1. H_2O NH_3 CO_2 CF_4 Cl_2
How many of the compounds above are **polar?**
A) 4
B) 3
C) 1
D) 2

2. Which of the following species is **non-polar**?
A) H_2S
B) CF_4
C) CO
D) HCl

3. A _____change occur when objects or substances undergo a change that does not change their chemical composition
A) physical
B) potential
C) chemical
D) mixed

4. Which reaction below is a Synthesis reaction?
A) Al + $FeCl_3$--> $AlCl_3$ + Fe
B) 2Na + Cl $_2$--> 2NaCl
C) $CH_4 + O_2$ --> $H_2O + CO_2$
D) $2H_2O$ --> $2H_2 + O_2$

Use the following to answer questions 5-9:
Identify the **major** attractive force in each of the following

5. H_2O
A) hydrogen bonding
B) dipole-dipole
C) London dispersion
D) Ionic

6. N_2
A) hydrogen bonding
B) ionic
C) dipole-dipole
D) London dispersion

7. CaO
A) ionic
B) hydrogen bonding
C) London dispersion
D) dipole-dipole

8. NF_3
A) ionic
B) hydrogen bonding
C) London dispersion
D) dipole-dipole

9. SF_6
A) London dispersion
B) hydrogen bonding
C) dipole-dipole
D) ionic

10. What type of reaction takes place here?
$\_\_ZnCl_2 + \_\_K_2S$ => $\_\_ZnS + \_\_KCl$
A) Combustion
B) Double replacement
C) Single replacement
D) Synthesis

11. Zinc reacts with oxygen to form
A) ZnO_2
B) Zn_2O
C) Zn_2O_3
D) ZnO

12. Which of the following is a **Chemical change**?
A) Melting metal
B) Grinding graphite
C) burning gasoline
D) evaporating water

13. A _____ change involves the breaking of the intramolecular bonds and the forming of new molecules
A) physical
B) potential
C) chemical
D) Mixed

14. Which of the following compounds is a product of the reaction and what type of reaction is it $CH_4 + O_2$
A) Combustion $CO_2 + H_2O$
B) Double displacement $CO_2 + H_2O$
C) Single displacement $CO_2 + H_2$
D) Synthesis CH_3OH

Use the following to answer questions 15-16:
When balanced correctly, what is the number in front of the underlined and bold substance in each case?

15. $C_3H_8(g) + \underline{\mathbf{O_2}(g)} \rightarrow CO_2(g) + H_2O(g)$
A) 10
B) 8
C) 4
D) 5

16. $Al(s) + \underline{\mathbf{Cu(NO_3)_2}(aq)} \rightarrow Al(NO_3)_3 + Cu(s)$
A) 4
B) 1
C) 5
D) 3

17. Which of the following involves a **physical change**?
A) cooking an egg
B) Combusting methane
C) boiling water
D) Decomposing meat

18. Which of the following species exhibit **hydrogen bonding**?
A) NO_3^-
B) NH_3
C) SF_4
D) HBr

19. All of the following are clues that a chemical reaction has taken place **except**
A) Gas is produced
B) The reactant is smaller.
C) A color change occurs.
D) Heat and light are produced

20. What type of reaction is the following:
aluminum oxide added to Iron (II) Phosphate →
A) Synthesis
B) Single Replacement
C) Double Replacement
D) Combustion

21. Predict the products: aluminum oxide added to Iron (II) Phosphate yields _____
A) $FeO + AlPO_4$
B) $Fe_2O + Al_2PO_4$
C) $FeO_2 + Al_3(PO_4)_2$
D) $Fe_3O + Al_3PO_4$

22. Which of these is a **chemical property**?
A) Graphite is brittle
B) Fluorine is very reactive.
C) Silver is shiny.
D) Carbon dioxide is a gas at room temperature.

23. Which of the following bonds does **not** have a dipole (polar) moment?
A) C-H
B) Cl-Cl
C) C-O
D) N-O

24. Rank from **lowest to highest** boiling point.
CH_2O CH_4 NH_3 C_2H_6
A) $CH_4 < C_2H_6 < NH_3 < CH_3O$
B) $CH_4 < C_2H_6 < CH_2O < NH_3$
C) $NH_3 < CH_3O < C_2H_6 < CH_4$
D) $C_2H_6 < CH_4 < CH_3O < NH_3$

25. CF_4 H_2O $KrCl_4$ SeF_4 HBr
How many of the compounds are **polar**?
A) 4
B) 1
C) 2
D) 3

26. Which of the following is polar?
A) Cl_2
B) NH_3
C) CH_4
D) CO_2

27. Which of the following should have the **highest** boiling point?
A) C_3H_8
B) C_5H_{12}
C) C_2H_6
D) C_4H_{10}

28. Consider the following compounds:
CO NH_3 SiO_2 F_2
Which compound has the **lowest** boiling point?
A) SiO_2
B) F_2
C) NH_3
D) CO

29. Which of the following has the **highest** melting temperature?
A) SiO_2
B) S_8
C) CaI_2
D) NH_3

30. When the following equation is balanced using the smallest possible integers, what is the number in front of the substance in bold type?
$Al + NaOH + H_2O \rightarrow NaAlO_2 + \mathbf{H_2}$
A) 4
B) 3
C) 1
D) 2

1)	D	2)	B	3)	A	4)	B	5)	A	6)	D	7)	A	8)	D
9)	A	10)	B	11)	D	12)	C	13)	C	14)	A	15)	D		
16)	D	17)	C	18)	B	19)	B	20)	C	21)	A	22)	B	23)	B
24)	B	25)	D	26)	B	27)	B	28)	B	29)	C	30)	B		