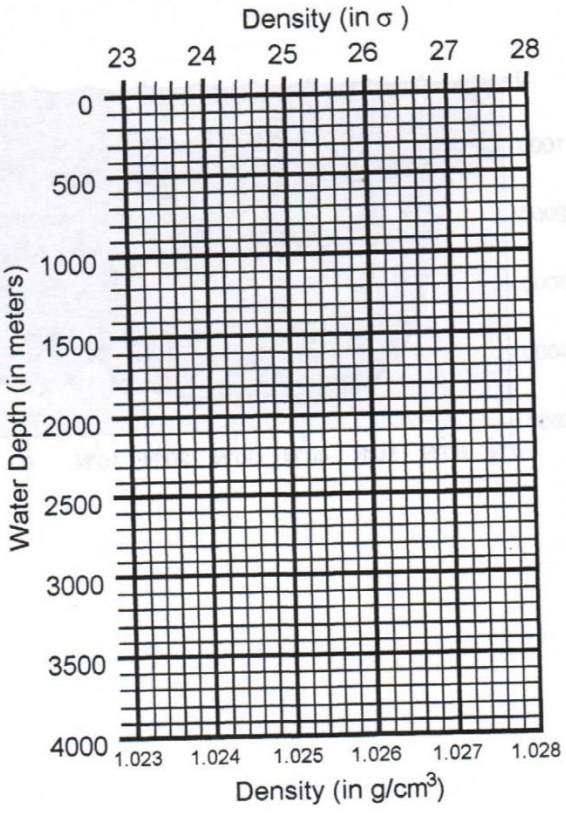
Bonus: This is representative activity A in the rule manual. (15)

2). Below are temperature and density data collected in the water column at a particular site in the ocean. Fill in the column for σ_t. Plot these data on the graphs below. Label the proper parts of the curves: mixed layer, thermocline or pycnocline, and deep waters.

Water Depth (meters)	Temperature (°C)	Density (g/cm^3)	σ_t (Density –1) x 1000
0 (surface)	24	1.0230	
100	22	1.0233	
200	18	1.0245	
300	15	1.0252	
400	12	1.0258	
500	10	1.0262	
1000	4	1.0270	
1500	3	1.0271	
2000	3	1.0271	
2500	3	1.0271	
3000	3	1.0271	
3500	2.5	1.0273	
4000	2.5	1.0273	

Are these data from low, middle, or high latitudes?_____





Name: _____ Team Number: _____ Date:_____

Provide an analogy that explains isostasy. (5)

List 5 reasons to study the oceans. (5)

Where did all the water in the ocean come from? (2)

Identify any non-punctuation grammar mistakes on this exam. List the mistake and the page number it's found on. (1 pt. each)

Name: _____ Team Number: _____ Date:_____