1. chem10b 18.2-30

What is the final stage in municipal water treatment?

Student Response	Correct Answer
A. aeration	
B. settling	
C. removal of added fluoride	
D. treatment with ozone or chlorine	
E. filtration through sand and gravel	

2. chem10b 18.1-14

What compound in limestone and marble is attacked by acid rain _____?

Student Response	Correct Answer
A. potassium hydroxide	
B. hydroxyapatite	
C. gypsum	
D. graphite	
E. calcium carbonate	

3. chem10b 18.2-32

In the presence of oxygen, the nitrogen present in biodegradable material ends up mainly as _____.

Student Response	Correct Answer
A. NO	
B. NO_3^-	
C. NO_2	
D. NH_3	

E. NH_4^+

4. chem10b 18.2-36

Eutrophication of a lake is the process of _____.

Student Response	Correct Answer
A. rapid increase in the amount of dead and decaying plant matter in the lake as a result of excessive plant growth	
B. dissolved oxygen being depleted by an overpopulation of fish	
C. restoration of the lake's dissolved oxygen supply by aerobic bacteria	
D. stocking the lake with fish	
E. rapid decline in the lake's pH due to acid rain	

5. chem10b 18.2-11

Of the reactions involved in the photodecomposition of ozone (shown below), which are photochemical?
1. $O_2\ (g) + hv \rightarrow O\ (g) + O\ (g)$
2. $O\ (g) + O_2\ (g) + M\ (g) \rightarrow O_3\ (g) + M^*\ (g)$
3. $O_3\ (g) + hv \rightarrow O_2\ (g) + O\ (g)$
4. $O\ (g) + O\ (g) + M\ (g) \rightarrow O_2\ (g) + M^*\ (g)$

Student Response	Correct Answer
A. 1□and 3	
B. 2 and 4	
C. 1, 2, and 4	
D. 1 onl□	
E. all of them	

6. chem10b 18.1-13

Natu□al, unpolluted rainwater is typically acidic. What is the source of this natural acidity _____?

Student Response	Correct Answer

A. NO_2
B. CO_2
C. chlorofluorocarbons
D. HCl
E. SO_2

7. chem10b 18.1-12

CFC stands for _____.

Student Response	Correct Answer
A. chlorinated freon compound	
B. carbonated fluorine compound	
C. chlorofluorocarbon	
D. carbofluoro compound	
E. caustic fluorine carbohydrate	

8. chem10b 18.6-6

The concentration of carbon monoxide in a sample of air is 9.2 ppm. There are _____ molecules of CO in 1.00 L of this air at 755 torr and 23°C.

Student Response	Correct Answer
A. 2.3×10^{17}	
B. 3.8×10^{-7}	
C. 1.7×10^{20}	
D. 2.2×10^{21}	
E. 2.9×10^{18}	

9. chem10b 18.2-16

The source(s) of sulfur dioxide in the atmosphere is/are _____.

Student Response	Correct Answer

A. bacterial action
B. forest fires
C. volcanic gases
D. fossil-fuel combustion
E. all of the above

10. chem10b 18.2-24

The reaction that forms most of the acid in acid rain is _____.

Student Response	Correct Answer
A. Cl_2 (g) + H_2O (l) → HCl (aq) + HClO (aq)	
B. SO_2 (g) + H_2O (l) → H_2SO_3 (aq)	
C. SO_2 (g) + H_2O (l) → H_2SO_4 (aq)	
D. H_2S (g) + 2 O_2 (g) → H_2SO_4 (l)	
E. SO_3 (g) + H_2O (l) → H_2SO_4 (aq)	

11. chem10b 18.4-7

Sulfur compounds in the atmosphere are equally derived from natural ☐ources and from human activity.

Student Response	Value	Correct Answer

12. chem10b 18.1-15

CO_2 from hydrocarbon combustion creates a major environmental problem that is described as _____.

Student Response	Correct Answer
A. photochemical smog	
B. acid rain	
C. stratospheric ozone depletion	

D. the greenhouse effect
E. all of the above

13. chem10b 18.1-11

Ozone is a(n) _____ of oxygen.

Student Response	Correct Answer
A. isotope	
B. resonance structure	
C. atomic form	
D. allotrope	
E. isomer	

14. chem10b 18.2-23

Which gaseous sulfur compound combines with water to form the principal acidic constituent of acid rain?

Student Response	Correct Answer
A. SO_2	
B. H_2S	
C. SO_3	
D. H_2SO_4	
E. SO	

15. chem10b 18.1-8

The amount of atomic O relative to O_2 _____.

Student Response	Correct Answer
A. is highest in the troposphere	
B. increases with altitude in the thermosphere	
C. is essentially independent of altitude in the thermosphere	

D. is highest in the stratosphere
E. decreases with altitude in the thermosphere

16. chem10b 18.1-6

Components of Air Mole Fraction
Nitrogen 0.781
Oxygen 0.209
Argon 0.010

What is the partial pressure or oxygen (in torr) in the atmosphere when the atmospheric pressure is 760 torr?

Student Response	Correct Answer
A. 430	
B. 720	
C. 601	
D. 159	
E. 760	

17. chem10b 18.2-7

Why does ozone not form in high concentrations in the atmosphere above 50 km?

Student Response	Correct Answer
A. Light of the required wavelength is not available at those altitudes.	
B. The pressure is too high.	
C. Insufficient molecules exist for removal of excess energy from ozone upon its formation.	
D. Insufficient oxygen is available.	
E. Atomic oxygen concentration is too low at high altitudes.	

18. chem10b 18.1-26

The "scale" caused by hard water is _____.

Student Response	Correct Answer
A. calcium ions	
B. magnesium ions	
C. chloride ions	
D. calcium carbonate	
E. magnesium oxalate	

19. chem10b 18.1-21

The brown color of photochemical smog over a city is mainly due to _____.

Student Response	Correct Answer
A. N_2O_4	
B. SO_2	
C. CO	
D. NO_2	
E. CO_2	

20. chem10b 18.2-19

How does lime reduce sulfur dioxide emissions from the burning of coal?

Student Response	Correct Answer
A. It oxidizes the sulfur dioxide to tetrathionate that is highly water soluble so it can be scrubbed from the emission gases.	
B. It converts SO_2 to solid, elemental sulfur.	
C. It reacts with the sulfur dioxide to form calcium sulfite solid that can be precipitated.	
D. It catalyzes the conversion of sulfur dioxide to sulfur trioxide which is much less volatile and can be removed by condensation.	
E. It reduces the sulfur dioxide to elemental sulfur that is harmless to the environment.	

1. chem10b 18.1-26

The "scale" caused by hard water is _____.

Student Response	Correct Answer
A. chloride ions	
B. calcium ions	
C. magnesium oxalate	
D. magnesium ions	
E. calcium carbonate	

2. chem10b 18.1-7

What is/are the product(s) of photodissociation of molecular oxygen?

Student Response	Correct Answer
A. ozone	
B. molecular nitrogen	
C. excited oxygen molecules	
D. ozone and atomic oxygen	
E. atomic oxygen	

3. chem10b 18.1-1

The liquid portion of the Earth is called the _____.

Student Response	Correct Answer
A. lithosphere	
B. atmosphere	
C. stratosphere	
D. mesosphere	
E. hydrosphere	

4. chem10b 18.4-6

Nitric oxide arises from internal combustion engines.

Student Response	Value	Correct Answer

5. chem10b 18.6-3

The concentration of ozone in Los Angeles is 0.67 ppm on a summer day. This means that if the total pressure is 735 torr, then the partial pressure of O_3 is _____ torr.

Student Response	Correct Answer
A. 9.1×10^{2}	
B. 4.9×10^{-4}	
C. 4.9×10^{2}	
D. 0.49	
E. 1.1×10^{9}	

6. chem10b 18.2-22

Which one of the following substances found in the atmosphere will absorb radiation in the infrared portion of the spectrum?

Student Response	Correct Answer
A. O_2	
B. N_2	
C. H_2O	
D. Kr	
E. He	

7. chem10b 18.6-7

The mole fraction of neon in dry air near sea level is 1.818×10^{-5} where the molar mass of neon is 20.183. The concentration of neon in the atmosphere is _____ ppm.

Student Response	Correct Answer
A. 18.18	
B. 5.50×10^{10}	
C. 0.001818	
D. 1.818×10^{4}	
E. 1.818×10^{-11}	

8. chem10b 18.4-5

Ozone depletion from chlorofluorocarbons is chiefly due to the production of free chlorine.

Student Response	Value	Correct Answer

9. chem10b 18.1-24

In the world's oceans, the average salinity is about _____g/kg.

Student Response	Correct Answer
A. 0.1	
B. 0.03	
C. 3.5	
D. 17	
E. 35	

1. chem10b 18.4-2

The bond energy of oxygen is higher than that of nitrogen.

Student Response	Value	Correct Answer

2. chem10b 18.1-18

Acid rain typically has a pH of about _____.

Student Response	Correct Answer
A. 7	
B. 5	
C. 4	
D. 2	
E. 1	

3. chem10b 18.1-11

Ozone is a(n) _____ of oxygen.

Student Response	Correct Answer
A. atomic form	
B. isomer	
C. allotrope	
D. isotope	
E. resonance structure	

4. chem10b 18.4-3

The partial pressure of a component in a gas mixture is the product of its mole fraction and the total mixture pressure.

Student Response	Value	Correct Answer

5. chem10b 18.1-12

CFC stands for _____.

Student Response	Correct Answer
A. chlorofluorocarbon	
B. carbonated fluorine compound	
C. chlorinated freon compound	
D. caustic fluorine carbohydrate	
E. carbofluoro compound	

6. chem10b 18.6-8

The mole fraction of oxygen in dry air near sea level is 0.20948. The concentration of oxygen is _____ molecules per liter, assuming an atmospheric pressure of 739 torr and a temperature of 29.5°C.

Student Response	Correct Answer
A. 4.93×10^{21}	
B. 5.07×10^{22}	
C. 3.75×10^{24}	
D. 6.23	
E. 0.00819	

7. chem10b 18.4-4

Nitrogen oxides catalytically destroy ozone.

Student Response	Value	Correct Answer

8. chem10b 18.6-7

The mole fraction of neon in dry air near sea level is 1.818×10^{-5} where the molar mass of neon is 20.183. The concentration of neon in the atmosphere is _____ ppm.

Student Response	Correct Answer
A. 0.001818	
B. 1.818×10^{4}	

C. 18.18
D. 5.50×10^{10}
E. 1.818×10^{-11}

Score: 1/1

9. chem10b 18.2-38

Water containing high concentrations of _____ cations is called hard water.

Student Response	Correct Answer
A. K^+	
B. Mg^{2+}	
C. Ca^{2+}	
D. Ca^{2+} or Mg^{2+}	
E. Na^+	

1. chem10b 18.4-5

Ozone depletion from chlorofluorocarbons is chiefly due to the production of free chlorine.

Student Response	Value	Correct Answer

2. chem10b 18.4-4

Nitrogen oxides catalytically destroy ozone.

Student Response	Value	Correct Answer

3. chem10b 18.2-1

In the troposphere, temperature _____ with increasing altitude, while in the stratosphere, temperature _____ with increasing altitude.

Student Response	Correct Answer
A. increases, increases	
B. decreases, decreases	
C. increases, decreases	
D. decreases, increases	
E. decreases, remains constant	

4. chem10b 18.4-10

Municipal water treatment consists of five steps beginning with chlorination.

Student Response	Value	Correct Answer

5. chem10b 18.6-5

The mole fraction of carbon dioxide in dry air near sea level is 0.000375, where the molar mass of carbon dioxide is 44.010. The partial pressure of carbon dioxide when the total

atmospheric pressure (dry air) is 97.5 kPa is

Student Response	Correct Answer
A. 2.63×10^{5}	
B. 0.0370	
C. 8.40×10^{-4}	
D. 1.63	
E. 5.97×10^{3}	

6. chem10b 18.2-13

In the reactions involved in the photodecomposition of ozone (shown below), what does M symbolize?

1. $O_2\ (g) + h\nu \rightarrow O\ (g) + O\ (g)$
2. $O\ (g) + O_2\ (g) + M\ (g) \rightarrow O_3\ (g) + M^*\ (g)$
3. $O_3\ (g) + h\nu \rightarrow O_2\ (g) + O\ (g)$
4. $O\ (g) + O\ (g) + M\ (g) \rightarrow O_2\ (g) + M^*\ (g)$

Student Response	Correct Answer
A. mesosphere	
B. molybdenum	
C. metal	
D. molecule	
E. methane	

Score: 1/1

7. chem10b 18.1-9

The C-Cl and C-F bond dissociation energies in CF_3Cl are 339 kJ/mol and 482 kJ/mol, respectively. The maximum wavelengths of electromagnetic radiation required to rupture these bonds are _____ and _____, respectively.

Student Response	Correct Answer
A. 353 nm, 248 nm	
B. 482 nm, 248 nm	
C. 742 nm, 654 nm	
D. 45.0 nm, 307 nm	
E. 979 nm, 953 nm	

8. chem10b 18.1-26

The "scale" caused by hard water is _____.

Student Response	Correct Answer
A. calcium carbonate	
B. chloride ions	
C. calcium ions	
D. magnesium oxalate	
E. magnesium ions	

9. chem10b 18.2-21

Carbon dioxide contributes to atmospheric warming by _____.

Student Response	Correct Answer
A. reducing the concentration of CO in the atmosphere.	
B. undergoing exothermic reactions extensively in the atmosphere	
C. absorbing incoming radiation from the sun and converting it to heat	
D. absorbing radiation emitted from the surface of the earth preventing its loss to space	
E. increasing the index of refraction of the atmosphere so that infrared radiation from the sun is refracted to the surface of the earth where it is converted to heat	

1. chem10b 18.2-31

Which of the following is not a stage in water treatment?

Student Response	Correct Answer
A. distillation	
B. chlorination	
C. settling	
D. aeration	
E. coarse filtration	

2. chem10b 18.1-12

CFC stands for _____.

Student Response	Correct Answer
A. carbonated fluorine compound	
B. chlorinated freon compound	
C. caustic fluorine carbohydrate	
D. carbofluoro compound	

E. chlorofluorocarbon

3. chem10b 18.2-30

What is the final stage in municipal water treatment?

Student Response	Correct Answer
A. aeration	
B. settling	
C. filtration through sand and gravel	
D. removal of added fluoride	
E. treatment with ozone or chlorine	

Score: 1/1

4. chem10b 18.2-9

Cl atoms formed via photolysis of C-Cl bonds of chlorofluorocarbons in the stratosphere are particularly effective in destroying ozone at these altitudes because _____.

Student Response	Correct Answer
A. Cl atoms react with H atoms, which catalyze conversion of O_2 to O_3	
B. Cl atoms catalytically convert O_3 to O_2	
C. Cl atoms stoichiometrically convert O_3 to O_2	
D. Cl atoms absorb UV, which generate O atoms to react with O_2 to produce ozone	
E. Cl atoms react with N atoms, which catalyze conversion of O_2 to O_3	

5. chem10b 18.2-34

Biodegradable material degraded by aerobic processes ends up as _____.

Student Response	Correct Answer
A. PH_3	
B. H_2S	

C. CH_4
D. SO_4^{2-}
E. NH_3

6. chem10b 18.2-25

Incomplete combustion of carbon-containing materials occurs when _____.

Student Response	Correct Answer
A. the combustion flame is too hot	
B. there are sulfur impurities in the carbon-containing material	
C. there is insufficient oxygen to convert all of the carbon to carbon dioxide	
D. there is an excess of oxygen	
E. the carbon-containing material is a gas	

7. chem10b 18.2-7

Why does ozone not form in high concentrations in the atmosphere above 50 km?

Student Response	Correct Answer
A. Insufficient molecules exist for removal of excess energy from ozone upon its formation.	
B. Insufficient oxygen is available.	
C. Atomic oxygen concentration is too low at high altitudes.	
D. Light of the required wavelength is not available at those altitudes.	
E. The pressure is too high.	

8. chem10b 18.4-5

Ozone depletion from chlorofluorocarbons is chiefly due to the production of free chlorine.

Student Response	Value	Correct Answer

9. chem10b 18.2-27

The concentration of Br^- in a sample of seawater is 8.3×10^{-4} M. If a liter of seawater has a mass of 1.0 kg, the concentration of Br^-- is _____ ppm.

Student Response	Value	Correct Answer
A. 66		
B. 8.3		
C. 0.066		
D. 0.83		
E. 8.3×10^{-6}		