

ST Pretest 3.2 2016 version *The test covers C-Cycle, Global Warming, Oceans, Permafrost, Watersheds and Glaciers (pages 106 to 116 and 124 to 134). The flashback includes pH, neutralization reactions and converting from m/V % to ppm.*

ANSWERS

1. a) What biological process removes some CO₂ from the atmosphere?

photosynthesis

b) What weather phenomenon (not shown in diagram) **removes** some CO₂ from the atmosphere?

Rain

c) List two ways that humans add CO₂ to the carbon cycle?

respiration, use of fossil fuels

d) Which type of rock captures some carbon from ocean sediments?

Sedimentary or carbonate or CaCO₃

e) How do igneous rocks and magma from **volcanoes** play a role in the carbon cycle?

They are derived from sedimentary rocks so they eventually release carbon dioxide.

2. List two ways in which gases like CO₂, CH₄, H₂O and N₂O act like glass in a green house.

(1) Both the glass and greenhouse gases are transparent to visible light from the sun.

(2) After the visible light excites atoms of the soil and other substances on the surface, the surface releases heat. Greenhouse gases and glass both absorb and transfer some of the heat to the air. Greenhouse gases warm up the atmosphere; glass keeps the heat inside the greenhouse.

3. a) It is the most powerful of the greenhouse gases, but there's so much of it in the atmosphere that our contribution does not mess up things. That gas is _____.

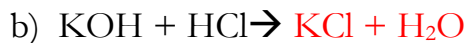
Water vapour

b) This greenhouse gas is the 2nd most abundant one in the atmosphere, and human activities change the percentage significantly_____

carbon dioxide

Numbers 4 and 5 are flashback

4. Predict what will form when the following acids and bases react:



5. Even though dark coffee has some bitter tasting substances, it contains more acid than base giving a pH of 4.8. How much more acidic is it when compared to a soil whose pH = 5.8?

$$5.8 - 4.8 = 1$$

$$10^1 = 10 \text{ X}$$

6. The porosity of rock will influence how fast water from a watershed is delivered to a river or bay. The factor being described here is_____

(A)Climate

(B)Geology

(C)Topography

(D)Vegetation

7. The Ottawa river which flows through our nation's capital is part of what major watershed?_____

(A)Hudson Bay

(B)Lake Champlain

(C)St. Lawrence River

(D)Ungava Bay

8. Sea ice is to an ice floe (small) is what a glacier is to an _____.

- (A) Iceberg
- (B) Ice cube
- (C) Ice cap
- (D) Ice cream



9. What name is given to permanently frozen ground?

- (A) Permafrost
- (B) Ice cap
- (C) Snow
- (D) Tundra

10. What greenhouse gas is released by decomposers when permanently frozen ground begins to thaw?

- (A) Carbon dioxide
- (B) Nitrous oxide
- (C) Water
- (D) Methane

11. What organisms convert waste into phosphates?

Bacteria

12. a) When ice floats, what two forces are balancing each other out? (for bonus question on test)

Buoyancy and gravity

b) If the ice is moved to sea water of a greater density, what will happen to the amount of ice sticking out of the water? (More? Less? The same?) (for bonus question on test) more ice will stick out

$V_{dw}/V_{ice} = d_{ice}/d_w$ will be lower because d_w is higher for sea water. If there's less submerged ice than that means more is sticking out.

c) Will a full glass holding an ice cube overflow with water after the ice melts? NO

d) If water- ice sinks in alcohol, will the volume of the alcoholic drink shrink after the completely submerged ice melts? (for bonus question on test)

YES



13. a) Which layer of the ocean is subject to the most dramatic changes in temperature?

The mixing layer.

b) Why?

It absorbs the most light and is the one in contact with the most air.

14. How do HCO_3^- ions end up in the ocean?

From the weathering of rocks and from the reaction between carbon dioxide and water.

15. List two ways that carbon from the continent or atmosphere ends up in the ocean.

a) Ocean water dissolves it directly from the atmosphere: water + carbon dioxide $\rightarrow \text{H}_2\text{CO}_3$

b) It receives hydrogen carbonate from weathered rocks.

16. Why is London warmer than Gaspé in the winter. Gaspé is cooled by the Labrador current while London is warmed by the gulf stream.

17. What three factors affect ocean currents?

1) Wind 2) tides 3) thermohaline current due to density differences (salty water is more dense than fresh water; cold is more dense than warm up to 4 °C)

18. If a sample from the Gulf of St. Lawrence has a salt concentration of 12 000 ppm, what is its concentration in %m/V ?

12 00 mg/L = 12 g/1000 ml *100% = 1.2 %