Diane

Dear Diane (alias Chicken woman)

Please attempt (Ha! Ha!) the following assignment during your childhood disease.

① Do 1-20 ch. 10 worksheet
② Continue reading ch. 6 Text

We all hope you are feeling better and will be able to join the flock (cackle! cackle!) very soon.

Your chicken-hearted rooster,
Mr Ellis

Chemistry & Organic Chemistry

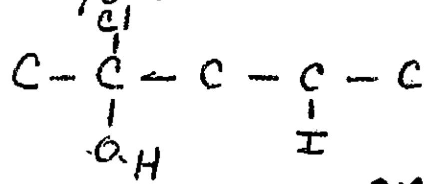
Name Diene — G Braino

Does this mean you are "double-trouble" or "double-talking"?

84

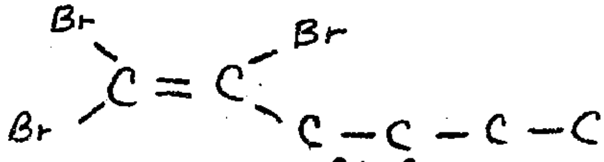
A. Name the following common, everyday items found in your household. (Use the scientific name)

① -3



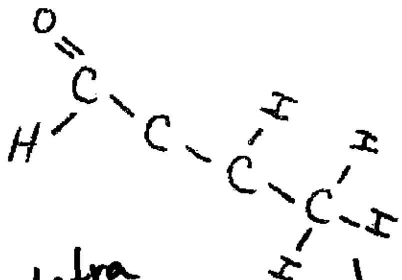
2- chloro 4-iodo 2 pentyl (anol)

② -4



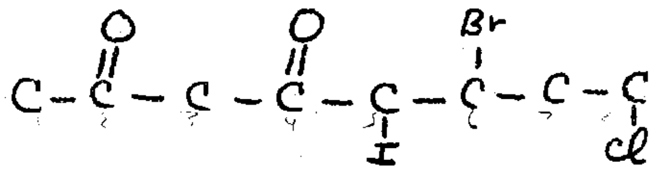
2,1,1, tribromo hexaline (ene)

③ -3



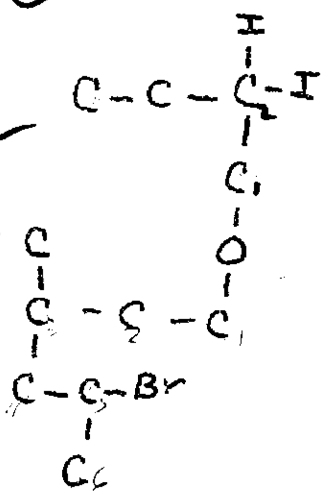
3,4,4,4 (qua) (tetra) iodo butal (anal)

④ -1



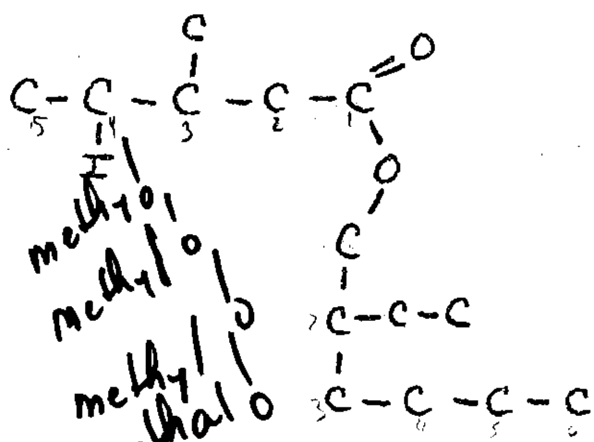
5-iodo 6 Bromo 8-chloro, 2,4 octone (adi)

⑤ -2



(3,3) 2,2 diIodo, butyl 3 methyl 5 bromo hexyl ether

⑥ -1



methyl / methal / methyl / methal

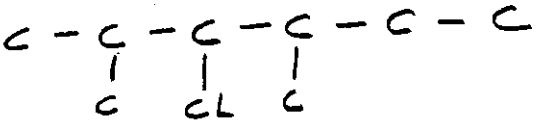
4-iodo 3-methal pentanoate

2-ethyl hexyl

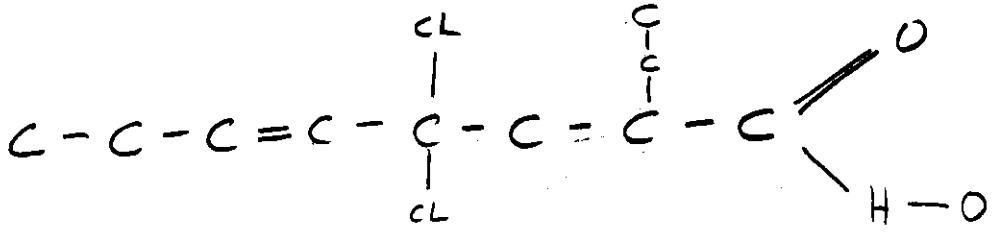
this Ms. Chicken Fain is not proper scientific symbols

B. Draw the structural formulas for the following compounds used in preserving natural, organic foods.

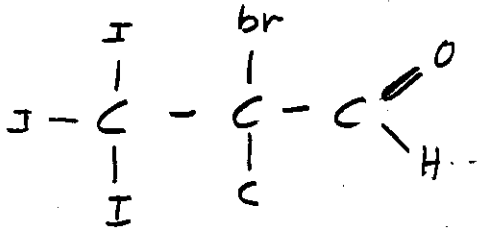
(7) 2,4, dimethyl-3 chloro-hexane



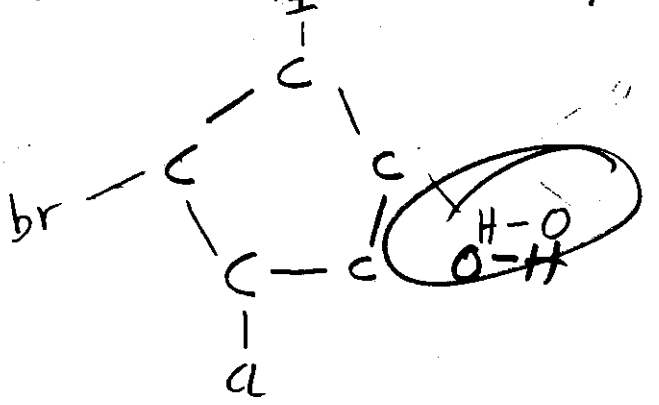
(8) 2, ethyl- 4,4, dichloro-5 ene-octanoic acid

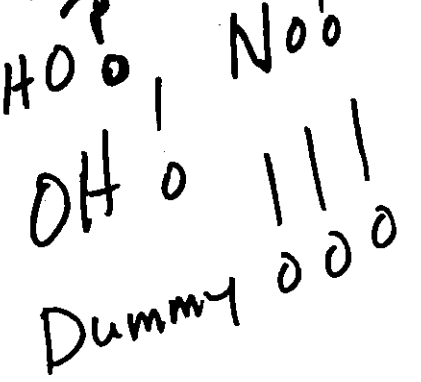


(9) 2, methyl- 2, bromo-3,3,3 triiodo propanal

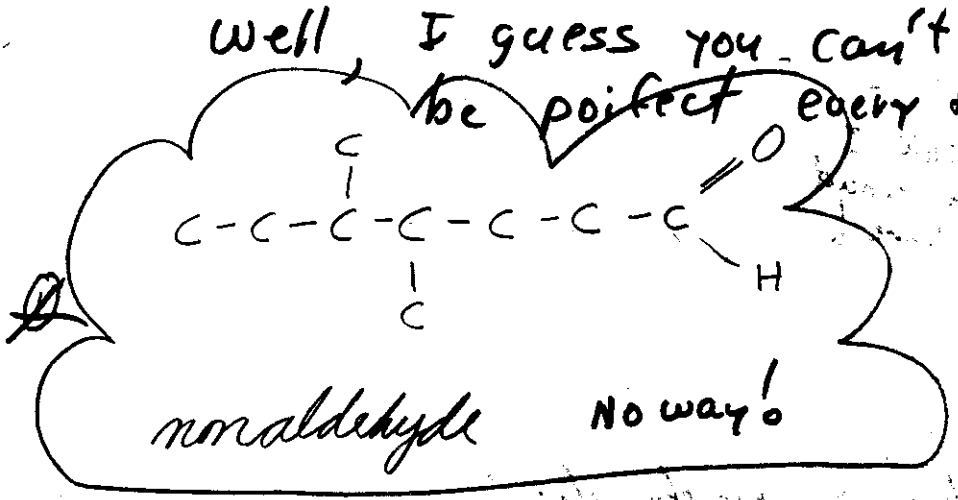


(10) 2, iodo-3, bromo-4, chloro-cyclopentanol





Well, I guess you can't be perfect every time!



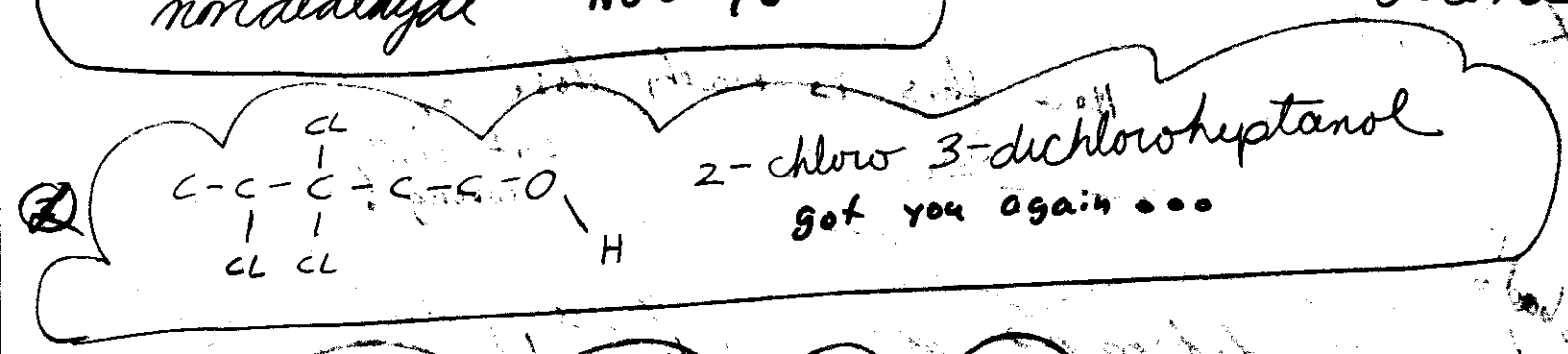
nonaldehyde No way!

Chemical sin in paint

heaven 1090

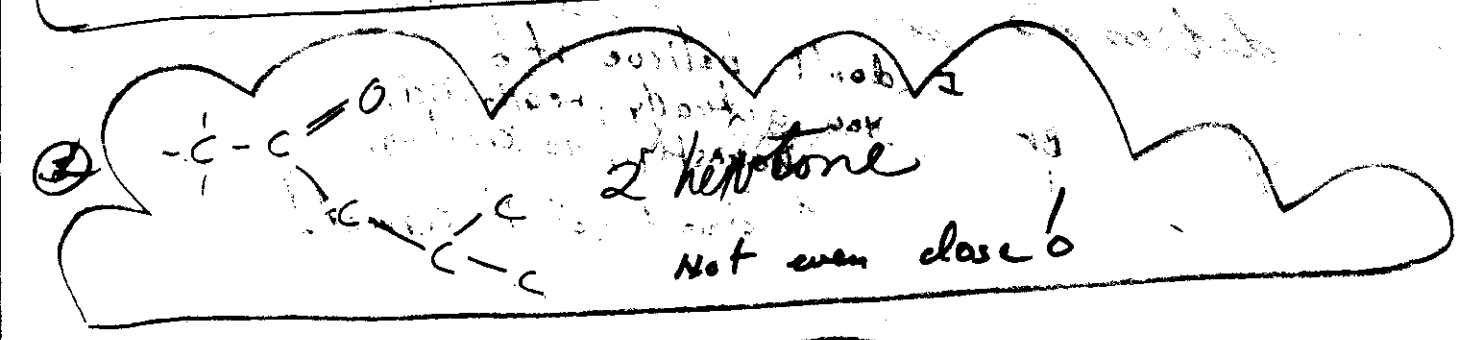
may they stay there -

diene.



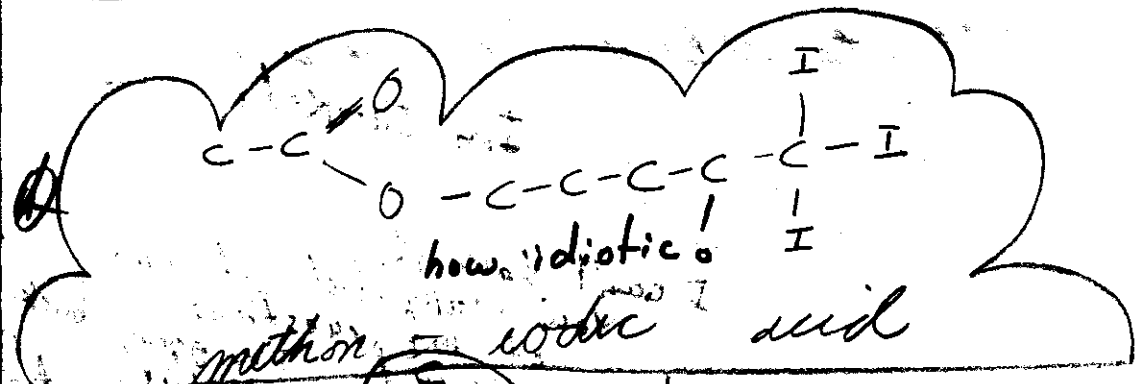
2-chloro 3-dichloroheptanol

Got you again ...



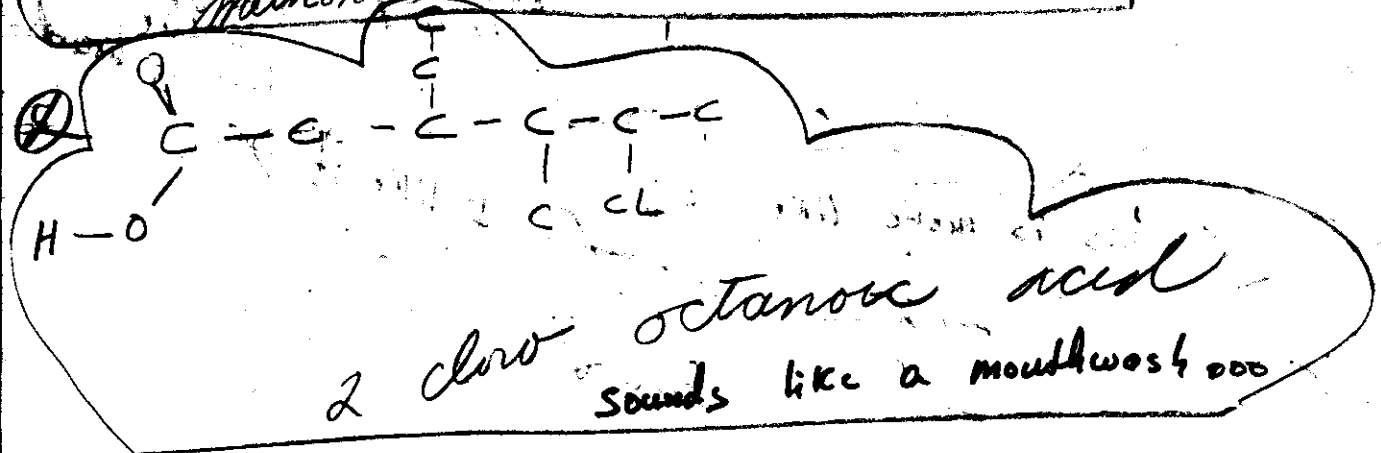
2 heptone

Not even close!



how idiotic!

methan-oic acid



2 chloro octanoic acid

sounds like a mouthwash ...

⑥ C-C ≡ C-C-C-C

I think I "c" a cloud here!

3 heptine

⑦ 3, 5 octadiene

Now this is really close...

C C=C-C=C-C-C-C but still wrong!

Too bad!

⑧ 2, 3 dibromo pentyl 4 iodo butyl ether

I don't believe it!

you actually, really did, honestly, no kidding almost got it correct!

br br Br

C-C-C-C-C-O-C-C-C-C

⑨ 1, 1, 2, 2, 4, 4, 6 hepta chloro decane!

I'm shocked.

Cloud #9 You should be.

Cl Cl Cl Cl

C-C-C-C-C-C-C-C-C-C

Cl Cl Cl

I can't take it. I can't take it. You really did get one of my questions correct. I'm going back to the drawing boards!

~~⑩ 1, 1 dimethyl 5, 5 diethyl 3 propene~~

This is more like it.

I like it.

Fun

I strongly suggest you get your head out of the clouds and begin studying chemistry!

Deerist Heleno

I thunk this is a gud choice.

If u dun wanna go to colidge four a yeur or so, the Navi wood be a gud xpearience for you.

Yoor chemistre teachur.

planned familiarization program between the two companies.

s/Paul C. Velte, Jr.
Managing Director and
Chief Executive Officer

cc: B/B's
File

40

Chemistry : Problem Test #1

MISTY eyes (Boo hoo)

Name CRYING [redacted]

Perform the indicated operations expressing the answer in scientific notation with the correct number of significant figures.

(Written over the instructions: "After grading this test I cried my eyes out" / "misty")

Does that make you carbohydrated then?

1. $(3.0 \times 10^{5})(5.0 \times 10^{4})$ — 1.3×10^{1}
2. $(8.20 \times 10^{-4}) \div (6.1 \times 10^{-5})$ — 1.25×10^{-7}
3. $(5.00 \times 10^{-3})^3$ — 8.2×10^{2}
4. $(1.200 \times 10^{3}) - (3.8 \times 10^{2})$ — $\sqrt{.50 \times 10^{2}}$
5. $\sqrt{.25 \times 10^{6}}$ — 4.43×10^{1}
6. $(3.33 \times 10^{3})(1.33 \times 10^{-3})$ — [redacted] 1.70
7. $\dfrac{(1.75 \times 10^{4}) + (3.75 \times 10^{3})}{(1.25 \times 10^{4})}$ — 2.70×10^{7}
8. $(5.20 \times 10^{3})^2$ — 5.13×10^{6}
9. $\dfrac{(3.00 \times 10^{10})^5}{(4.00 \times 10^{7})^6}$
10. $\dfrac{(1.0 \times 10^{6})(5.0 \times 10^{8})}{(2.0 \times 10^{-4})}$

Answers
1. 1.5×10^{9}
2. 1.34×10^{1}
3. 7.50×10^{-8}
4. 8.2
5. Help I'm being held prisoner in an answer column
6. 4.43×10^{2}
7. 5.25×10^{3}
8. 2.80×10^{7}
9. 5.32×10^{-1}
10. 2.5×10^{18}
11. 4.7144-10
12. 4.137×10^{4}

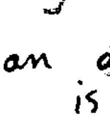
11. Give the logarithm of 0.000005179

(8888888888888888)

12. Give the antilog for the following log: 4.617

[redacted]

an antilog is a lumber Jack?



Well what did you think it was — a yellow bellied sap su[...] or some[...]

I'm trying! I'm trying! As a matter of fact - you are the most trying student I've ever had!

Chemistry Problem Test #1 x10⁰ yes, you are.

Sobbing Soda ???? Doesn't that make you a hoped pop? "Name" the secret word and collect $100.

1. $\frac{6.25 \times 10^2}{25}$

2. $\frac{1.50 \times 10^4}{3.75 \times 10^{-2}}$

3. $(62800)(0.005)$

4. $\sqrt[3]{1.25 \times 10^{17}}$

5. $(6.2 \times 10^3) + (4.1 \times 10^2)$

6. $(1.2 \times 10^{-2})(5 \times 10^3)$

7. $(3.0 \times 10^7)^3$

8. $(3.70 \times 10^8) - (2.8 \times 10^5)$ would josh you? you've got to be kidding!

9. $\sqrt{\frac{4.6 \times 10^5}{.64 \times 108}}$

10. $(9.0 \times 10^{10})(8.0 \times 10^6)$

11. $(5 \times 10^4) + (6.0 \times 10^5)$

12. $\frac{(5.0 \times 10^3)^3 \left(\sqrt[3]{8.0 \times 10^6}\right)}{(2.0 \times 10^2)^3}$

you have again proven this to be a true statement. (nobody's perfect you know)

13. Determine the log of 89.88

14. Determine the log of 0.000190

15. Determine the ~~anti~~ log of 5.8537

what does it have to do with chemistry?

haven't you ever heard of an antacid?

Answers only this time if you don't mind.

1. 2.5×10^1
2. 4.00×10^5
3. $3.\cancel{50} \times 10^2$ -2
4. ~~4.17×10^5~~ -4
5. 6.6×10^3
6. $6. \times 10^1$
7. 2.7×10^{22}
8. $3.\cancel{70} \times 10^8$
9. 5.0×10^{-2}
10. 7.2×10^{17}
11. $6. \times 10^5$
12. ~~3.4×10^{13}~~ -4
13. 1.9537 ?
14. 6.2788 - 10
15. ~~7.140×10^5~~ -2

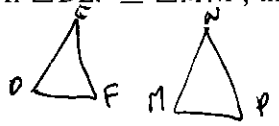
+10 8870

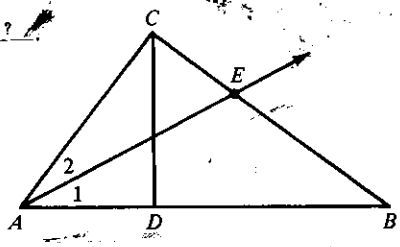
NAME Dianne S. late to everyday CLASS DATE SCORE 87

6 *Test 21* Test on Chapter 6

Directions: Write all answers in the spaces provided.

QUESTIONS	ANSWERS
1. $MNP \leftrightarrow DEF$ specifies a correspondence in which point E is paired with point ?.	1. N (3)
2. In $\triangle RST$, the angle included between sides $\overline{SR}$ and $\overline{ST}$ is ?.	2. $\angle S$ (3)
3. If two angles of a $\triangle$ are congruent, the $\triangle$ is a(n) ? $\triangle$.	3. ISOCELES (3)
4. Angles and sides of two figures that are paired under a correspondence are called ? parts of the two figures.	4. corresponding (3)
5. If $\triangle DEF \cong \triangle MNP$, then $\overline{DF} \cong$?.	5. $\overline{MP}$ (3)

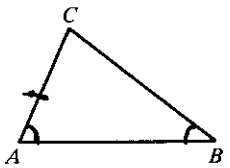


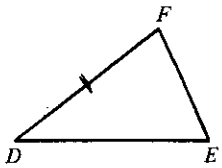


Questions 6 through 10: Refer to the adjacent plane figure.

6. If $CE = EB$, then $\overline{AE}$ is a(n) ? of $\triangle ABC$.	X bisector (3)
7. If $\overline{CD} \perp \overline{AB}$, then $\overline{CD}$ is a(n) ? of $\triangle ABC$.	X Perpendicular bisector (3)
8. If $\angle 1 \cong \angle 2$, then $\overrightarrow{AE}$? $\angle CAB$.	8. bisects (3)
9. If no two sides of $\triangle ABC$ are congruent, then $\triangle ABC$ is a(n) ? triangle.	X (3)
10. Name two $\triangle$, excluding $\triangle ABC$, that have $\angle B$ as one angle.	10. $\triangle CDB$; $\triangle AEB$ (3)

Questions 11 through 15: Write the abbreviation for a congruence theorem, corollary, or postulate that can be used to prove $\triangle ABC \cong \triangle DEF$.





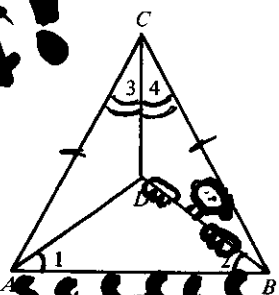
11. $\overline{AC} \cong \overline{DF}$; $\overline{CB} \cong \overline{FE}$; $\overline{AB} \cong \overline{DE}$	(SSS) (4)
12. $\angle C$ and $\angle F$ are rt. $\triangle$s; $\overline{AB} \cong \overline{DE}$; $\angle A \cong \angle D$	(4)
13. $\overline{AC} \cong \overline{DF}$; $\angle A \cong \angle D$; $\angle B \cong \angle E$	13. AAS (4)
14. $\overline{AC} \cong \overline{DF}$; $\overline{CB} \cong \overline{FE}$; $\angle C \cong \angle F$	14. ASA (4)
15. $\angle C$ and $\angle F$ are rt. $\triangle$s; $\overline{AB} \cong \overline{DE}$; $\overline{CB} \cong \overline{FE}$	15. HL (4)

HA! HA! HA! to you too

16. Supply the reasons in the proof shown.

Given: $\overline{AC} \cong \overline{BC}$
$\angle 1 \cong \angle 2$

To Prove: $\angle 3 \cong \angle 4$



PROOF

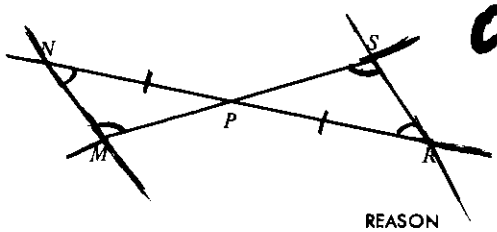
STATEMENT	REASON
a. $\overline{AC} \cong \overline{BC}$; $\angle 1 \cong \angle 2$	a. Given
b. $\overline{AD} \cong \overline{BD}$	b. in a Δ if two ∠s are congruent the sides opposite ≅ and the sides are equidistant
c. $\overline{DC} \cong \overline{DC}$	c. Congruence of segments is reflexive
d. $\triangle ADC \cong \triangle BDC$	d. SSS
e. $\angle 3 \cong \angle 4$	e. CPCTC

(15)

17. Write a proof.

Given: $\overline{MN} \parallel \overline{RS}$; $PN = PR$

To Prove: $\triangle PNM \cong \triangle PRS$



PROOF

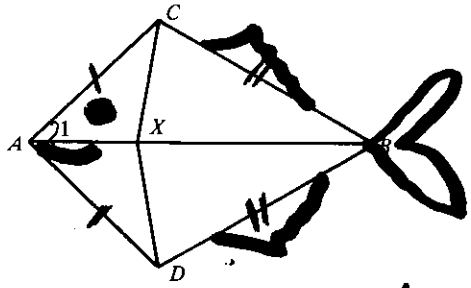
STATEMENT	REASON
① $\overline{MN} \parallel \overline{RS}$; $PN = PR$	① Given
② $\angle N \cong \angle R$; $\angle S \cong \angle M$	② if two // lines are cut by a transversal corresponding ∠s are ≅
③ $\triangle PNM \cong \triangle PRS$	③ AAS

(15)

18. Write a proof.

Given: $\overline{AC} \cong \overline{AD}$; $\overline{BC} \cong \overline{BD}$

To Prove: $\overline{CX} \cong \overline{DX}$



PROOF

STATEMENT	REASON
① $\overline{AC} \cong \overline{AD}$; $\overline{BC} \cong \overline{BD}$	① Given
② [illegible]	②
③ $\overline{AB} \cong \overline{AB}$; $\overline{AX} \cong \overline{AX}$	③ Congruence of segments is reflexive
④ $\triangle ABD \cong \triangle ACB$	④ SSS
⑤ $\angle 1 \cong \angle 2$	⑤ CPCTC
⑥ $\triangle ACX \cong \triangle ADX$	⑥ SAS
⑦ $\overline{CX} \cong \overline{DX}$	⑦ CPCTC

(20)

NAME Polyester Sugarcube CLASS Sweet DATE Are you really asking or has this become an out dated phrase? You bet your sweet bippy I'm asking! Gee! no where to put the score... too BAD!

24 Aspects of Biochemistry

yea that's what I say! Bye ol' Chemistry forever!!!

my sentiments exactacly!

the test is hard enough with out confusing me with complicated directions!

Directions: Write the answers in the box at the bottom of the right-hand column. For each question, write the letter that corresponds to the correct answer.

1. Which of the following compounds is of least importance to the biochemist?

(a) alcohols (b) sugar (c) starch (d) protein (e) fats (f) blondes

2. The emperical formula for sugar is

(a) CH_2O_2 (b) $C_2H_2O_2$ (c) CH_2O (d) $C_2H_4O_2$ (e) $C_6H_{22}O_{11}$ (f) NO SUCH recipe

3. Which of the following is *not* true of sugars?

(a) Glucose is a simple sugar containing an aldehyde group
(b) Fructose is a ketone type of sugar
(c) Sucrose is a disaccharide
(d) Sources of sugar are extremely limited
(e) Hydrolysis occurs in an acid solution of sugar

All this name calling is terrible! what did they do to you?!!

4. Which of the following statements is *not* true of starches?

(a) They are mixtures of glucose polymers
(b) Their solubility depends on the length of the polymers
(c) The starch polymers are formed by condensation
(d) Cereals are the main source of starch in our diet
(e) Cellulose is a disaccharide of great molecular weight See they even have FAT molecules!

5. Which of the following statements does *not* refer to fats?

(a) They are esters NOW LISTEN! JUST WAIT TILL I tell that ester you implied she was fat!
(b) Oils are made up of several kinds of acids combined with glycerol
(c) The acids from which fats are formed may contain as many as 16 or 18 carbon atoms
(d) Alkaline hydrolysis of fats is called saponification
(e) Fats have a definite boiling point

All esters are fat!

6. One of the *most* important sources of energy for living creatures is

(a) peanut butter (b) glucose (c) cellulose (d) fructose (e) olive oil (f) what's a "Live in criture" ??? any way...

You are about to find out what it is!

7. Which of the following statements concerning glucose is *not* true?

(a) It is used by yeast cells in fermentation of sugar
(b) It can be broken down by the muscles
(c) Stearic acid may be produced by the breaking down of glucose
(d) Enzymes are necessary for the breaking down of glucose in the body
(e) Lactic acid may be an end product when sugar is broken down by living cells

I've noticed lot of DRUNK YEAST CELLS RUNNING AROUND these days

8. Which of the following statements does *not* relate to metabolism?

(a) Water and carbon dioxide are the products of the normal oxidation of glucose
(b) Fermentation of glucose in the absence of oxygen provides materials for the process of digestion
(c) Some energy is stored in the body for emergency use
(d) Acetic acid and carbon dioxide are produced by the oxidation of pyruvic acid
(e) The "burning" of sugar and its ultimate use in the body is a complex cyclic reaction
(f) A new form of canabolism

9. Which of the following statements does *not* apply to photosynthesis?

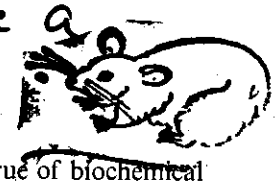
(a) Chlorophyll is a catalyst in this process
(b) Carbohydrates are synthesized from carbon dioxide and water
(c) Energy for this process comes from the sun
(d) Photosynthesis is an exothermic reaction
(e) Chlorophyll is a complex ion containing magnesium
(f) it takes tri-x film on Pentax.

10. Which of the following would *not* be considered an enzyme?

(a) glucose (b) ptyalin (c) insulin (d) lysozyme (e) alcohol dehydrogenose (f) garbage slime monster of N.Y.

ANSWERS			
1. A	2. C	3. D	4. D
5. E	6. B	7. C	8. D
9. E	10. A		

Polyester Sugarcubes smell like a



11. Which of the following accounts for the difference between cellulose and water soluble starches?

(a) They exist as isomers of different geometry
(b) They contain different monomers
(c) They exist as ring structures
(d) They contain different numbers of hydroxide groups
(e) They form long chains by condensation
(f) ANY dummy KNOWS that! ONE taste good the other DOES'NT! You really didn't know that???

12. Which of the following is *not* true of enzymes?

(a) They are composed of fat molecules
(b) They are called biological catalysts
(c) Their molecules are relatively large in comparison to the substance on which they act
(d) The substance on which an enzyme acts is called a substrate
(e) Most enzymes will catalyze only certain reactions
(f) under SKIN conspirators (USC)

Questions 13 and 14 refer to the following equation:

$$6CO_2(g) + 6H_2O(l) + \text{energy} \xrightarrow{\text{catalyst}} C_6H_{12}O_6 + 6O_2(g)$$

C = 12
O = 16

13. If 0.03% of the molecules in air are carbon dioxide, how many liters of air at STP are necessary to produce 3.6 grams of glucose?

(a) 900 liters
(b) 300 liters
(c) 3,000 liters
(d) 9,000 liters
(e) 30 liters

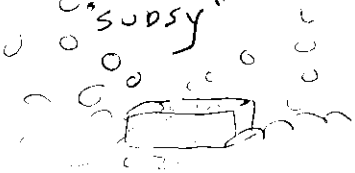
14. In the reaction in question 13, the number of liters of oxygen produced is

(a) 4.5×10^{-1} liters
(b) 45 liters
(c) 27 liters
(d) 2.7 liters
(e) 270 liters

15. Which of the following is not necessarily closely associated with the study of biochemistry?

(a) photosynthesis
(b) oxidation of fructose
(c) catalytic action of enzymes
(d) the ionic nature of the bonds in sodium chloride
(e) saponification of fats this one

I think you need a good saponification!



16. Which of the following is *not* true of biochemical reactions?

(a) Some drugs inhibit enzyme activity in bacteria
(b) Sulfanilamide is used in treating bacterial infections
(c) Most synthetic drugs are inorganic compounds
(d) A false substrate can be made to predominate in a enzyme reaction
(e) The enzymes contain a niche into which the substrate fits and reacts.
(f) slight Nausea reactions on contact

17. Which of the following would *not* be included in the study of biochemistry?

(a) The study of living plants
(b) The study of living animals
(c) The refining of iron ore
(d) The study of catalysts
(e) The study of molecular structure
(f) The study of Bio Chemistry

OBVIOUSLY this is the ~~reason~~ answer

18. Which of the following is *not* true of starches and sugars?

(a) They are called carbohydrates
(b) They are esters
(c) Their emperical formulas are CH_2O
(d) They are polysaccharides
(e) They contain long chains of rings

19. A simple sugar has a molecular weight of 240. Its molecular formula is

(a) $C_8H_{22}O_{11}$ wow! what
(b) $C_6H_{18}O_9$ does a
(c) $C_6H_{12}O_6$ complicated
(d) $C_8H_{16}O_8$
(e) $C_7H_{14}O_7$

sugar weigh ???? ..... Am I a bunch. a complicated sugar

20. Which of the following would be a good source of ~~sugar~~? Popeye energy?

(a) peanut butter
(b) spinach
(c) potatoes
(d) cellulose
(e) liver
(f) ICE CREAM CAKE

extremely complicated

ANSWERS			
11. A	12. A	13. D	~~K~~ E
15. D	16. C	17. C	18. B
19. D	20. C		

wow what a mean trick they say "ANSWERS" AND I have to find them myself. That's not even fair. They gave you all the answers. All you had to do was to be smart enough to find them. Too bad!

Better or more commonly known as... chlorinated Alka-Seltzer!

NAME CARBONELLA CHLORINESTEIN $Ca(ClO_4)_2$ CLASS not so VERY high class of knuckleheads DATE Aren't you from the South end of town? SCORE High class people get high class scores... right??? ain't so high 55

yes, but from the north part of the south end of the city

That's what I understand!

1 From Questions to Knowledge

Directions: Write the answers in the box at the bottom of the right-hand column. For each question, write the letter that corresponds to the correct answer.

1. The hottest part of a bunsen burner flame is

(a) at the very top of the flame
(b) at the top of the inner cone of the flame
(c) in the blue section of the flame
(d) at the bottom of the flame, nearest the burner
(e) none of these

2. Which of the following are *conditions that matter* in making a scientific observation of a burning candle?

(a) The candle is on the second floor.
(b) The room lights are on.
(c) The candle is made of yellow wax.
(d) The room temperature is 75°F.
(e) The candle is near an open window.

3. The freezing point temperature of a substance

(a) is the same as its melting point temperature
(b) is always below 0°C
(c) is usually higher than its melting point
(d) is equal to the boiling point temperature of that substance
(e) none of these

4. Which of the following statements applies to the scientific use of a model system?

(a) A *known* system is studied to gain a better understanding of an *unknown* system.
(b) A *macroscopic* system is studied to help explain a *microscopic* system.
(c) A model is an analogy of an unknown system rather than a copy or imitation of the unknown system.
(d) All of the above
(e) None of the above

5. When put in water, cobalt chloride paper

(a) is not affected
(b) turns colorless
(c) turns blue
(d) turns pink
(e) none of these

6. Limewater turns cloudy in the presence of

(a) oxygen
(b) hydrogen
(c) carbon dioxide
(d) nitrogen
(e) none of these

7. If something is described as macroscopic, it is

(a) very large
(b) too small to be observed with the naked eye
(c) a model system
(d) readily observable with the naked eye
(e) none of these

8. The products formed from a burning candle are

(a) carbon monoxide and hydrogen
(b) carbon monoxide and oxygen
(c) carbon dioxide and water
(d) carbon dioxide and hydrogen
(e) none of these

9. In view of the products formed by a burning candle, before being burned the candle must have contained

(a) carbon and oxygen
(b) hydrogen and oxygen
(c) carbon and hydrogen
(d) carbon dioxide and water
(e) none of these

10. When conducting an experiment, what is the next step in the scientific method of inquiry after making careful observations and recording the facts?

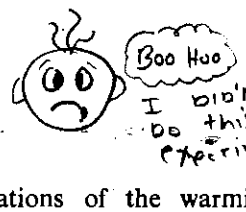
(a) construction of a model
(b) communication of results
(c) organization of observations
(d) drawing of logical conclusions
(e) none of these

Correct only

ANSWERS

1. B	2. E	3. E	4. D
5. B	6. C	7. D	8. E
9. E	10. C		

If you had done this experiment you still would have looked like this →



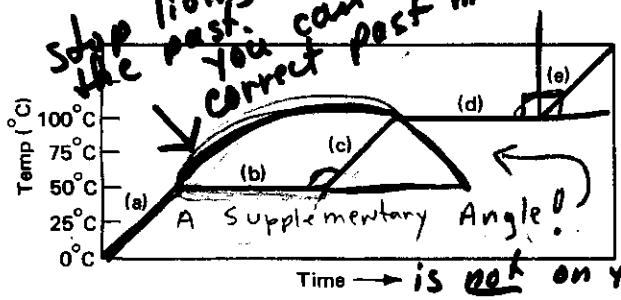
← Please! not all over my test!

11. Based on your observations of the warming behavior of *para*dichlorobenzene, which of the following statements best describes what occurs when you continue to apply heat to a substance which is already at its melting point temperature?

(a) The temperature of the substance continues to go up.
(b) The substance liquifies, but the temperature remains constant until the entire substance has melted.
(c) The substance liquifies and the temperature increases at the same time.
(d) The temperature remains constant while the substance evaporates.
(e) None of these

Water and alcohol mix readily in all proportions. However, bear in mind that the freezing and boiling points of alcohol are considerably lower than those of water. Questions 12–17 refer to the following graph which represents the warming behavior of a water-alcohol mixture.

Stop living in the past you can never correct past mistakes!



is not on your side!

Which segment(s) of the graph represent the following:

12. The boiling of alcohol?
(a) (b) (c) (d) (e)

13. The warming of the liquid water-alcohol mixture?
(a) (b) (c) (d) (e)

14. The boiling of water?
(a) (b) (c) (d) (e)

15. The warming of liquid water and gaseous alcohol?
(a) (b) (c) (d) (e)

16. The warming of gaseous water and gaseous alcohol?
(a) (b) (c) (d) (e)

17. In what temperature range would you expect to find gaseous alcohol and liquid water?

(a) 0–25°C
(b) In excess of 100°C
(c) 50–100°C
(d) 25–50°C
(e) None of these

18. Which of the following is *not* closely associated with the scientific method of conducting an experiment?

(a) interpretation
(b) observation
(c) obliteration
(d) organization
(e) analysis

19. Which of the following is *not* a valid observation that may be made from Experiment 2, The Behavior of Solids on Warming?

(a) Candle wax has the lowest melting point of all the substances tested.
(b) All substances do not melt at the same temperature.
(c) Iron has a higher melting point than does copper.
(d) Tin has a higher melting point than does candle wax.
(e) A hotter flame can be produced by a bunsen burner than by a candle.

20. The melting point temperature of a substance

(a) is always greater than 100°C
(b) is the temperature at which a liquid changes to a gas
(c) is higher than the freezing point temperature of that substance
(d) depends on how far the substance is from the source of heat
(e) none of these

Correct ANSWERS only

1. ~~C~~	12. B	13. A	14. D
15. C	16. E	17. ~~B~~	18. ~~A~~
19. ~~E~~	20. C		

NAME Molly Millileter — EGADS!

CLASS ~~better~~ couldn't be better naturally DATE I'll think about it if SCORE 85

I get a 100% on this test for your confidence. Just fill in the dotted lines, thanks

2 Measurement, Units (wit) and Accuracy Counts

I GOT that!

At least Tammy didn't set all of these impossible preconditions.

Directions: Write the answers in the ~~box~~ Coffin at the bottom of the right-hand column. For each question, write the letter that corresponds to the correct answer.

1. In the metric system, the liter is a unit of

(a) pressure
(b) volume
(c) weight
(d) length
(e) none of these

2. Which of the following is a unit of length in the metric system?

(a) centimeter
(b) milligram
(c) liter
(d) cubic centimeter
(e) none of these

3. The major advantage in using the metric system of measurement lies in the fact that

(a) it is a decimal system
(b) it makes use of Latin prefixes
(c) its basic unit of volume is approximately equal to one quart
(d) much larger measurements are possible using the metric system
(e) none of these

4. A kilometer is equivalent to

(a) 10 meters
(b) 1/10 of a meter
(c) 1000 meters
(d) 1/1000 of a meter
(e) none of these

5. A milliliter is equivalent to

(a) a quart
(b) 1000 liters
(c) 100 liters
(d) 1/10 of a liter
(e) none of these

6. Which of the following is a unit of heat energy?

(a) degree
(b) kilogram
(c) calorie
(d) centigrade
(e) none of these

7. The product of 4.6×12.62 will contain how many significant figures?

(a) 3 (b) 4 (c) 5 (d) 1 (e) none of these

8. The expression Δt indicates *an isosceles triangle*

(a) temperature in degrees Celsius
(b) calories
(c) temperature change
(d) time consumed
(e) none of these

9. When a substance has more heat energy than its surroundings it

(a) tends to absorb more heat
(b) becomes unstable
(c) tends to achieve the temperature of its surroundings by heat loss
(d) undergoes a phase change
(e) none of these

10. What is the maximum value that $865.8 \pm .4$ can have?

(a) 865.4
(b) 869.8
(c) 861.8
(d) 866.2
(e) none of these

11. The number 8526 expressed in exponential notation is

(a) 8.526×10^{3}
(b) 85.26×10^{2}
(c) 0.8526×10^{4}
(d) 8.5×10^{-3}
(e) 852.6×10^{-2}

12. Expressed in exponential notation, the quotient of $\frac{1.2 \times .004}{30}$ would be

(a) 1.6×10^{-4}
(b) 16×10^{-8}
(c) 0.16×10^{-2}
(d) 1.6×10^{-3}
(e) 16×10^{3}

ANSWERS

1. B	2. A	3. A	4. C
5. E	6. C	7. E	8. C
9. C	10. D	11. A	12. A

HERE LIES the efforts of a trying student Rest in Peace, Amen

13. Which of the following is used to determine the density of a substance?
(a) a barometer
(b) a calorimeter
(c) ratio of weight to volume
(d) ratio of area to weight
(e) none of these

14. Volume is measured in which of the following units?
(a) temperature
(b) milliliters
(c) degrees
(d) calories
(e) kilometers

15. Which of the following is equivalent to 10 millimeters?
(a) a meter
(b) a kilometer
(c) 1.0×10^2 meters
(d) 1.0×10^3 kilometers
(e) none of these

16. 2.50×10^{-3} kilometers is equivalent to which of the following?
(a) .0250 kilometers
(b) 250 meters
(c) 2500 millimeters
(d) 25 meters
(e) none of these

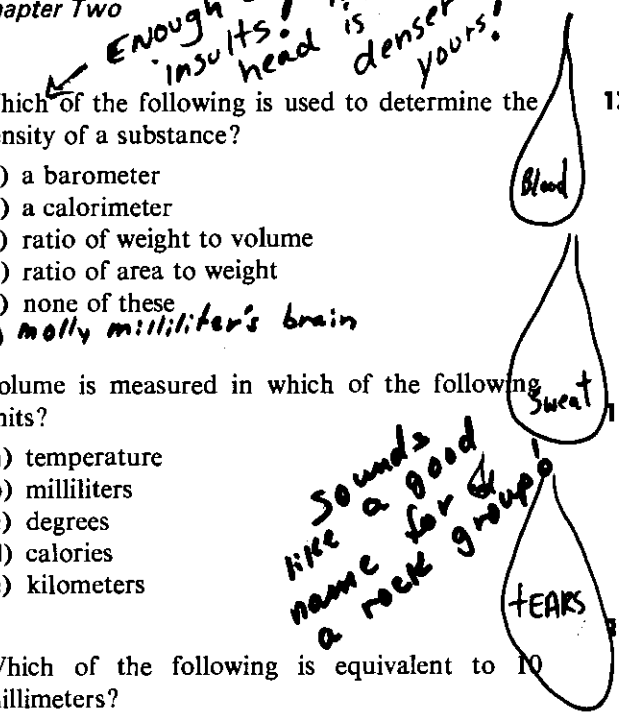
17. The amount of heat required to raise the temperature of 10 grams of water 5 degrees centigrade is
(a) determined by the formula $w = q \times \Delta t$
(b) determined by the formula $q = w \times \Delta t$
(c) about 50 calories
(d) precisely 500 kilocalories
(e) none of these

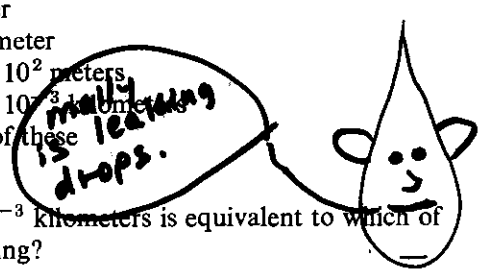
18. What is the uncertainty in the product of $250 \pm 3 \times 45 \pm 5$?
(a) ± 2770
(b) ± 9880
(c) ± 1265
(d) ± 1385
(e) none of these

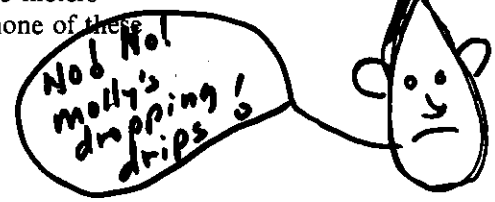
19. Which of the following is the product of $(4 \times 10^4) \times (5.4 \times 10^{-7})$ expressed in exponential notation?
(a) 2.16×10^{11}
(b) 2.16×10^{-11}
(c) 21.6×10^3
(d) 2.16×10^3
(e) 2.16×10^{-2}

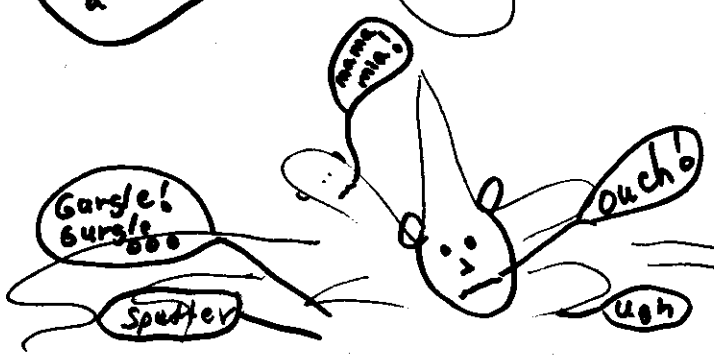
20. The difference between $18.6 \pm .2$ and $2.92 \pm .02$ has an uncertainty of
(a) 0.2 (b) 2.2 (c) 0.18 (d) 0.22 (e) 0.022

ANSWERS
13. D 14. B 15. A 16. D
17. ---- 18. B 19. E 20. B









NAME MOLELY-CURLS (LORD - OF COURSE) CLASS HELP! DATE DON'T CARE SCORE

For reasons of emergency Please do not make any marks in this Box. (It has been chemically treated and will eat your pencil away on contact)

3 Atoms and Molecules in Gases

who ever heard of going out on a raison? For them... you got any raisons? will dried grapes do?

Directions: Write the answers in the box at the bottom of the right-hand column. For each question, write the letter that corresponds to the correct answer.

Score 68

1. Pressure is defined as

(a) energy per unit volume
(b) weight per unit volume
(c) push per unit volume
(d) force per unit area
(e) energy per unit area

2. An instrument used to measure gas pressure is a

(a) calorimeter
(b) thermometer
(c) barometer
(d) speedometer
(e) hygrometer

3. Gas pressure may be expressed in all of the following units *except*

(a) Torr
(b) atmospheres
(c) lbs. per square inch
(d) mm of mercury
(e) grams per ml

I'm not that fat!

4. When two quantities are said to vary inversely it means that

(a) if one increases the other increases
(b) if one decreases the other increases
(c) if one increases the other remains the same
(d) as the quantities vary, their product changes
(e) as the quantities vary their sum remains the same

5. Which statement about two equal volumes of gases having the same temperature and pressure is *not* true?

(a) They contain the same number of molecules.
(b) They weigh the same.
(c) They are buoyed up by the same amount of air.
(d) They displace the same volume of air.
(e) They displace the same volume of water.

6. The volume of a gas is *not* affected by

(a) number of molecules
(b) temperature
(c) pressure
(d) kinds of molecules
(e) none of these

7. If 586 ml of a gas is heated from 20°C to 40°C (pressure and number of molecules constant) the resulting volume would be

(a) 1172 ml
(b) 293 ml
(c) 7383 ml
(d) 1758 ml
(e) 626 ml

8. The partial pressure exerted by each individual gas in a mixture of gases is

(a) the sum of the individual gas pressures
(b) the product of the individual gas pressures
(c) is the difference between the individual pressures
(d) the difference between the total pressure and the pressure exerted by the other gases
(e) none of these

9. 700 ml of a gas at 740 Torr pressure will occupy what volume at a pressure of 1400 Torr?

(a) 370 ml
(b) 740 ml
(c) 350 ml
(d) 500 ml
(e) 185 ml

$700 \cdot \frac{740}{1400} =$

10. All of the statements concerning a mole are true *except*

(a) it is the number of molecules in 32 grams of oxygen gas
(b) it is used only for gases
(c) it contains 6.02×10^{23} particles
(d) it contains Avogadro's number of particles
(e) it is the number of atoms in one gram of hydrogen gas

11. All of the following gases are diatomic *except*

(a) fluorine
(b) nitrogen
(c) argon
(d) oxygen
(e) chlorine

ANSWERS			
1. B	2. C	3. E	4. B
5. D	6. D	7. A	8. D
9. C	10. B	11. C	

This test spells "BAD"!

12. Charles' Law concerns

(a) pressure and volume (temperature and number of molecules constant)
(b) volume and number of molecules (temperature and pressure constant)
(c) volume and temperature (pressure and number of molecules constant)
(d) number of molecules and temperature (pressure and volume constant)
(e) none of these

13. Boyle's Law concerns

(a) pressure and volume (number of molecules and temperature constant)
(b) partial pressure of gases
(c) temperature and volume (number of molecules and pressure constant)
(d) number of molecules and temperature (pressure and volume constant)
(e) volume and number of molecules (temperature and pressure constant)

14. Which statement concerning a mole of ammonia (NH_3) gas at STP is *not* true?

(a) It occupies a volume of 22.4 liters.
(b) It weighs 28 grams.
(c) It contains 6.02×10^{23} molecules.
(d) It has a temperature of 0°C.
(e) It has a pressure of 760 Torr.

15. Which statement is *not* true of absolute zero?

(a) It is the lowest possible temperature.
(b) It is zero on the Kelvin thermometer.
(c) It is equal to −273°C.
(d) It is the temperature at which gas molecules have no kinetic energy.
(e) It is sometimes called Celsius temperature.

16. During an experiment a student collects hydrogen over water and determines that 3×10^{-3} moles of hydrogen and 9×10^{-5} moles of gaseous water are present. The total pressure is 740 Torr. The partial pressure of the hydrogen is

(a) 718 Torr
(b) 760 Torr
(c) 780 Torr
(d) 810 Torr
(e) 185 Torr

17. A 2.5 liter sample of air in a cylinder exerts a pressure of 5 atm at room temperature. With no change in temperature, the volume is changed until the pressure is 1 atm. The volume of the cylinder is now

(a) 5 liters
(b) 12.5 liters
(c) 0.5 liters
(d) 10 liters
(e) 1 liter

18. If one liter of a gas at STP weighs 4.8 grams, its molecular weight is

(a) 48 grams
(b) 67.8 grams
(c) 107.5 grams
(d) 1.2 grams
(e) 24 grams

19. The number of moles of oxygen gas contained in a 50 liter cylinder at 100 atm pressure and 0°C is

(a) 22.3 moles
(b) 223 moles
(c) 2230 moles
(d) 0.223 moles
(e) 230 moles

20. The discovery of the barometer is attributed to

(a) Robert Boyle
(b) Jacques Charles
(c) Lord Kelvin
(d) Torricelli
(e) Lavoisier

21. The pressure-volume relationship of gases was developed by

(a) Jacques Charles
(b) Amedeo Avogadro
(c) Robert Boyle
(d) Lord Kelvin
(e) Torricelli

22. The temperature-volume relationship of gases was developed by

(a) Lord Centigrade
(b) Lord Kelvin
(c) Robert Boyle
(d) Jacques Charles
(e) Amedeo Avogadro

23. The concept of absolute temperature was developed by

(a) Lord Kelvin
(b) Lord Centigrade
(c) Torricelli
(d) Boyle
(e) Charles

24. Who determined the number of particles in a mole?

(a) Lavoisier
(b) Avogadro
(c) Celsius
(d) Lord Kelvin
(e) Robert Boyle

25. STP represents which of the following temperature-pressure conditions?

(a) 760 Torr Hg and 0°K
(b) 1 atm and 25°C
(c) 760 Torr Hg and 273°K
(d) the difference between the total pressure and the pressure exerted by the other gases
(e) none of these

ANSWERS

12. C	13. A	14. B	15. A
16. E	17. B	18. D	19. C
20. E	21. C	22. D	23. A
24. E	25. C		

NAME Potassilla Brain-ee-not CLASS _____ DATE _____ SCORE BEAT 86

Better get your eyes checked!

4 Elements, Compounds, Chemical Reactions

Directions: Write the answers in the box at the bottom of the right-hand column. For each question, write the letter that corresponds to the correct answer.

1. The factor which changes in a phase change is
   (a) atomic structure (d) chemical composition
   (b) atomic weight (e) temperature
   (c) kinetic energy

2. The factor which changes in a chemical change is
   (a) atomic structure (d) atomic weight
   (b) identifying properties (e) kinetic energy
   (c) molecular weight

3. Substances composed of identical atoms are called
   (a) elements (d) particles
   (b) molecules (e) mixtures
   (c) compounds

4. Pure substances composed of molecules containing different kinds of atoms are called
   (a) mixtures (d) atoms
   (b) elements (e) particles
   (c) compounds

5. A gas will condense when
   (a) it is heated
   (b) its volume is increased
   (c) its pressure is decreased
   (d) it is sufficiently cooled
   (e) its molecules become smaller
   (F) you scare it enough

6. A substance which can readily be separated into its constituent parts must be
   (a) an element (d) a compound
   (b) a mixture (e) a molecule
   (c) a pure substance

7. Molecular formulas may indicate all of the following *except*
   (a) the symbols of the atoms
   (b) the numbers of atoms
   (c) the kinds of atoms
   (d) the arrangement of the atoms
   (e) one mole
   (F) one wart

8. The structural formula of a compound may depict
   (a) the shape of the molecule
   (b) size of the molecule
   (c) the arrangement of atoms
   (d) the size of atoms
   (e) the atomic weight of the molecule

9. Isomers are different substances which have
   (a) the same chemical properties
   (b) the same physical properties
   (c) the same kinds and numbers of atoms
   (d) different atomic masses
   (e) different atoms

10. $4\ Fe + 3\ O_2 \rightarrow 2\ Fe_2O_3$ represents
    (a) a chemical formula
    (b) a balanced equation
    (c) chemical equilibrium
    (d) a phase change
    (e) none of these

11. A chemical equation represents all of the following *except*
    (a) the temperature of the reaction
    (b) the number of moles of products
    (c) the number of moles of reactants
    (d) conservation of atoms
    (e) relationship between molecules

12. Phosphorus, P_4, burns in air to form the oxide, P_4O_{10}. The balanced equation for the reaction is
    (a) $P_4 + 10\ O \rightarrow P_4O_{10}$
    (b) $P_4 + 5\ O_2 \rightarrow P_4O_{10}$
    (c) $4P + 10\ O \rightarrow P_4O_{10}$
    (d) $P_4 + 5\ O_2 \rightarrow 2P_4O_{10}$
    (e) none of these

ANSWERS			
~~E~~	~~A~~	3. A	4. C
~~DF~~	6. B	7. D	8. C
9. C	~~E~~	11. A	12. B

$NH_3 + H_2O + CHO + CL + K_3 + LUMg_3 + Lu_3 + H + H$

Questions 13–16 pertain to the following reaction:

$$C_4H_{10}(g) + \tfrac{13}{2}\,O_2 \rightarrow 4\,CO_2(g) + 5\,H_2O(g)$$

13. The number of moles of *atoms* involved in the reaction is

(a) 39 **(b)** 9 **(c)** 19 **(d)** 27 **(e)** 16

14. The number of moles of carbon dioxide produced is

(a) 4
(b) 12
(c) $4 \times 6.02 \times 10^{23}$
(d) 6.5
(e) $16 \times 6.02 \times 10^{23}$

15. The number of moles of *atoms* of oxygen gas consumed is

(a) 52 **(b)** 13 **(c)** 26 **(d)** 6.5 **(e)** 27

16. If four moles of butane, C_4H_{10}, are burned the number of moles of oxygen necessary for the reaction is

(a) 52 **(b)** 13 **(c)** 6.5 **(d)** 4 **(e)** 26

17. The number of moles of water produced in the burning of four moles of butane is

(a) 4 **(b)** 5 **(c)** 10 **(d)** 20 **(e)** 15

18. How many grams of carbon dioxide are produced by burning 0.4 moles of butane?

(a) 16 **(b)** 70.4 **(c)** 176 **(d)** 44 **(e)** 35.2

19. Most elements are found in nature

(a) alone
(b) as mixtures
(c) in solution
(d) as gases
(e) in compounds

20. All of the following are pure compounds *except*

(a) sugar
(b) seawater
(c) table salt
(d) limestone
(e) hydrochloric acid

21. None of the following are compounds *except*

(a) glass
(b) steel
(c) seawater
(d) dry ice
(e) bronze

22. Which of the following do *not* form diatomic molecules?

(a) hydrogen and chlorine
(b) flourine
(c) nitrogen
(d) hydrogen and oxygen
(e) bromine

23. The number of moles in 51 grams of ammonia is (nitrogen 14, hydrogen 1)

(a) 3 **(b)** 3.4 **(c)** 6.8 **(d)** 765 **(e)** 867

24. The number of grams of sulfuric acid in 0.25 moles is (sulfur-32, oxygen-16)

(a) 49 g **(b)** 24.5 **(c)** 392 g **(d)** .0025 g **(e)** 98 g

25. Which of the following is *not* a correctly written symbol for an element?

(a) Cu **(b)** Ca **(c)** CO **(d)** Te **(e)** Na

ANSWERS

13. D	14. A	15. B	16. E
17. D	18. B	19. E	20. B
21. D	22. B	23. A	24. B
25. C			

That's what I asked. why?

(A) 1. SODIUM Phosphate
2. magnesium CARBONATE +2 C.
4. Cuprous oxide

(B) 2. K H_2CL
4. Fe_2PO_3
3. Ag Br
5. Na_2HSO_3

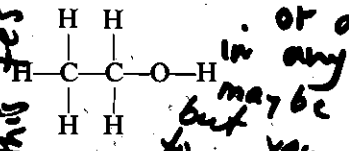
NAME _____ CLASS _____ DATE _____ SCORE _____

Cumulative Test Chapters 1–4

Directions: Write the answers in the box at the bottom of the right-hand column. For each question, write the letter that corresponds to the correct answer.

Questions 1 through 6 refer to ethanol, C_2H_5OH, a liquid which is useful as an antiseptic, a solvent, and a fuel.

1. According to the formula, C_2H_5OH, which of the following statements is WRONG?
   (a) Ethanol is a compound made up of four elements.
   (b) Each molecule of ethanol is made up of nine atoms.
   (c) One mole of ethanol includes 2 moles of carbon atoms, combined with other elements.
   (d) One mole of ethanol weighs less than 50 grams.
   (e) The structural formula of ethanol could be



Once vaporized and ignited, ethanol burns readily. The following equation for this process is incomplete because most of the coefficients have been omitted. Balance the equation on scratch paper for use in answering questions 2 through 4.

$$1\ C_2H_5OH + 3\ O_2 \rightarrow 2\ CO_2 + 3\ H_2O$$

2. How many moles of CO_2 are produced when 1.0 mole of ethanol burns? (Assume that CO_2 and H_2O are the only products.)
   (a) 0.5
   (b) 1.0
   (c) 1.5
   (d) 2.0
   (e) Impossible to determine from the balanced equation.

3. When one mole of C_2H_5OH burns completely, the volume of O_2 consumed, measured at standard temperature and pressure, is
   (a) variable
   (b) 7.5 liters
   (c) 22.4 liters
   (d) 44.8 liters
   (e) 67.2 liters

4. How many grams of H_2O are formed when one mole of ethanol burns?
   (a) 3 grams
   (b) 6 grams
   (c) 18 grams
   (d) 36 grams
   (e) 54 grams

Atomic Weights:

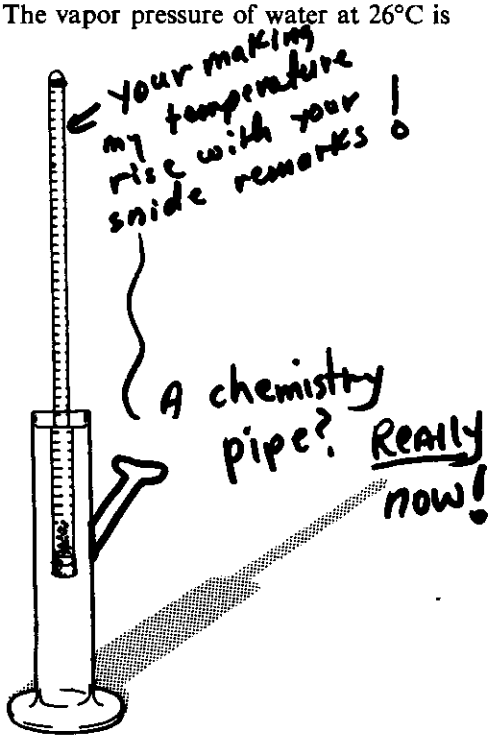
Carbon	12.0
Hydrogen	1.0
Oxygen	16.0

5. Which of the following statements about this reaction is WRONG?
   (a) The weight of the reactants consumed equals the weight of the products formed, within the degree of weighing precision attainable.
   (b) No atoms are created or destroyed in the reaction.
   (c) The number of moles of products equals the number of moles of reactants.
   (d) The average kinetic energy of the products can differ from that of the reactants.
   (e) The reaction produces new molecules through rearrangement of atoms.

6. Both the evaporation and the burning of a mole of ethanol involve energy. On the basis of your results and discussion of Experiment 5, which one of the following statements is CORRECT? (Notice, we're looking for the CORRECT answer.)
   (a) Ethanol absorbs a small amount of energy in evaporating, and evolves a larger amount in burning.
   (b) Ethanol evolves a small amount of energy in evaporating, and evolves a larger amount in burning.
   (c) Ethanol absorbs a large amount of energy in evaporating, and absorbs a larger amount in burning.
   (d) Ethanol evolves a small amount of energy in evaporating, and absorbs a larger amount in burning.
   (e) The amount of energy involved in the evaporation of ethanol is about the same as the amount involved in its burning.

ANSWERS
1. A 2. D 3. E 4. ____
5. D 6. B

Questions 7 through 16 refer to an experiment similar to Experiment 7. A small piece of calcium carbonate, $CaCO_3$, reacted with hydrochloric acid producing carbon dioxide gas, CO_2. At 26°C and 756 Torr pressure the volume of wet CO_2 collected was 30.0 ml. The vapor pressure of water at 26°C is 25.2 Torr.



7. The fraction of the total pressure caused by the carbon dioxide is

(a) $\frac{25.2}{30}$ (d) $\frac{30.0}{756}$

(b) $\frac{25.2}{756}$ (c) $\frac{30.0}{25.2}$

(c) $\frac{731}{756}$

8. If the CO_2 were dried and again measured at the same pressure of 756 Torr, its volume would be

(a) 30.0 ml (d) $\frac{756}{756 - 25} \times 30.0$ ml

(b) $\frac{25}{756} \times 30.0$ ml (e) $\frac{756 - 25}{756} \times 30.0$ ml

(c) $\frac{760}{756 - 25} \times 30.0$ ml

9. The molar volume of carbon dioxide at 26°C and 756 Torr pressure is 24.7 liters. The number of moles of CO_2 collected in this experiment is

(a) 1.17×10^{-3} mole (d) 8.57×10^{-4} mole
(b) 2.90×10^{-2} mole (e) 1.05×10^{-1} mole
(c) 5.32×10^{-2} mole

10. The density of water is usually expressed in which of the following units?

(a) 1 gram (d) 1 g/ml
(b) 1 ml (e) 1 g/mm
(c) 1 ml/g

11. How many significant figures will be in the quotient of 682 divided by 84.06?

(a) 2 (b) 3 (c) 4 (d) 7 (e) 5

12. Calculate the quotient of 6.4×10^6 divided by 1.28×10^{-3}.

(a) 5×10^3 (d) 5.0×10^{-3}
(b) 2×10^{-9} (e) 5.0×10^9
(c) 0.5×10^3

13. The volume of a gas collected at 27°C and 745 Torr was found to be 3,540 ml. What would the volume be at STP?

(a) 3,950 ml (d) 3,100 ml
(b) 2,800 ml (e) 4,200 ml
(c) 3,050 ml

14. A burning candle was used to raise the temperature of 340 ± 2.0 g of water. At the conclusion of the experiment it was found that 1.42 ± 0.02 g of the candle had been consumed and the temperature of the water had been raised 34.0 ± 0.4 centigrade degrees. From this information, calculate the heat of combustion of the candle.

(a) 8,200 cal/g (d) 8,200 kcal
(b) 8,200 cal (e) 8,200 kcal/g
(c) 8,200 g

15. How many atoms are contained in 3 moles of acetic acid, CH_3COOH?

(a) $8 \times 6.02 \times 10^{23}$ atoms
(b) 8 atoms
(c) 58 atoms
(d) $24 \times 6.02 \times 10^{23}$ atoms
(e) 24 atoms

16. How many molecules are contained in 66 g of carbon dioxide, CO_2?

(a) $1.5 \times 6.02 \times 10^{23}$
(b) $3 \times 6.02 \times 10^{23}$
(c) $66 \times 6.02 \times 10^{23}$
(d) $0.75 \times 6.02 \times 10^{23}$
(e) cannot be calculated from this data

I think I could sell this song to a company

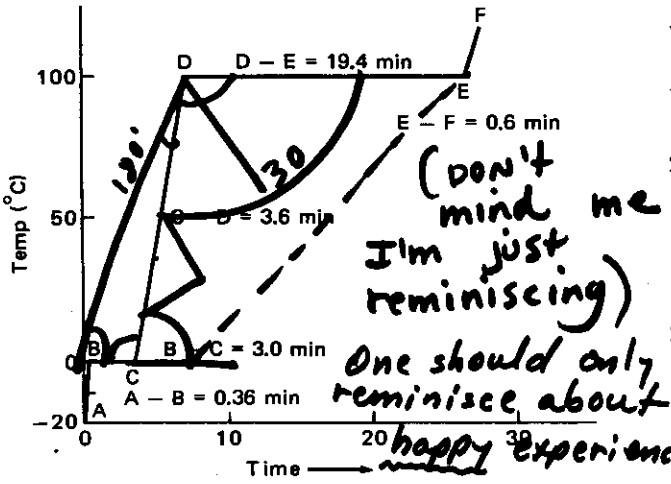
ANSWERS

B	B	B	e
11. B	12. e	B	14. A
15. B	E		

Just a few wrong notes here!

I think you are a little bit sharp!

Questions 17–19 pertain to the graph below which was obtained by plotting data for the heating curve obtained in an experiment similar to Experiment 3. A pure solid substance was heated over a temperature range by a constant source of heat which supplied 500 calories per minute to an 18 g sample of the substance. The temperature of the sample confined in a test tube was noted every half-minute.



17. The portion of the graph between B and C represents the time the substance is:
- **(a)** being warmed as a solid
- **(b)** being warmed as a liquid
- **(c)** being warmed as a gas
- **(d)** changing from solid to liquid at its melting temperature.
- **(e)** changing from liquid to gas at its boiling temperature

18. The portion of the graph between C and D represents the time the substance is:
- **(a)** being warmed as a solid
- **(b)** being warmed as a liquid
- **(c)** being warmed as a gas
- **(d)** changing from solid to liquid at its melting temperature
- **(e)** changing from liquid to gas at its boiling temperature

19. The heat required to change the sample from liquid to gas can be determined by making which one of the following calculations:
- **(a)** 0.36 min × 500 cal/min
- **(b)** 3.0 min × 500 cal/min
- **(c)** 3.6 min × 500 cal/min
- **(d)** 19.4 min × 500 cal/min
- **(e)** 0.6 min × 500 cal/min

In an investigation similar to Experiment 6, three equal volumes of gases were collected under the same conditions of temperature and pressure, 25°C and 740 Torr. The following data were collected:

Weight of bag assembly (empty)	24.32 ± 0.01 g
Weight of bag assembly and Gas A	24.70 ± 0.01 g
Weight of bag assembly and Gas B	25.32 ± 0.01 g
Weight of bag assembly and Gas C	23.90 ± 0.01 g
Volume of bag	1.300 ± 0.025 liters

20. The weight of air in the inflated bag is
- **(a)** 1.15 ± 0.01 g
- **(b)** 1.50 ± 0.05 g
- **(c)** 1.25 ± 0.03 g
- **(d)** 1.75 ± 0.05 g
- **(e)** 1.80 ± 0.01 g

21. The actual weight of Gas A is
- **(a)** 1.68 ± 0.07 g
- **(b)** 1.33 ± 0.03 g
- **(c)** 1.43 ± 0.05 g
- **(d)** 1.98 ± 0.03 g
- **(e)** 1.93 ± 0.07 g

22. If gas A is oxygen, the molecular weight of gas B is approximately

(a) 22 g **(b)** 24 g **(c)** 66 g **(d)** 44 g **(e)** 16 g

23. If gas A is oxygen, the molecular weight of gas C is approximately

(a) 23 g **(b)** 32 g **(c)** 34 g **(d)** 9 g **(e)** 17 g

24. Repeating the same experiment by refilling the bag with the same gases at the same pressure and volume but at a temperature 20° higher, the weights of the gases would be expected to be
- **(a)** less in all cases
- **(b)** the same in all cases
- **(c)** more in all cases
- **(d)** less in some cases, more in others
- **(e)** changed by the same number of grams in each case

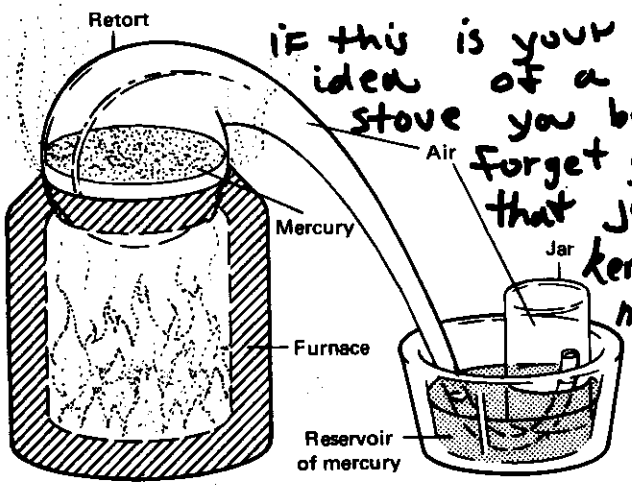
25. The smallest number that could result from subtracting 24 ± 2 from 37 ± 3 is
- **(a)** 11
- **(b)** 12
- **(c)** 8
- **(d)** 18
- **(e)** 14

ANSWERS

17. D 18. B 19. D 20. B
21. A 22. B 23. E 24. A
25. C

26. How many milliliters are contained in 3 liters?

(a) 300
(b) 3000
(c) 0.3
(d) 30
(e) 3×10^{-2}



Questions 27 through 30 refer to an experiment performed in 1775 by Antoine Lavoisier using apparatus similar to that shown in the diagram. If you had been present you might have made the following notes:

1. At the beginning the levels of mercury in the jar and in the reservoir were the same.
2. The surface of the mercury in the jar and reservoir remained calm and shiny during the entire experiment.
3. As the mercury at the left was heated, the mercury level in the jar at the right first fell below the level in the reservoir, then began to rise slowly.
4. A silvery metallic coating formed on the glass above the mercury at the left as it was heated, and slowly spread down the neck of the retort.
5. A red, powdery substance formed on the surface of the hot mercury at the left due to a reaction with the gas in the retort.
6. After several days of heating no further change could be observed. The heating was stopped, and the mercury level in the jar began to rise again.
7. When the entire apparatus had reached room temperature, the mercury level in the jar had risen considerably above the level in the reservoir.

27. Which one of the above statements includes an *interpretation* as well as reporting an observation?

(a) 1
(b) 3
(c) 5
(d) 6
(e) 7

28. Which one of these observations may be most readily explained as involving a phase change?

(a) 1
(b) 2
(c) 3
(d) 4
(e) 7

29. Statements 1 through 7 are consistent with all EXCEPT one of the following statements. Identify the EXCEPTION.

(a) Mercury does not react readily with air at room temperature.
(b) The volume of a gas increases when it is heated.
(c) Mercury evaporates when heated.
(d) Mercury reacts chemically when heated in air.
(e) Gas pressure decreases with an increase in temperature.

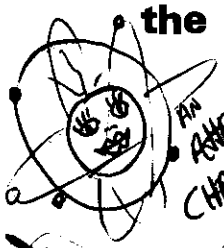
30. Which of the following variations of this experiment would probably provide the LEAST amount of additional information about the behavior of metals heated in contact with gases?

(a) Heat iron filings instead of mercury in the retort.
(b) Replace the air in the system with carbon dioxide gas.
(c) Heat the same system for several hours longer.
(d) Remove the mercury at the left before heating.
(e) Weigh the mercury at the left beforehand, and weigh the mercury plus the red powder afterward.

ANSWERS
26. B 27. C 28. D 29. E
30. C

NAME Alpha Angstrom CLASS ____ DATE ____ SCORE 80

5 The Electrical Nature of Matter and the Structure of the Atom



Directions: Write the answers in the box at the bottom of the right-hand column. For each question, write the letter that corresponds to the correct answer.

1. When a plastic rod is rubbed with a piece of fur
   (a) nothing happens
   (b) the rod gains electrons
   (c) the rod loses weight
   (d) the rod will attract another rod which has been rubbed with fur
   (e) the rod loses protons

2. When a glass rod is rubbed with silk all of the following answers are true *except*
   (a) the rod loses electrons
   (b) the rod will attract a plastic rod which has been rubbed with fur
   (c) the rod gains protons
   (d) the rod will attract a pith ball
   (e) the rod acquires an electrical charge

3. Which of the following statements is *not* true?
   (a) A positive electrical charge is attractive.
   (b) The forces between charged objects varies inversely with the distance between them.
   (c) The electrical force between two charged objects is proportional to $1/d^2$.
   (d) The magnitude of the electrical charges is directly proportional to the forces.
   (e) It is possible to determine whether or not a force is repulsive.

4. Electrical charges exert forces on each other because
   (a) nature abhors a vacuum
   (b) like charges repel
   (c) unlike charges attract
   (d) all matter is neutral
   (e) none of these

5. All of the following statements concerning neutral atoms are true *except*
   (a) they are composed of equal numbers of oppositely charged particles
   (b) the protons can easily be removed
   (c) friction can dislodge electrons
   (d) they are the normal state of matter
   (e) they can acquire either a positive or negative charge

6. Which of the following statements concerning the flow of an electric current through a conductor is *not* true?
   (a) The conductor must have more electrons than protons.
   (b) Electrons move from one atom to another.
   (c) Electrons are injected at the negative electrode.
   (d) The current flows from the negative to the positive electrode.
   (e) The protons are immobile.

7. Which of the statements concerning a model of a nuclear atom is *not* true?
   (a) It satisfies all experimental facts concerning the atom.
   (b) The mass is concentrated in the nucleus.
   (c) All atoms have the same number of units of positive charge.
   (d) The number of protons in the nucleus is the atomic number.
   (e) The atom is electrically neutral.

8. All of the statements concerning ions are true *except*
   (a) they always have a net charge
   (b) they can be formed by losing electrons
   (c) they can either be positive or negative
   (d) they can be formed by gaining protons
   (e) they involve energy in their formation

9. If a positively charged ion has 19 protons in its nucleus and a mass number of 39 which of the following statements is true?
   (a) There are 19 neutrons in the nucleus.
   (b) There are 19 electrons around the nucleus.
   (c) There are less than 19 electrons around the nucleus.
   (d) There are more than 19 electrons around the nucleus.
   (e) The atomic number is 20.

ANSWERS

1. B	2. C	3. A	4. E
5. B	6. E	7. C	8. D

9. B C

10. Which of the following statements is not true concerning an atom of atomic number 14?

(a) It contains 14 protons.
(b) It contains 14 electrons.
(c) Its mass number is 14.
(d) It may have 14 neutrons.
(e) It may form an ion.

11. Which of the following statements concerning the size of an atom is *not* true?

(a) Its diameter can be approximately determined in the solid phase of an element.
(b) The diameter of the nucleus is about 1/100,000 the diameter of the atom.
(c) The diameter is measured in Angstroms.
(d) Atoms are sub-microscopic.
(e) Size increases with increasing atomic number.

12. Which of the statements concerning a neutron is *not* true?

(a) It is found in the nucleus.
(b) It has almost the identical mass of a proton.
(c) It has no charge.
(d) It was discovered in 1932.
(e) It weighs about 10 times as much as an electron.

13. Nuclear stability may be attributable to all of the following facts *except*

(a) the neutrons bind the protons
(b) most nuclei have more neutrons than protons
(c) protons exert a repulsive force on each other
(d) is an unsolved question
(e) the clouds of electrons exert a force on the nucleus

14. Which of the statements concerning isotopes of oxygen is *not* true?

(a) They all have the same number of neutrons.
(b) They all have the same number of protons.
(c) They have different mass numbers.
(d) They have the same number of electrons.
(e) One could be designated as oxygen-18.

15. Atoms of carbon differ from the atoms of every other element in all ways *except*

(a) they have chemical behavior different from atoms of any other element
(b) they have a higher ratio of neutrons to protons than any other element
(c) they have a different volume than the atoms of any other element
(d) neutral atoms have a different number of electrons than any other element
(e) their nuclei have a different number of protons

16. Radioactive substances have all of the following properties *except*

(a) their nuclei spontaneously decompose
(b) they may give off helium nuclei
(c) they may give off hydrogen nuclei
(d) they may form new elements
(e) they may give off electrons

17. Which of the following statements concerning gamma rays is *not* true?

(a) They are more energetic than x-rays.
(b) They help rid the nucleus of energy.
(c) They are of short wave length.
(d) They have an electrical charge.
(e) They are emitted when the nucleus changes in structure.

18. What is *not* true concerning the following equation?

$$^{235}_{92}\mathrm{U} \rightarrow {}^{231}_{90}\mathrm{Th} + {}^{4}_{2}\mathrm{He}$$

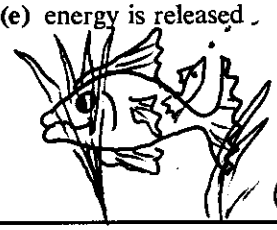
(a) $^{235}_{92}\mathrm{U}$ undergoes alpha decay
(b) $^{4}_{2}\mathrm{He}$ represents a helium atom
(c) $^{231}_{90}\mathrm{Th}$ is an isotope of thorium
(d) $^{235}_{92}\mathrm{U}$ has 143 neutrons
(e) none of these

19. What is *not* true about beta decay?

(a) It occurs in stable nuclei.
(b) It causes an increase in number of protons in nucleus.
(c) It causes a decrease in number of neutrons in nucleus.
(d) It leads to formation of a new element.
(e) The mass number does not change.

20. All of the statements concerning nuclear fission are true *except*

(a) it occurs spontaneously in light atoms
(b) it occurs in nuclear reactors
(c) it results from bombardment of nuclei by neutrons
(d) it causes a chain reaction
(e) energy is released



ANSWERS

10. C	E	12. E	C
14. A	15. B	16. C	17. D
18. B	A	20. A	

NAME Ms. Chicken Fairy CLASS ______ DATE 14 Feb SCORE 60

Feb. my mistake

Pretty sly! but it's already January 29, that means I have to wait a whole year for a date?? How cruel!

The real reason noble gases are called noble is because they're so stuck-up and high-born that they won't mix with anyone else

6 The Periodic Table

Directions: Write the answers in the box at the bottom of the right-hand column. For each question, write the letter that corresponds to the correct answer.

1. Which of the following was *not* a part of Mendeleev's periodic law?

(a) Elements are arranged according to increasing atomic weight.
(b) Blank space is provided for undiscovered elements. or for students who don't know the elements anyhow
(c) Elements with similar properties are arranged in columns.
(d) Column of noble gases.
(e) Seven families of elements.

2. A family of elements can be identified by each of the following statements *except*

(a) all elements in the family have the same atomic number
(b) elements are arranged in a vertical column
(c) all elements in a family have similar chemical properties
(d) all elements in a family have the same number of valence electrons
(e) families are also called groups
(f) MR. ELEMENT the head of the family has 5 children

3. Select the statement which is *not* true of a series of elements.

(a) Elements are arranged in a horizontal row on the periodic table.
(b) Series are also called periods.
(c) Metallic properties of elements in a series increase as atomic numbers increase.
(d) A series may contain as many as 18 elements.
(e) The last element in a series is a noble gas.

4. Select the statement concerning the noble gases which is *not* true.

(a) They combine readily with other elements.
(b) Argon was the first noble gas discovered.
(c) They have low boiling points.
(d) Helium is used by deep sea divers to prevent bends.
(e) Argon is used in light bulbs.

5. Select the statement concerning the alkali metals which is *false*.

(a) They have one less electron than the closest noble gas.
(b) They have low melting points.
(c) They are extremely chemically reactive.
(d) They are never found free in nature.
(e) They readily form positive ions.

6. Alkali metals will react to form all of the following *except*

(a) with water to form hydrogen and a metallic hydroxide
(b) with halogens to form an ionic solid
(c) with water to produce energy
(d) with water to form stable ions and hydrogen
(e) with water to form the metallic oxide and hydrogen

7. Which of the following statements concerning halogens is *false*?

(a) Their name means salt formers.
(b) They are all gases at room temperature.
(c) They precede the family of noble gases on the periodic chart.
(d) They all exist as diatomic molecules.
(e) They have boiling points which decrease as the atomic numbers increase.

8. Which of the following statements is *not* true of iodine?

(a) It forms a yellow precipitate with the silver ion.
(b) It is a violet gas at ordinary room temperatures.
(c) It is soluble in alcohol.
(d) It is used to prevent goiter.
(e) It is the least active of the halogens.

ANSWERS

1. D	2. A	3. C	4. A
5. A	6. E	7. E	8. E

BRAINY CHEMIST NEVER OMIT FLAWS (AFTER ALL PERFECTION IS SO BORING)

PERIODIC TABLE

I	II											III	IV	V	VI	VII	0
1 H 1.00																	2 He 4.00
3 Li 6.94	4 Be 9.01						Transition Elements					5 B 10.8	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.0	10 Ne 20.2
11 Na 23.0	12 Mg 24.3											13 Al 27.0	14 Si 28.1	15 P 31.0	16 S 32.1	17 Cl 35.5	18 Ar 39.9
19 K 39.1	20 Ca 40.1	21 Sc 45.0	22 Ti 47.9	23 V 50.9	24 Cr 52.0	25 Mn 54.9	26 Fe 55.8	27 Co 58.9	28 Ni 58.7	29 Cu 63.5	30 Zn 65.4	31 Ga 69.7	32 Ge 72.6	33 As 74.9	34 Se 79.0	35 Br 79.9	36 Kr 83.8
37 Rb 85.5	38 Sr 87.6	39 Y 88.9	40 Zr 91.2	41 Nb 92.9	42 Mo 95.9	43 Tc (99)	44 Ru 101.1	45 Rh 102.9	46 Pd 106.4	47 Ag 107.9	48 Cd 112.4	49 In 114.8	50 Sn 118.7	51 Sb 121.8	52 Te 127.6	53 I 126.9	54 Xe 131.3
55 Cs 132.9	56 Ba 137.3	57–71 See Below	72 Hf 178.5	73 Ta 180.9	74 W 183.9	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.1	79 Au 197.0	80 Hg 200.6	81 Tl 204.4	82 Pb 207.2	83 Bi 209.0	84 Po (209)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra (226)	89– See Below															

57 La 138.9	58 Ce 140.1	59 Pr 140.9	60 Nd 144.2	61 Pm (147)	62 Sm 150.4	63 Eu 152.0	64 Gd 157.3	65 Tb 158.9	66 Dy 162.5	67 Ho 164.9	68 Er 167.3	69 Tm 168.9	70 Yb 173.0	71 Lu 175.0

89 Ac (227)	90 Th (232.0)	91 Pa (231)	92 U 238.0	93 Np (237)	94 Pu (242)	95 Am (243)	96 Cm (247)	97 Bk (249)	98 Cf (251)	99 Es (254)	100 Fm (253)	101 Md (256)	102 No (253)	103 Lw (257)

9. Which of the following statements concerning the halogens is *false*?

(a) They form negative ions.
(b) They form covalent bonds with the alkali metals.
(c) They react with hydrogen at high temperatures.
(d) The names of their ions end in *ide*.
(e) Their hydrogen compounds are soluble in water.

10. Which of the following statements is *not* true concerning the third row elements?

(a) The metallic elements have the lowest atomic numbers.
(b) The non-metallic elements tend to form covalent bonds with hydrogen.
(c) The metallic elements in this row tend to gain electrons.
(d) The combining capacities of the elements are determined by their electron configuration.
(e) The non-metallic elements tend to form negative ions.

11. Which of the following is *not* true of chlorine?

(a) It forms a red precipitate with silver ions.
(b) It is used as a bleaching agent.
(c) It is a greenish yellow gas at room temperature.
(d) It can be produced from sea water.
(e) It is used in swimming pools to kill bacteria.

(F) It mixes with chocolate to form chocolate chlorinate. (CH_3Cl_2)

12. Which of the following statements is *not* true of fluorine?

(a) It is the most active of the halogens.
(b) It is used in frosting light bulbs.
(c) Its ion forms a white precipitate with the silver ion.
(d) It is a gas at ordinary room temperatures.
(e) It is used as an insecticide.

13. The least reactive family of elements is found in

(a) Column I
(b) Column IV
(c) Column 0
(d) Row 2
(e) Row 3

I see that C's seem to see the humour of this test

unfortunately you don't seem to realize or see the fact C's were not always the correct choice

ANSWERS

9. B 10. C 11. C 12. C

The following questions are based on the periodic table on the opposite page.

14. Elements with similar properties are grouped in

(a) a horizontal row
(b) a family
(c) a series
(d) order of decreasing atomic number
(e) none of these

15. Which one of the following atoms is the least chemically reactive?

(a) Sodium
(b) Chlorine
(c) Argon
(d) Magnesium
(e) Carbon

16. Which of the following families does hydrogen most closely resemble?

(a) The noble gases
(b) The halogens
(c) Column II (alkaline earth metals)
(d) Alkali metals
(e) None of these

17. Which of the following is *not* classed as a metal?

(a) Aluminum(Al)
(b) Cadmium(Cd)
(c) Manganese(Mn)
(d) Silicon(Si)
(e) Gallium(Ga)

18. What information is not generally contained in each block of the periodic table?

(a) The atomic number
(b) The number of neutrons
(c) The atomic mass
(d) The symbol of the element
(e) The number of protons in the nucleus

19. The elements are listed in order according to

(a) alphabetical sequence
(b) their increasing activity
(c) the number of neutrons in the nucleus
(d) the increasing number of protons
(e) the order of their discovery

20. The parentheses around the atomic mass numbers of many of the heavier elements indicate

(a) elements that are plentiful in the earth's crust
(b) that these elements are gases at 0°C
(c) isotopes with longest half-lives
(d) elements that form diatomic molecules
(e) non-metallic elements

21. Which of the following ions will *not* possess the same number of electrons as an atom of the noble gas neon?

(a) Na^{+}
(b) Mg^{+2}
(c) Cl^{-}
(d) Al^{+3}
(e) O^{-2}

22. Based on information contained in the periodic table, which of the following compounds is *least* likely to form?

(a) NaCl
(b) Ca_3Al_2
(c) MgO
(d) KBr
(e) $BeCl_2$

23. Also based on information from the periodic table, which of the following compounds is *most* likely to form?

(a) $MgNe_2$
(b) NaO
(c) Al_2O_3
(d) BaO_2
(e) CaI

24. Negative ions are formed from neutral atoms by which of the following processes?

(a) loss of electrons
(b) loss of protons
(c) gain of protons
(d) gain of neutrons
(e) gain of electrons

ANSWERS

14. B	15. C	16. D	17. D
18. E	19. D	20. C	21. C
22. B	23. D	24. E	

25. Which of the following statements concerning hydrogen is *false*?

(a) Hydrogen reacts with the noble gases to form noble hydrates.
(b) Hydrogen reacts with the halogens to form the hydrogen halides.
(c) Hydrogen reacts with the alkali metals to form the metallic hydrides.
(d) A neutral hydrogen atom contains only one electron and one proton.
(e) The neutral atom of hydrogen may lose its electron to form the H^+ ion.

26. Which of the following statements is *not* true concerning the compound formed from potassium, K, and chlorine, Cl?

(a) The compound will have the formula KCl.
(b) The bonding in the compound will be ionic.
(c) All of the ions in the compound will have the same electron arrangement as is found in the noble gas argon.
(d) Weak bonding in the compound results in a very unstable compound.
(e) The potassium ions present in the compound will have 18 electrons.

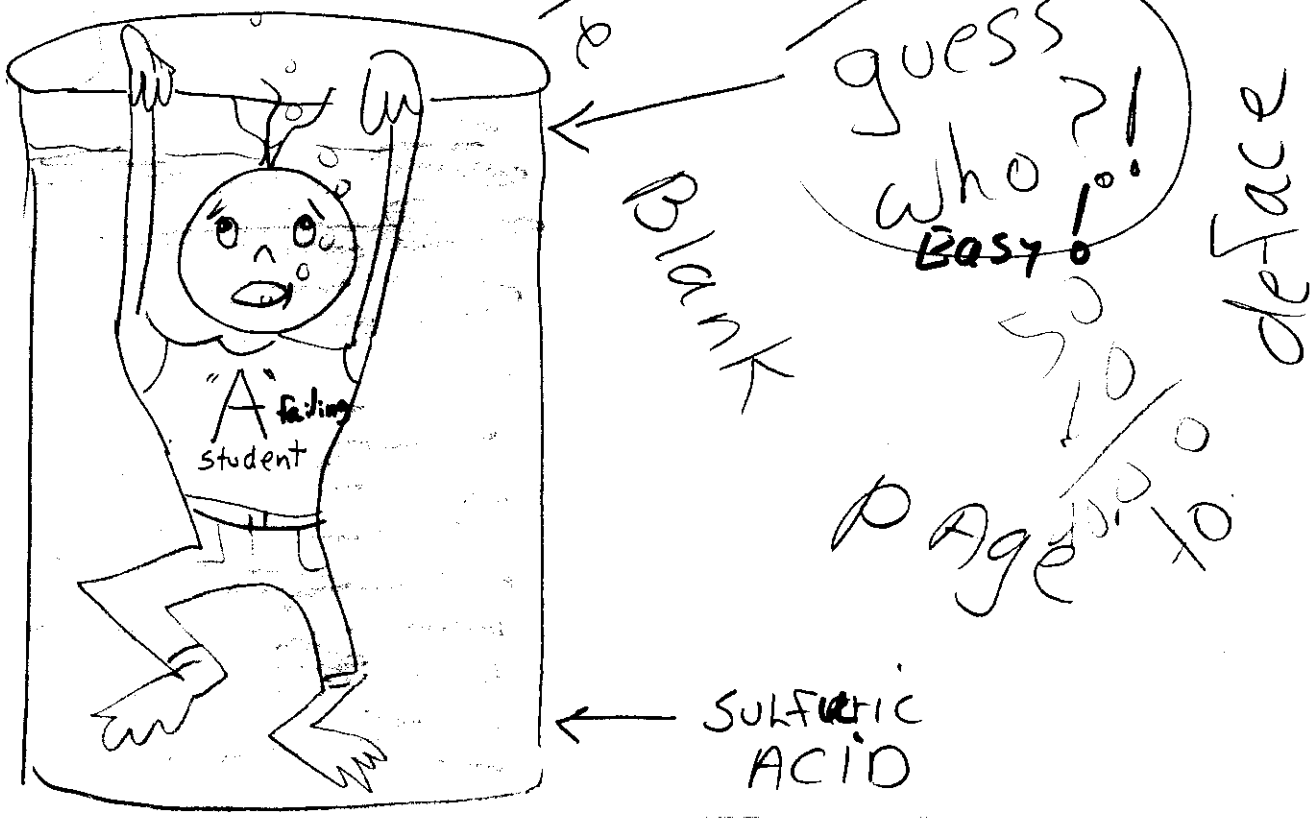
27. Which of the following statements concerning the elements in column VII of the periodic table is *true*?

(a) They are called the alkali metals.
(b) They are all gases at room temperature.
(c) They are all chemically reactive.
(d) They readily give up electrons to form positive ions.
(e) Each element in this column has one more electron than the noble gas which it precedes.

28. Which of the following statements concerning the element calcium, Ca, is *true*?

(a) Calcium is an alkali metal.
(b) Calcium will readily accept two electrons to form the ion Ca^{-2}.
(c) Calcium is classified as a non-metal.
(d) A neutral calcium atom possesses two more electrons than the nearest noble gas that precedes it in the periodic table.
(e) Calcium readily forms the diatomic molecule having the formula Ca_2.

ANSWERS
25. A 26. D 27. B 28. B



NAME Cock-A-Doo-Cal-Doo lover (Squawk) CLASS Rhode Island Red DATE knowing you I'll get to go to a kindergarten's Valentines DANCE. OH well February 14 it is. SCORE why ruin a good thing with less than 90%?

what you mean "we"?

7 Why We Believe in Atoms

If you can't believe in atoms, what can you believe in anymore?

Directions: Write the answers in the box at the bottom of the right-hand column. For each question, write the letter that corresponds to the correct answer.

No! today is only 30 Jan.!

1. Which of the following offers positive proof of the existence of atoms?
   (a) The Law of Multiple Proportions
   (b) The Law of Definite Proportions
   (c) The Law of Combining Volumes
   (d) Faraday's experiment on electrolysis
   (e) None of these

DON'T try to worm out of this one! three cracks in a row is a little obvious!

2. All of the following statements concerning the law of definite composition are true *except*
   (a) it formed the basis for the atomic theory
   (b) it was proposed by John Dalton
   (c) a compound has a definite composition by weight
   (d) compounds always contain equal numbers of different atoms
   (e) the composition of a compound is independent of how it is prepared

(f) once a chicken, always a chicken

3. Which pair of substances best illustrates the Law of Multiple Proportions?
   (a) NaCl and $ZnCl_2$
   (b) O_2 and O_3
   (c) SO_2 and SO_3
   (d) H_2SO_4 and H_2SeO_4
   (e) None of these

OK! you caught me this time!

(f) a pair of pants

4. Which of the statements relating to the atomic theory is *not* true?
   (a) It was devised to explain the relationship of reacting volumes of gases.
   (b) Matter is composed of molecules.
   (c) It is the basis for the atomic model.
   (d) It is related to Avogadro's hypothesis.
   (e) None of these

(f) It was devised to help explain the blond females in the world

5. Which of the following was Faraday's contribution to the atomic theory?
   (a) The Law of Combining Volumes
   (b) The Law of Multiple Proportions
   (c) Atoms carry afixed charges
   (d) Invention of the spectograph
   (e) He determined the charge on the nucleus of an atom.

(F) He died before he got any smarter so I wouldn't have to learn anything else he did. You have learned something he did?

6. Which of the following statements concerning Faraday's experiments is *not* true?
   (a) One ampere of current will deposit equal numbers of moles of all elements.
   (b) Atoms of different elements could be "counted."
   (c) Individual electrical particles were called electrons.
   (d) Electric charges come in "packages."
   (e) Electric current is particles in motion.

If that's the case I know what to get for your Birthday... PREFerably 600 VOLTS

7. All of the following statements concerning the e/m ratio of an electron are true *except*
   (a) it was determined by Millikan
   (b) it is expressed in coulombs per gram
   (c) it is determined by the use of a magnetic field
   (d) it was calculated by Faraday on Friday.
   (e) it can be used to determine the mass of an electron

I'm not hearing any more birthdays!

8. Which of the following statements concerning the mass spectrograph is *not* true?
   (a) It measures the mass of the electron.
   (b) It measures the mass of the proton.
   (c) It can be used to measure the charge/mass ratio of ions.
   (d) It indicates the number of existing isotopes of a gas.
   (e) It proved that ionized gases may form more than one ion.

(f) It does not react to the color blonde.

9. Which of the following statements is *not* true of the atomic model developed by Thomson?
   (a) The atom had uniform density.
   (b) The atom was spherical.
   (c) It explained the chemical properties of the atom.
   (d) It would not deflect alpha particles.
   (e) It has now been discarded.

(BUSY AS a bee and with about the same I.Q.)

ANSWERS

1. E	~~B~~ D	~~E~~ C	~~E~~ B	would you believe Busy as a DCB
5. C	~~A~~	~~D~~	~~E~~	
9. C				

10. Which of the following statements concerning Rutherford's experiments is *not* true?

(a) He found that the mass of the atom is concentrated in the nucleus.
(b) He found that most of the atom is empty space.
(c) He found that alpha particles and the nuclei attract each other.
(d) He showed that different atoms have different nuclear charges.
(e) He found that most nuclei are heavier than alpha particles.
(f) he had a blond assistant who kept ruining his experiments.

During the electrolysis of water, hydrogen and oxygen gas are produced.

$$2H_2O(g) \rightarrow 2H_2(g) + O_2(g)$$

11. The number of moles of electrons required to reduce sufficient hydrogen ions to produce four moles of hydrogen gas is

(a) 2 moles
(b) 4 moles
(c) 8 moles
(d) 12 moles
(e) 6 moles

12. The number of moles of oxygen gas produced at the same time that the four moles of hydrogen is being produced is

(a) 2 moles
(b) 4 moles
(c) 8 moles
(d) 12 moles
(e) 6 moles

13. The number of electrons needed to reduce 2.16 grams of silver (a.w. = 108) from a solution of silver nitrate is

(a) 6.02×10^{23} electrons
(b) 12.04×10^{23} electrons
(c) 12.04×10^{21} electrons
(d) 6.02×10^{21} electrons
(e) 12.04×10^{22} electrons

14. The number of grams of nickel metal (a.w. = 59) which could be dissolved by the electrons in question 13 is

(a) 6 grams
(b) 0.6 g
(c) 60 grams
(d) 12 grams
(e) 1.2 grams

P.S. Wou[redacted]ld you like to go to the a Valentines dance after school in the Kindergarten room on Feb. 14?

15. If the mass of an electron is 9.11×10^{-28} grams, the weight of one mole of electrons is

(a) 6.7×10^{50} grams
(b) 1.5×10^{-51} grams
(c) 1.5×10^{51} grams
(d) 5.48×10^{-4} grams
(e) 1.1×10^{27} grams

16. The number of electrons which weigh 1 gram is

(a) 6.7×10^{50} electrons
(b) 1.5×10^{-51} electrons
(c) 1.5×10^{51} electrons
(d) 5.48×10^{-4} electrons
(e) 1.1×10^{27} electrons

17. The number of electrons necessary to reduce 1.27 grams of copper (a.w. = 63.5) from a solution of $CuSO_4$ is

(a) 6.02×10^{23}
(b) 24.08×10^{21}
(c) 12.04×10^{23}
(d) 6.02×10^{21}
(e) 3.01×10^{21}

18. In an experiment, 1 mole of electrons passing through a series of solutions causes ½ mole of metal X to be deposited from a solution and ⅓ mole of a different metal, Y, to be deposited from a second solution. The formulas for the metallic ions which were reduced are probably

(a) X^{+3}, Y^{+2}
(b) X^{+2}, Y^{+2}
(c) X^{+3}, Y^{+3}
(d) X^{+2}, Y^{+3}
(e) none of these

~~Algebra~~ HELP gurg, eeeeeeak! This actually is a question!

19. The weight of sodium which could be obtained from the electrolysis of 146.3 kg of molten ~~sodium chloride~~ molly is (Na = 23; Cl = 35.5)

(a) 57.5 kg
(b) 57.5 g
(c) 575 kg
(d) 5,750 g
(e) 5,750 kg

Ah (C) ..ah.. right..?

20. In problem 19, the weight of chlorine gas produced is (DEAD)

(a) 88.8 g
(b) 88.8 kg
(c) 8.8 kg
(d) 8888 g
(e) 44.4 kg

ANSWERS
10. D 11. D 12. A 13. D
14. B 15. D 16. D 17. A
18. C 19. C 20. C

CUTE, NO? No! this impressive... test has ESP POWERS Too bad you don't!

NOW one of those has to be right! That's what you think!

Diane - You're a real gem! (VALUE Approximately 300 Carats)

you are ALSO in the psychiatric Business could you make an appointment for me? You do need one. Several!

NAME DIAMOND GIRL CLASS .... DATE .... SCORE 56

BOOK IN HOROZONAL POSITION (fow) ~~PARRELL~~ PARRELELL to the plane of the table and subsequent walking area

10 Solids, Liquids and Solutions

Don't be funny! You didn't set many records in Geometry either!

Silly! Parrelell is really spelled pairalel or is it pearalel? No matter, it is deafanately not speled parrellel!

Directions: Write the answers in the box at the bottom of the right-hand column. For each question, write the letter that corresponds to the correct answer.

Nitrogen is a gas at a temperature above 126°K. Very little energy is required to change nitrogen from solid to liquid to gas. Nevertheless, kinetic energies corresponding to thousands of degrees Kelvin cannot cause appreciable decomposition of the N_2 molecules.

1. Which forces are holding the nitrogen molecules together in the liquid form?

(a) ionic bonds
(b) hydrogen bonds
(c) covalent bonds
(d) van der Waals
(e) metallic bonds

2. What forces or bonds are holding the two nitrogen atoms together?

(a) ionic bonds
(b) hydrogen bonds
(c) covalent bonds
(d) metallic bonds
(e) van der Waal forces

Questions 3–8 refer to the information in the following table.

Substance	m.p. (K°)	b.p. (K°)
(1) sodium chloride	1073.4	1686
(2) carbon tetrachloride	250	349.8
(3) carbon dioxide		sublimes at 194.5
(4) water	273	373
(5) methane	89	111
(6) diamond	above 3800	about 4500
(7) helium	3.3	4.1
(8) silicon dioxide	about 2000	about 2500

3. All of the intermolecular forces of attraction are due to van der Waals forces in all of the listed substances *except*

(a) 7 (b) 2 (c) 3 (d) 5 (e) 6

4. Which of the above substances form molecular solid(s) made up of polar molecules?

(a) 4 (b) 5 (c) 8 (d) 2 (e) 7

5. In which of the substances does hydrogen bonding occur?

(a) 7 (b) 5 (c) 6 (d) 4 (e) 3

6. In which of the solid substances is the bonding predominately ionic?

(a) 2 (b) 1 (c) 8 (d) 3 (e) 6

7. According to the data given which of the solid substances would have the weakest bonds?

(a) 5 (b) 4 (c) 7 (d) 2 (e) 6

8. Which of the compounds is a network solid?

(a) 8 (b) 1 (c) 2 (d) 4 (e) 7

9. All of the following are forms of carbon *except*

(a) diamond
(b) lampblack
(c) graphite
(d) charcoal
(e) sand

10. All of the following are characteristic of metals *except*

(a) ductility
(b) permeability
(c) malleability
(d) luster
(e) conductivity

11. Which of the following groups has (1) van der Waals forces, (2) hydrogen bonds, and (3) covalent bonds listed in order of increasing energies?

(a) 1, 2, 3
(b) 3, 2, 1
(c) 2, 1, 3
(d) 1, 3, 2
(e) 3, 1, 2

12. The compound below containing a polyatomic ion is

(a) $CaCl_2$
(b) KBr
(c) Al_2Cl_3
(d) $NaNO_3$
(e) None of these

what a good deed I've done to so thoroughly FAIL this test

ANSWERS

1. D	2. E	3. E	4. D
5. D	6. B	7. C	8. A
9. E	10. B	11. B	12. D

13. Hydrogen bonds play an important part in all except which one of the following

(a) crystalline structure forms
(b) activity of biological molecules
(c) solidification of carbon dioxide
(d) structure of proteins
(e) freezing of water

14. Hydrogen bonds could form with each of the following atoms *except*

(a) S (b) O (c) F (d) N (e) Cl

15. All of the following elements will form cations *except*

(a) Ba (b) S (c) Al (d) Mg (e) Cr

16. The low melting point exhibited by sulfur can be attributed to

(a) covalent bonds
(b) low ionization energy
(c) hydrogen bonding
(d) van der Waal forces
(e) relatively large molecules

17. All of the following statements concerning ionic solids are true *except*

(a) they are brittle
(b) they are non-conductors
(c) they have high melting points
(d) they are ductile
(e) they have a definite crystalline structure

The orbital representations below are to be used in answering questions 18–23. The letters used are *not* the symbols for the elements represented.

	2s	2p		2s	2p
H	⊘	○○○	P	⊗	⊗⊗⊗
M	⊗	⊘○○	S	⊗	⊗⊗⊘
N	⊗	⊘⊘○			

18. The elements which would be expected to form metallic bonds are

(a) H and P
(b) P and S
(c) H and M
(d) H only
(e) P only

19. Which of the elements would be expected to form a network solid?

(a) P and N
(b) P and M
(c) M only
(d) N only
(e) H only

20. What combinations of two elements would most likely form an ionic solid?

(a) H and S
(b) H and M
(c) N and P
(d) S and N
(e) M and P

21. The emperical formula for a compound formed by the combination of N and S is

(a) NS_4
(b) N_2S_8
(c) NS_3
(d) N_2S_3
(e) N_3S_6

22. Write the emperical formula for a compound formed by the combination of P and S

(a) PS
(b) P_2S_2
(c) PS_2
(d) P_2S_4
(e) P_2S

23. A condition for metallic bonding is

(a) high ionization energy
(b) large atomic number
(c) stability of atom
(d) vacant valence orbitals
(e) high temperature

24. The dissolving of ionic solids in water involves all of the following *except*

(a) hydration
(b) vaporization
(c) interaction with dipoles
(d) release of energy
(e) dissociation

ANSWERS

13. D	14. E	15. C	16. D
17. E	18. E	19. C	20. A
21. B	22. C	23. D	24. E

NAME DISSOLVING Dieting Dunne CLASS DIEING DATE MOUSE SCORE DEAD

14 Equilibrium in Chemical Reactions

Directions: Write the answers in the box at the bottom of the right-hand column. For each question, write the letter that corresponds to the correct answer.

1. Which of the following statements concerning equilibrium is *not* true?
   (a) It occurs in all chemical reactions
   (b) It exists between a liquid and its vapor
   (c) It may exist between a gas and a solid
   (d) It may exist between a liquid and a solid
   (e) It always exists in a closed system

2. Which of these is *not* classified as a steady state?
   (a) A Bunsen burner flame
   (b) Hoover Dam and the lake behind it
   (c) Students entering and leaving the cafeteria at the same rate
   (d) A football team and the bench of reserves if the number of players is constant
   (e) A teakettle of water boiling on a stove

3. Which statement concerning vapor pressure is *not* true?
   (a) It increases as the temperature of a liquid is increased
   (b) It is affected by the atmospheric pressure
   (c) It is expressed in Torr
   (d) A liquid boils when its vapor pressure is exactly one atmosphere
   (e) Alcohol has a higher vapor pressure than water

4. Which statement concerning a system at equilibrium is not true?
   (a) It is characterized by constancy of macroscopic properties
   (b) It is at a uniform temperature
   (c) It is an open system
   (d) It exists in a saturated solution
   (e) Microscopic processes continue to occur within the system

5. A chemical system in equilibrium can be altered by all of the following *except*
   (a) adding a catalyst
   (b) changing the concentrations of the reactants
   (c) changing the temperature
   (d) changing the concentration of the products
   (e) none of these

Questions 6–8 refer to the following equation:

$$2\,SO_2(g) + O_2(g) \rightleftarrows 2\,SO_3(g) + 45\text{ kcal}$$

6. What information concerning the reaction is *not* conveyed by the above equation?
   (a) The reaction mechanism
   (b) The reaction is exothermic
   (c) The system is homogeneous
   (d) two moles of sulfur dioxide react with one mole of oxygen to produce two moles of sulfur trioxide
   (e) The system is in equilibrium

7. If the pressure on the reaction is increased isothermally which one of the following will occur?
   (a) The reactants will be favored
   (b) The temperature will change
   (c) The production of SO_3 will be favored
   (d) The color of the reaction will change
   (e) Nothing will happen

8. If the temperature of the system is increased
   (a) the concentration of the reactants would decrease
   (b) the equilibrium would not affected
   (c) the concentration of the product would decrease
   (d) there would be no color change
   (e) none of these

9. In which of the following does the tendency towards minimum energy favor reactants?
   (a) $CO_2(g) \rightleftarrows CO_2(s)$
   (b) $H_2O(l) \rightleftarrows H_2O(g)$
   (c) $H_2O(g) \rightleftarrows H_2O(l)$
   (d) $4Fe(s) + 3\,O_2(g) \rightleftarrows 2Fe_2O_3(s) + 400$ kcal
   (e) none of these

ANSWERS

1. A	2. D	3. D	4. C
5. A	6. D	7. B	8. B
9. C			

10. In which of the following does the tendency towards maximum randomness favor products?

(a) $CO_2(g) \rightleftarrows CO_2(s)$
(b) $H_2O(l) \rightleftarrows H_2O(g)$
(c) $H_2O(g) \rightleftarrows H_2O(l)$
(d) $4Fe(s) + 3O_2(g) \rightleftarrows 2Fe_2O_3(s) + 400$ kcal
(e) none of these

Questions 11–14 refer to the following equilibrium situation. Gaseous water reacts with carbon monoxide gas to produce water gas, a mixture of hydrogen gas and carbon dioxide gas according to the equation below:

$$5H_2O(g) + 4CO(g) \rightleftarrows H_2(g) + 2CO_2(g) + 10 \text{ kcal}$$

Five moles of water (g) and four moles of carbon monoxide gas are reacted at a constant temperature of 1000 degrees C. and the reaction reaches equilibrium. After equilibrium has been established, it is determined that two moles of carbon dioxide gas are present.

11. The number of moles of carbon monoxide present at equilibrium is

(a) 0.5 moles
(b) 2 moles
(c) 3 moles
(d) 4 moles
(e) 5 moles

12. The number of moles of hydrogen gas present at equilibrium is

(a) 1 mole
(b) 2 moles
(c) 3 moles
(d) 4 moles
(e) 5 moles

13. Determine the numerical value of the equilibrium constant at 1000°C given the following equilibrium concentrations:

$[CO(g)] = 1.0$ m/liter $[H_2(g)] = 0.4$ m/liter
$[H_2O(g)] = 0.4$ m/liter $[CO_2(g)] = 0.6$ m/liter

(a) 0.4
(b) 0.6
(c) 1.0
(d) 1.6
(e) cannot be calculated from the given data.

14. If the reaction came to equilibrium at a higher temperature than 1000°C, which of the following would be true concerning the value of K?

(a) It would be greater than at 1000°
(b) It would be less than the value at 1000°C
(c) It would be the same as at 1000°C
(d) More information would be necessary in order to make the calculation.
(e) None of these

Refer to the following information to answer 15–21:

When oxygen gas and a gaseous oxide react, a new oxide (gaseous) is formed, and the system is at equilibrium.

15. Using *only* the information given above, the surest way to increase the number of moles of product at equilibrium would be

(a) to add a catalyst
(b) to decrease the volume
(c) to increase the temperature
(d) to add more of the original oxide
(e) none of these
(f) to kill off all the wolves

16. It is determined that the net reaction is

$$2NO(g) + O_2(g) \rightleftarrows 2NO_2(g) + 27$$

Using this additional information, which one, if any, of the following would be sure to decrease the nitric oxide gas present at equilibrium?

(a) Adding a catalyst
(b) Decreasing the volume
(c) Increasing the temperature
(d) Adding more of the original oxide
(e) None of these

17. Further study shows that 27 kcal of heat is evolved in the reaction. Using this additional information which of the following would definitely increase the equilibrium concentration of the nitrogen dioxide?

(a) Adding a catalyst
(b) Increasing the volume
(c) Increasing the temperature
(d) Adding more of the original oxide
(e) None of these

18. If 15 liters of NO react completely, what volume of oxygen at the same temperature and pressure would be required?

(a) 30 liters
(b) 75 liters
(c) 7.5 liters
(d) 15 liters
(e) 20 liters

19. The number of moles of nitric oxide needed to produce 92 grams of nitrogen dioxide (N = 14, O = 16) in the above reaction is

(a) 92 moles
(b) 1 mole
(c) 44.8 moles
(d) 4 moles
(e) 2 moles

ANSWERS
10. B 11. D 12. D 13. D
14. B 15. D 16. B 17. D
18. C 19. A

"D" for Demented Dianne

Blonde, female,

20. Adding an inert gas to a system at equilibrium without changing the temperature or volume would cause which of the following to occur?
(a) No effect on the equilibrium
(b) Increase the concentration of the product
(c) Increase the rates of the forward and reverse reactions
(d) Increase the concentrations of both reactants
(e) Decrease the concentration of the oxygen
(f) Everything to go wrong.

21. Adding a catalyst to the above system at equilibrium will do all of the following *except*
(a) increase the forward reaction rate
(b) increase the reverse reaction rate
(c) add a new reaction path
(d) cause an increase in released heat
(e) have no effect on the amount of the product formed

22. LeChatelier's principle pertains to all except which of the following statements?
(a) A catalyst will cause a shift in the equilibrium
(b) Increasing the concentration of one of the reactants causes a decrease in the concentration of the other reactant
(c) Increasing the temperature of an exothermic reaction causes a shift in the equilibrium
(d) In an equilibrium reaction involving only gases, increasing the pressure favors the formation of fewer molecules
(e) None of these

(f) Evolution will definitely, once and for all, finally, much to our relief, at last, for ever and ever, with no hope of ever returning, for all time, indefinitely, till the end of time, squash, stamp out, annihilate, remove from the face of the earth as well as the universe, all females with blonde hairs protruding from the rather large bump on the top of their neck.

23. Determine the equilibrium law relationship for the following reaction:

$$N_2(g) + 3H_2(g) \rightleftarrows 2NH_3(g)$$

(a) $\dfrac{[2NH_2]}{[N_2][3H_2]}$
(b) $\dfrac{[N_2][H_2]^3}{[NH_3]^2}$
(c) $\dfrac{[NH_3]^2}{[N_2][H_2]^3}$
(d) $\dfrac{[NH_3]^2}{[N_2]^2[H_2]^3}$
(e) none of these

24. Determine the equilibrium constant for the following reaction:

$$FeO(s) + CO(g) \rightleftarrows Fe(s) + CO_2(g)$$

(a) $K = \dfrac{[Fe(g)][CO_2(s)]}{[FeO][CO]}$
(b) $K = \dfrac{[FeO][CO]}{[Fe][CO_2]}$
(c) $K = \dfrac{[CO_2]}{[CO]}$
(d) $K = \dfrac{[CO]}{[CO_2]}$
(e) None of these

ANSWERS
20. D 21. D 22. A 23. E 24. E

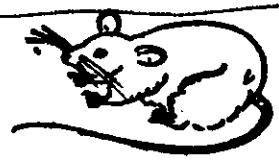
reserve Box:
JUST TAKE ONE?)
of the following letters to exchange for above mistakes
thankyou

Z R L P
S E G Q

I'm sure it will help EGADS,

you don't have enough letters here!

The



MABE sp. I could get a job as a calpriemeter maid!? Not a chance! why bother with trivial things like grades?

NAME (CAUTIOUS) CALORIE CONSUMER CLASS Home Ec DATE OK! SCORE 55

This test paper is exothermic because it's making me hot under the collar.
this test is endothermic because it steals all my energy.

13 Energy Effects in Chemical Reactions

the owner of this paper has JUST FAINTED from shock after years of trying to get a date with you. You may however visit the victim at the base hospital (PLEASE STAY AWAY from the oxygen tent though)

CHEATING we're only on chapter twelve! ... no! ... nine! WAIT MABE chapter ....

Directions: Write the answers in the box at the bottom of the right-hand column. For each question, write the letter that corresponds to the correct answer.

1. Which of the following statements does *not* apply to the term "heat content"?

(a) It is described as stored energy.
(b) It is the same for all substances.
(c) It is stored during the formation of a substance.
(d) It changes during a chemical reaction.
(e) It is symbolized by the letter H.
(f) the NORTH POLE?????

2. Which of the following statements is *not* true concerning ΔH?

(a) It is the difference between the heat content of the products and the heat content of the reactants.
(b) It may be written into the equation.
(c) If it is negative in value it indicates an endothermic reaction.
(d) It is positive if the reaction consumes heat.
(e) None of these
(f) it stands for "POINTED (Δ) HEAD (H)" You should know!

3. Which of the following reactions are exothermic?

(1) $2H_2O(g) \rightarrow 2H_2(g) + O_2(g) + 115$ kcal
(2) $\frac{1}{2}N_2(g) + \frac{1}{2}O_2(g) \rightarrow NO(g) \Delta H = 21$ kcal
(3) $\frac{1}{2}N_2(g) + \frac{3}{2}H_2(g) \rightarrow NH_3(g) + 11$ kcal
(4) $2NH_3(g) \rightarrow N_2(g) + 3H_2(g) \Delta H = 22$ kcal
(5) $N_2 + 2O_2 + 16.2 \text{ kcal} \rightarrow 2NO_2$

(a) 1, 2, 4
(b) 1, 3
(c) 1, 3, 5
(d) 2, 4, 5
(e) 1, 2, 3, 4, 5

4. Which of the following was proposed by Hess?

(a) Calorimetry
(b) Heat of reactions
(c) Additivity of reaction heats
(d) The use of ΔH
(e) Exothermic reactions
(f) Blonds have more fun.

5. Which of the following statements does not pertain to calorimetry?

(a) It is used to measure the heat of combustion of a fuel.
(b) It makes use of insulated material.
(c) It involves a change in water temperature.
(d) It generally involves the use of only small amounts of water.
(e) The amount of sample must be measured accurately.
(F) ICECREAM CAKE WITH whipped cream + 30 Baht = FAT + RICH + Poly saturated

There'll be no derrogatory comments about minority ethnic groups in my classroom from imperialistic calorie counting yankee ...

6. Which statement is *not* true of heats of reaction?

(a) They are always expressed in kilocalories.
(b) They are generally called heat of formation.
(c) They can be determined experimentally.
(d) They can be calculated by using a formulated table of reaction heats.
(e) They can indicate either endothermic or exothermic reactions.

Questions 7–9 refer to the following reactions:

(I) $C(s) + O_2(g) \rightleftarrows CO_2(g) + 94$ kcal
(II) $CO(g) + \frac{1}{2}O_2(g) \rightleftarrows CO_2(g) + 67.6$ kcal

7. On the basis of the information given in equation (II), and assuming no change in temperature or pressure, one can correctly conclude that

(a) the rates of the reactions are rapid
(b) the total number of moles of products is the same as the total number of moles of reactants
(c) the reaction to the right is exothermic
(d) the weights of the products are greater than the weights of the reactants
(e) there will be an increase in the volume of the reactants and products taken together as the reactions proceed

8. When 112 grams of carbon monoxide are consumed according to equation (II), which of the following occurs? (C = 12; O = 16)

(a) 0.50 mole of oxygen is consumed
(b) 1.0 mole of carbon dioxide is produced
(c) 67.6 kcal of heat are generated
(d) 2.0 moles of oxygen are consumed
(e) 0.25 mole of carbon dioxide is produced
(f) one more of the world goes insane!

9. On the basis of calculations using equation (I) and (II), determine in kcal per mole of carbon the heat produced in the following reaction:

$C(s) + \frac{1}{2}O_2(g) \rightleftarrows CO(g) + \_\_$ kcal/mole carbon

(a) 20.6
(b) 26.4
(c) 41.2
(d) 161.6
(e) none of these

ANSWERS			
1. B	2. C	3. C	4. C
5. D	6. A	7. B	8. C
9. B			

Now I see why you got so many incorrect answers

10. Given the two equations:

$H_2(g) + O_2(g) \rightleftarrows H_2O_2(l) + 44.84$ kcal and

$H_2O_2(l) \rightleftarrows H_2O(l) + \frac{1}{2}O_2(g) + 23.48$ kcal

determine ΔH for the following reaction:

$$H_2(g) + \tfrac{1}{2}O_2(g) \rightarrow H_2O(l)$$

(a) 68.32 kcal/mole
(b) −68.32 kcal/mole
(c) +21.36 kcal/mole
(d) −213.6 kcal/mole
(e) 89.68 kcal/mole

11. Which statement concerning the Law of Conservation of Energy is *not* true?

(a) It applies to all chemical reactions.
(b) It involves all different forms of energy.
(c) It does not apply to nuclear reactions.
(d) It includes potential energy.
(e) It involves heat content of substances.

12. Which of the following is *not* a macroscopic form of energy?

(a) Heat energy
(b) Chemical energy
(c) Temperature
(d) Kinetic energy
(e) Potential energy

13. Which statement does *not* apply to molar heat content of a substance?

(a) It is a measure of chemical bond energy.
(b) It is not affected by temperature.
(c) It concerns the heat content of 6.02×10^{23} molecules of a substance.
(d) The electrons of the substance possess energy.
(e) It deals with the nuclear energy of the atoms.

14. Which of the following statements concerning a consistent increase in the temperature of a substance is *not* true?

(a) The substance is gaining potential energy.
(b) The molecular motion within the substance is increased.
(c) A phase change always occurs.
(d) The molecules may disintegrate.
(e) Nuclear reactions may occur.

15. Which of the following is *not* true of phase changes?

(a) They involve changes in kinetic energy.
(b) They involve changes of several kilocalories per mole.
(c) They involve more energy than chemical changes.
(d) The gaseous phase has more randomness than the liquid phase of the substance.
(e) They are involved in nuclear reaction.

16. When concentrated sulfuric acid is added to water, heat is liberated. The heat of dilution is about 18 kcal/mole of H_2SO_4 diluted with a large volume of water. Using the law of additivity of heat, predict how much heat would be released if 9.8 grams of sulfuric acid were added to sufficient water such that all the heat of dilution would be released. (S = 32; O = 16; H = 1)

(a) 18 kcal
(b) 9 kcal
(c) 90 kcal
(d) 1.8 kcal
(e) 98 kcal

17. The following two reactions represent a method for producing americium.

(1) $^{238}_{92}U + {}^{4}_{2}He \rightarrow {}^{241}_{94}Pu$ 2 u 2
(2) $^{241}_{94}Pu \rightarrow {}^{241}_{95}Am +$ _____

Which of the following are the correct terms for the two blanks taken in order:

(a) $^{1}_{0}n$, $^{0}_{-1}e$
(b) $^{0}_{-1}e$, $^{4}_{2}He$
(c) $^{1}_{0}n$, $^{1}_{0}n$
(d) $^{0}_{-1}e$, $^{0}_{-1}e$
(e) none of these

Questions 18–20 refer to the reaction of hydrogen gas and oxygen gas to form water:

$2H_2(g) + O_2(g) \rightleftarrows 2H_2O(g) + 115.6$ kcal

$2H_2(g) + O_2(g) \rightleftarrows 2H_2O(l) + 136.6$ kcal

18. One mole of gaseous water molecules contains how much less energy than is stored in one mole of hydrogen molecules and $\frac{1}{2}$ mole of oxygen molecules?

(a) 57.8 kcal
(b) 115.6 kcal
(c) 331.2 kcal
(d) 21 kcal
(e) 252.2 kcal

19. What is the ΔH for the formation of liquid water from hydrogen gas and oxygen gas?

(a) 68.3 kcal/mole of water
(b) −68.3 kcal/mole of water
(c) −136.6 kcal/mole of water
(d) 136.6 kcal/mole of water
(e) 21 kcal/mole of water

20. The energy required to evaporate one mole of liquid water would be

(a) 21 kcal
(b) 115.6 kcal
(c) 136.6 kcal
(d) 10.5 kcal
(e) 252.2 kcal

ANSWERS

10. B	11. C	12. C	13. E
14. A	15. E	16. A	17. E
18. D	19. A	20. D	

NAME _____ DATE _____ SCORE _____

11 Chemical Reactions and Calculations

Directions: Write the answers in the box at the bottom of the right-hand column. For each question, write the letter that corresponds to the correct answer.

1. Which statement concerning radicals is *not* true?
   (a) They consist of two or more atoms.
   (b) They have an electrical charge.
   (c) They exist as independent structures.
   (d) Their valence orbitals are not complete.
   (e) The ammonium radical has a positive charge.

2. Which of the following statements concerning chemical formulas is *not* correct?
   (a) The element with the negative valence is written last.
   (b) Parentheses are used to indicate a single element used more than once.
   (c) The net charge on the compound must equal zero.
   (d) Valence charges must be balanced.
   (e) The valence of an element may be determined if a formula containing it is known.

3. The correct formula for mercurous nitrate is
   (a) $Hg(NO_3)_2$
   (b) Hg_2NO_3
   (c) $HgNO_3$
   (d) $Hg(NO_2)_2$
   (e) $Hg_3(NO_3)_2$

4. The correct name for Na_2SO_3 is
   (a) sodium sulfide
   (b) sodium sulfite
   (c) sodium sulfate
   (d) sodium sulfur trioxide
   (e) none of these

5. Which of the following statements concerning valence is *not* true?
   (a) It represents the number of electrons used in bonding.
   (b) It is the combining capacity of an atom.
   (c) A positive ion has an excess of electrons.
   (d) A negative ion is indicated by a minus sign.
   (e) All elements of the alkaline earths have the same valence.

6. In the equation $2KClO_3 \xrightarrow[\Delta]{MnO_2} 2KCl + 3O_2$, $KClO_3$ is
   (a) the coefficient
   (b) the catalyst
   (c) the reactant
   (d) the product
   (e) none of these

Questions 7–10 relate to the following experiment. A zinc strip weighing $16.82 \pm .01$ g is placed in a solution of silver nitrate and allowed to stand overnight. Next day the silvery deposit is collected, dried and weighed, as is the zinc strip. The weight of silver produced is $2.70 \pm .02$ g and the zinc strip after the reaction weighs $16.00 \pm .01$ g. (zinc = 65 g/mole; silver = 108 g/mole)

7. The number of moles of zinc which reacted is
   (a) 0.13 moles
   (b) 0.33 moles
   (c) 0.013 moles
   (d) 0.03 moles
   (e) 0.05 moles

8. The number of moles of silver produced is
   (a) 0.10 moles
   (b) 0.30 moles
   (c) 0.01 moles
   (d) 0.03 moles
   (e) 0.025 moles

9. The reaction taking place can be written: _____ zinc + _____ silver nitrate (aqueous) yields _____ silver + _____ zinc nitrate. From the data in the experiment described above, the coefficients for the above substances in order of appearance are:
   (a) 1,1,1,1
   (b) 1,2,1,2
   (c) 1,2,2,1
   (d) 2,1,1,2
   (e) 2,3,3,2

10. The particles in the decanted solution consist mainly of
    (a) zinc and silver ions
    (b) silver ions and nitrate ions
    (c) zinc ions only
    (d) nitrate ions only
    (e) zinc ions and nitrate ions

11. Elements which generally have common valences of +2 and +3 are called
    (a) noble elements
    (b) alkaline earths
    (c) amphoteric
    (d) metalloids
    (e) transition elements

ANSWERS			
1. D	2. B	3. C	4. C
5. C	6. C	7. C	8. E
9. A	10. E	11. D	

Nitrogen combines with hydrogen to form ammonia gas. Questions 12–15 refer to this reaction.

12. The correct equation for the reaction is

(a) $N(g) + 4H(g) \rightarrow NH_4(g)$
(b) $2N(g) + 4H(g) \rightarrow 2NH_4(g)$
(c) $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$
(d) $2N(g) + 3H_2(g) \rightarrow 2NH_3(g)$
(e) None of these

13. The number of moles of ammonia formed from one mole of nitrogen is

(a) 3 (b) 2 (c) 1 (d) 4 (e) 5

14. The number of grams of hydrogen needed to produce six moles of ammonia is (H = 1; N = 14)

(a) 6 (b) 18 (c) 12 (d) 24 (e) 20

15. The volume of nitrogen needed to produce 15 liters of ammonia is

(a) 15 liters
(b) 30 liters
(c) 45 liters
(d) 2214 liters
(e) 7.5 liters

Questions 16–18 pertain to the reaction in which ammonia gas and oxygen gas react and form water vapor and nitrogen dioxide.

16. The correctly balanced equation for the reaction is

(a) $2NH_4(g) + 8O(g) \rightarrow 4H_2O(g) + 2NO_2(g)$
(b) $2NH_3(g) + 8O(g) \rightarrow 6H_2O(g) + 2NO(g)$
(c) $NH_4(g) + 6O_2(g) \rightarrow 4H_2O(g) + NO_2(g)$
(d) $2NH_3(g) + \frac{5}{2}O_2(g) \rightarrow 3H_2O(g) + NO_2(g)$
(e) $2NH_3(g) + \frac{7}{2}O_2(g) \rightarrow 3H_2O(g) + 2NO_2(g)$

17. After the reaction of 350 liters of ammonia with 350 liters of oxygen is completed, the gas that remains unreacted is

(a) 50 liters of ammonia
(b) 100 liters of ammonia
(c) 150 liters of ammonia
(d) 150 liters of oxygen
(e) 50 liters of oxygen

18. The number of moles of the gas completely consumed in the reaction is

(a) 9 moles of ammonia
(b) 7 moles of oxygen
(c) 2 moles of ammonia
(d) 15.5 moles of oxygen
(e) 31 moles of oxygen

19. Which of the following ~~elements~~ students is *not* multivalent?

(a) Fred
(b) Custer
(c) Ferdinand
(d) Craig
(e) Hg-chee-chou
(f) 2×2 (multiple??)
(g) what?
(H) Help!!

20. Which statement is *not* true concerning equation writing?

(a) The reactants are written on the left.
(b) Atoms are conserved.
(c) Correct formulas for the products are written on the right.
(d) The equation can be balanced by changing the subscripts of the formulas.
(e) A balanced equation represents a chemical reaction.

21. Lead nitrate reacts with sodium iodide to form sodium nitrate and lead iodide, which is insoluble in water. Which of the following is the most accurate equation for the reaction?

(a) $Pb(NO_3)_2 + 2NaI \rightarrow PbI_2(s) + 2NaNO_3$
(b) $Pb^{+2} + 2NO_3^- + 2Na^+ + 2I^- \rightarrow PbI_2(s) + 2Na^+ + 2NO_3^-$
(c) $Pb^{+2}(aq) + 2I^-(aq) \rightarrow PbI_2$
(d) $2Na^+ + 2NO_3 \rightarrow 2NaNO_3$
(e) $Pb(NO_3)_2 + NaI \rightarrow PbI(s) + NaNO_3$

22. The correct balanced equation for the reaction described above is

~~(a) $2S + 2H_2O \rightarrow 2SOH + 2H(g)$~~
(b) $2Na + 2H_2O \rightarrow 2NaOH + H_2(g)$
~~(c) $2S + 2H_2O \rightarrow 2SOH + H_2(g)$~~
~~(d) $2Na + 2H_2O \rightarrow Na_2O + H_2$~~
~~(e) $2Na + 2H_2O \rightarrow 2NaOH + 2H$~~

23. The number of moles of water required for the above reaction is

(a) 2 (b) 2.5 (c) 3.5 (d) 5 (e) 7

24. The volume of hydrogen produced in the above reaction is

(a) 44.8 liters
(b) 39.2 liters
(c) 22.4 liters
(d) 78.4 liters
(e) none of these

25. The halogens generally have a valence number of

(a) +7 (b) +5 (c) +1 (d) −1 (e) −2

ANSWERS

12. C	13. B	14. B	15. E
16. E	17. C	~~X~~ C	19. ☆
20. D	~~X~~ A	22. B	~~X~~ A
~~X~~ C	25. D		

26. Which of the following does *not* relate to stoichiometry?

(a) Several reactions are involved.
(b) The reaction is complete.
(c) There is a limiting reactant.
(d) It makes use of the mole method.
(e) Adequate amounts of reactants are required.
(f) Blonde, female chemistry students

27. Which of the following statements concerning the contact process for making sulfuric acid is not true?

(a) It is less costly than the lead chamber process.
(b) It produces very pure and concentrated acid.
(c) It involves the use of a solid catalyst.
(d) It involves the burning of sulfur to form sulfur dioxide.
(e) It involves the dissolving of sulfur trioxide in sulfuric acid.
(f) It involves ordinary chemicals found under your kitchen sink.

28. The alkali metals have a valence number of

(a) −1 (b) +1 (c) −2 (d) +2 (e) +3

29. Which of the following is *not* associated with a chemical change?

(a) Color change
(b) Formation of a precipitate
(c) Change in temperature
(d) Formation of a gas
(e) Identical arrangements of atoms in products and reactants
(f) lady clairol

30. The rate of a chemical reaction in solution can be affected by all of the following *except*

(a) a catalyst
(b) a change in pressure
(c) a change in temperature
(d) change in concentration
(e) none of these
(f) blonde, female chemistry students

ANSWERS
~~26.~~ C ~~27.~~ E 28. B ~~29.~~ C
30. B

THIS SPACE MAY BE USED FOR YOUR CALCULATIONS.

$$\begin{array}{r} 2 \\ +\,2 \\ \hline 4 \end{array}$$

(wouldn't want you think that I wasted this space)

$$\begin{array}{r} 19 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 3.3 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 57 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 2.7 \\ \hline \end{array}$$

I didn't overlook it as it is, as, usual, spelled incorrectly! it's B

NAME BASICLY BAD BRAIN CLASS I wouldn't DATE 100 SCORE 70

there... I'm sorry I wouldn't wait too long to show you've late if I were ruined your chances absolutely as you are no more forgiveness we all gone forever ended... getting older... Well... I might give one more chance but just once. See if I Well ask ever again! I wouldn't even consider it. Never in a million years. You can only stand to be turned down so many times. Ha! Take that. Well, I might get up enough courage to ask just one more time.

Don't over look this clever word!

16 Acids and ~~Bases~~

silly! Flasks you can't put an acid in a VASE! REALLY

Directions: Write the answers in the box at the bottom of the right-hand column. For each question, write the letter that corresponds to the correct answer.

1. An acid solution would have which of the following properties?

(a) It would turn litmus blue
(b) The solution would have a sour taste
(c) The solution would have a pH of 12
(d) The solution would feel slippery
(e) The solution would turn pink with phenolphthalein
(f) NONE, ACIDS Are'nt into real Estate

2. Which of the following properties would be characteristic of both solutions of strong acids and solutions of strong bases?

(a) They are good conductors of electricity
(b) They would turn litmus red
(c) The solutions would have a pH of 7
(d) The solutions would react with zinc to produce hydrogen gas
(e) The solutions would have a bitter taste
(f) a molecular riot!

3. Which of the following statements concerning electrolytes is *not* true?

(a) Acetic acid is a strong electrolyte
(b) Dissociation of hydrogen chloride gas in water forms a strong electrolyte
(c) An electrolyte in solution will conduct an electric current
(d) Pure water is a very weak electrolyte
(e) A solution of sodium hydroxide is a strong electrolyte
(f) they are related to socialytes

4. Which of the following concerning pure water is *not* true?

(a) The water contains three species
(b) $K_w = 1.00 \times 10^{-14}$
(c) Pure water readily conducts an electric current
(d) The $[H^+]$ in pure water is 1.00×10^{-7} *M*
(e) Adding additional hydrogen ions decreases the concentration of the OH^-.
(f) it contains several microbe species

5. In a 0.2 M nitric acid solution, the hydrogen ion concentration is

(a) 1×10^{-2} *M*
(b) 2×10^{-2} *M*
(c) 4×10^{-1} *M*
(d) 1×10^{-7} *M*
(e) 2×10^{-1} *M*

6. The $[OH^-]$ of the nitric acid solution is

(a) 1×10^{-7} *M*
(b) 2×10^{-1} *M*
(c) 5×10^{-7} *M*
(d) 5×10^{-14} *M*
(e) 2×10^{-14} *M*

7. The $[H^+]$ of a 0.1 *M* solution of a weak acid HF is found to be 8.2×10^{-3} *M*. The value of the equilibrium constant is

(a) 8.2×10^{-6}
(b) 6.7×10^{-4}
(c) 6.7×10^{-5}
(d) 16.4×10^{-5}
(e) none of these

8. 11.2 grams of potassium hydroxide is dissolved to make one liter of solution (potassium = 39, oxygen = 16). The molar concentration of the solution is

(a) 0.1 *M*
(b) 0.2 *M*
(c) 0.01 *M*
(d) 0.02 *M*
(e) 2.0 *M*

9. The $[OH^-]$ in the solution in question 8 is

(a) 0.1 *M*
(b) 0.2 *M*
(c) 0.01 *M*
(d) 0.02 *M*
(e) 2.0 *M*

10. The $[H^+]$ in the solution in question 8 is:

(a) 1×10^{-7} *M*
(b) 2×10^{-1} *M*
(c) 5×10^{-14} *M*
(d) 5×10^{-7} *M*
(e) 2×10^{-14} *M*

11. Which of the following statements is *not* true of bases?

(a) Their formulas always contain the hydroxide ion
(b) They can counteract the properties of acids
(c) They have a slippery feeling
(d) Sodium carbonate will form a basic solution
(e) They can react with hydrogen ions to form water
(f) they always get to the bottom of things

ANSWERS			
1. B	2. A	3. A	4. C
5. E	6. B	7. B	8. B
9. B	10. B	11. A	

12. Which of the following is colorless in an acid solution?

(a) methyl orange
(b) phenolphthalein
(c) methyl red
(d) alizarin yellow
(e) bromthymol blue

[redacted] dy clairol "natural" blonde

13. In a reaction between solutions of nitric acid and sodium hydroxide which of the following is *not* true?

(a) Evaporation would leave a salt
(b) A precipitate would form
(c) Dissociation
(d) Neutralization
(e) The solution is a conductor

14. Which of the following is characteristic of an acid solution?

(a) turns litmus blue
(b) tastes bitter
(c) contains OH^- ion
(d) slippery feel
(e) pH = 3
(f) it tastes good with sugar

15. When solutions of barium hydroxide and sulfuric acid are combined, a white precipitate is formed and the electrical conductivity decreases. Which of the following statements concerning this reaction is *not* true?

(a) The white precipitate is barium sulfate
(b) Most of the hydrogen ions are used up
(c) A molecular solid is formed
(d) Water is one of the products
(e) A neutralization reaction has occurred
(f) the electrical conductivity increases

16. The pH of a solution in which the $[OH^-]$ is 1.0×10^{-4} is:

(a) −4 (b) +4 (c) +7 (d) −10 (e) +10

17. The strongest acid in the following list is the one with K_A equal to:

(a) 1.3×10^{-2}
(b) 6.7×10^{-5}
(c) 5.7×10^{-10}
(d) 4.4×10^{-7}
(e) 1.8×10^{-16}

18. Which of the following does *not* pertain to the Brønsted-Lowry theory of acids and bases?

(a) It involves the transfer of hydrogen ions
(b) It involves the transfer of hydroxide ions
(c) Water may act as an acid
(d) It may involve the use of the hydronium ion
(e) It is generally more useful than the original concepts of acids and bases
(f) who needs them?

19. Acetic acid dissociates according to the equation

$$CH_3COOH \rightleftarrows H^+(aq) + CH_3COO^-(aq)$$

If sodium acetate is added to the acid which of the following will occur?

(a) Nothing will happen
(b) The acetate ion concentration will decrease
(c) The hydrogen ion concentration will decrease
(d) A precipitate will form
(e) More acetic acid will ionize
(f) an ulcer will develop on the beaker

20. What volume of 0.04 *M* HCl is needed to completely react with 200 ml of 0.01 *M* LiOH?

(a) 100 ml
(b) 200 ml
(c) 150 ml
(d) 50 ml
(e) 500 ml
(f) yes

ANSWERS

12. B
13. ~~B~~ D
14. E
15. ~~B~~ B
16. ~~C~~
17. A
18. B
19. C

NAME Strawberry Flavored ester CLASS esters I said! DATE wouldn't SCORE 70

think High!

you be embarrassed to be seen with a fat fruity aroma ester? my mistake so sorry I should only be a

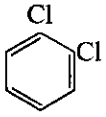
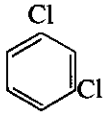
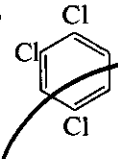
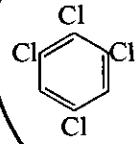
23 Organic Chemistry

Directions: Write the answers in the box at the bottom of the right-hand column. For each question, write the letter that corresponds to the correct answer.

1. Which of the following statements is *not* true of coal and coal products?
   (a) Coal gas is an important by-product in the production of coke
   (b) Hard coal is sometimes called bituminous
   (c) Peat is an early stage in the formation of coal
   (d) Coke is produced by the destructive distillation of coal
   (e) The volatile products of destructive distillation of coal are used in producing many organic compounds

2. Which of the following does *not* apply to natural gas and petroleum?
   (a) Ethane is the most abundant constituent of natural gas
   (b) Gasoline is a mixture of several hydrocarbons
   (c) Lead tetra-ethyl may improve the burning qualities of gasoline
   (d) Catalytic cracking is used to increase the yield of gasoline from crude oil
   (e) The odor of cooking gas is due to added impurities

3. Which of the following would be classed as an organic compound?
   (a) $Ca(HCO_3)_2$
   (b) CO_2
   (c) KCN
   (d) CH_3COOH
   (e) H_2CO_3

4. The formula for para-dichlorobenzene is represented by
   (a) 
   (b) 
   (c) 
   (d) 
   (e) 

5. Which of the following does *not* apply to structural formulas?
   (a) They help explain the different properties of compounds
   (b) They depend on the molecular formula of the compound
   (c) Compounds having the same molecular formula but different structures are called isomers
   (d) They are extremely important to chemists
   (e) They are easily determined

6. Which of the following does *not* apply to unsaturated hydrocarbons?
   (a) The names of compounds containing double bonds end in *-ene*
   (b) The prefix *propyl-* denotes three carbon atoms
   (c) They may exist as cyclic compounds
   (d) They are quite unreactive
   (e) The most characteristic type of reaction involving these compounds is addition

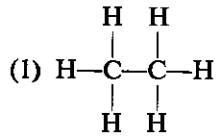
7. Which is *not* true concerning aromatic hydrocarbons?
   (a) They contain only single bonds.
   (b) Benzene is the simplest aromatic hydrocarbon
   (c) The bonding in benzene is not completely understood
   (d) A chlorine atom may be substituted for one of the hydrogen atoms in benzene
   (e) Benzene forms the basis for many important substances

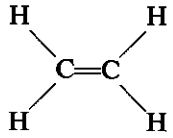
8. Which of the following statements concerning polymers is *not* true?
   (a) The properties of plastics may be controlled by the chemist
   (b) Polymerization is used to form complex molecules
   (c) A monomer is generally an unsaturated organic compound
   (d) Nylon is a derivative of polyethylene
   (e) Dacron is a condensation polymer

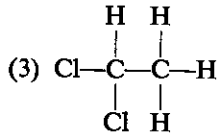
ANSWERS

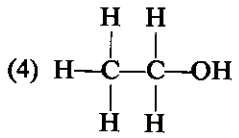
~~1.~~ free!	2. A	3. D	4. A
5. E	6. D	7. A	~~8.~~ free!

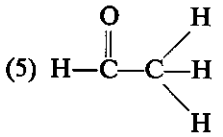
Questions 9–17 refer to the following structural formulas.

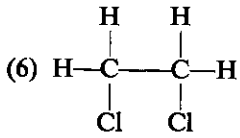
(1) 

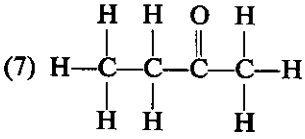
(2) 

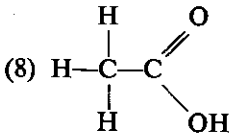
(3) 

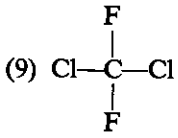
(4) 

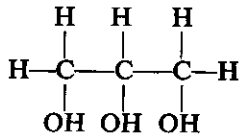
(5) 

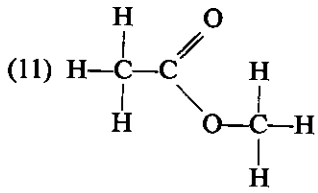
(6) 

(7) 

(8) 

(9) 

(10) 

(11) 

9. The compound represented by formula number 4 is
- **(a)** a secondary alcohol
- **(b)** acetic acid
- **(c)** methyl hydroxide
- **(d)** methyl alcohol
- **(e)** ethanol

10. The compound in formula 5 is
- **(a)** an alcohol
- **(b)** an aldehyde
- **(c)** an ether
- **(d)** a ketone
- **(e)** an acid

11. Which of the compounds may be used as a refrigerant?
(a) 6 **(b)** 10 **(c)** 9 **(d)** 8 **(e)** 7

12. Glycerol is represented by formula number
(a) 4 **(b)** 10 **(c)** 11 **(d)** 5 **(e)** 8

13. The compound containing a carboxyl group is
(a) 11 **(b)** 8 **(c)** 4 **(d)** 10 **(e)** 5

14. Formula number 3 is
- **(a)** 1,1,dichloromethane
- **(b)** 1,2,dichloroethane
- **(c)** dichloromethane
- **(d)** 1,2,dichloromethane
- **(e)** 1,1,dichloroethane

15. The formula containing the ketone functional group is number
(a) 5 **(b)** 7 **(c)** 8 **(d)** 11 **(e)** 10

16. The formula for a compound methyl acetate is represented by number
(a) 11 **(b)** 8 **(c)** 10 **(d)** 5 **(e)** 7

17. The compound produced by an addition reaction is
(a) 11 **(b)** 10 **(c)** 9 **(d)** 6 **(e)** 4

18. Which of the following statements concerning esters is *not* true?
- **(a)** They may be referred to as acid derivatives
- **(b)** They correspond to an inorganic salt
- **(c)** Sulfuric acid may be used as a catalyst in their preparation
- **(d)** They are all synthetics
- **(e)** They be used as inexpensive solvents

(E) she "streaks" under the name of ethyl

19. Which of the following is *not* a true statement?
- **(a)** Oxidation is an important reaction in forming organic compounds
- **(b)** Many organic compounds are derived from hydrocarbons
- **(c)** Carbon monoxide and water are formed when hydrocarbons are burned
- **(d)** Amines are related to ammonia
- **(e)** Amides are found in proteins

20. Which of the following statements is false?
- **(a)** Formaldehyde can be prepared by placing heated copper in methyl alcohol
- **(b)** 2-butanol is more reactive than 1-butanol
- **(c)** Cyclohexene is a saturated cyclic compound
- **(d)** Ethyl alcohol will reduce a solution of $KMnO_4$
- **(e)** There are four alcohols having the formula C_4H_9OH

Do you mean A or D

ANSWERS

9. C	10. B	11. C	12. B
13. B	14. E	15. B	16. II
17. free!	18. D	19. C	20. free!

21. Which of the following does *not* apply to saturated hydrocarbons?

(a) They contain only carbon and hydrogen
(b) They contain only single bonds
(c) Alkanes are relatively active saturated hydrocarbons
(d) Ethyl alcohol is derived from ethane
(e) Combustion is the most important simple reaction of these compounds

22. The empirical formula for a compound containing 20% hydrogen and 80% carbon is (carbon = 12)

(a) C_2H_8
(b) CH_4
(c) CH_3
(d) C_2H_2
(e) C_2H_{10}

23. If the molecular weight of the compound in problem 22 is found to be 45, its correct molecular formula is

(a) C_2H_{21}
(b) C_3H_8
(c) C_3H_9
(d) C_3H_{10}
(e) C_2H_{22}

12
12
12
.36 9/3
4

24. Which of the following is *not* true of organic compounds?

(a) Many carbon compounds contain hydrogen
(b) All compounds of carbon are classed as organic
(c) Carbon atoms may form long chains
(d) Carbon atoms have four valence electrons
(e) They may have a cyclic structure
(f) they are health nuts

25. Which of the following statements is *not* true?

(a) Proteins are polyamides formed by polymerization
(b) Amides are decomposed by acids
(c) There are many "natural" amino acids
(d) Living organisms synthesize enzymes
(e) Plants contain only one kind of protein
(f) ALL OF THEM

ANSWERS
21. C 22. C 23. C 24. B
free!

NO wait I can't let this opportunity go to waste — I pick (F). wrong as usual