Name:_____

UBSP, Summer 2019 Chemistry-**EXAM**

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) The atomic number (Z) is the number of _____ found in the nucleus of an atom.
A) neutrons B) protons C) protons and electrons D) protons and neutrons E) electrons

2) A neutral atom's atomic number is equal to _____.
A) the sum of the number of protons and neutrons B) the number of neutrons
C) the number of electrons D) the number of nucleons

3) If a neutral element has the following chemical symbol, how many electrons does it have? $^{235}_{92}U$
A) 235 B) 82 C) 143 D) 92 E) none of the above

4) Which element has the atomic number 12?
A) Na B) Mg C) Be D) C E) B

5) Which atom is smallest?
A) Ca B) Mg C) Be D) Sr E) All are the same size.

6) The mass number is equal to
A) the sum of the number of the neutrons and electrons.
B) the sum of the number of the electrons and protons.
C) the sum of the number of protons, neutrons, and electrons.
D) the sum of the number of protons and neutrons.

7) What does "X" represent in the following symbol? $^{80}_{35}X$
A) mercury B) scandium C) bromine D) chlorine E) selenium

8) Which of the following is not a nonmetal?
A) titanium (atomic no. = 22) B) sulfur (atomic no. = 16) C) xenon (atomic no. = 54)
D) helium (atomic no. = 2) E) selenium (atomic no. = 34)

9) What element is defined by the following information?
$p^+ = 11$ $n° = 12$ $e^- = 11$
A) sodium B) titanium C) vanadium D) magnesium

10) The atomic number of an element is the number of
A) protons and electrons. B) protons.
C) protons and neutrons. D) all the particles in the atom.

11) The number of valence electrons found in an atom of a Group A element is equal to _____.
A) its mass number B) eight minus the group number
C) its atomic number D) eight E) its group number

12) In an electron-dot structure of an element, the dots are used to represent _____.
A) the electrons that the element will gain when it forms a compound
B) the complete electron arrangement
C) only the electrons that will participate in bond formation
D) all of the electrons in the atom

E) the valence electrons

13) A **neutron** walks in to a bar and orders a drink. The bartender says_____
A) For you, no charge! B) Stop being so negative! C) Thanks for being positive!

14) One element that has 5 valence electrons is _____.
A) lithium B) sulfur C) carbon D) neon E) nitrogen

15) Neon has _____ valence electrons.
A) 8 B) 4 C) 6 D) 2 E) 10

16) Which of the following provides the *minimum* amount of protection you need to block the following form of radiation?
gamma
A) lead suit B) suntan lotion C) thick leather D) T–shirt E) none of the above

17) Group IIA elements are called
A) alkali metals. B) alkaline earth metals. C) alkaline salts. D) beryllium metals.

18) The gain or loss of electrons from an atom results in the formation of a (an)
A) ion. B) metal. C) semiconductor. D) isotope.

19) What is the name of the following compound? **SF_3**
A) trifluorosulphide B) sulfur trifluoride C) fluorine sulphide
D) sulfur fluoride E) none of the above

20) Which of the following is a type II metal?
A) Ni B) Cs C) Zn D) Ca

21) Which of the following ionic compounds is named *without* using a Roman numeral?
A) CaO B) $AuCl_3$ C) CuS D) PbO

22) The correct name for the compound $NaNO_3$ is
A) sodium nitrogen trioxygen. B) sodium nitrate. C) sodium nitrite. D) sodium nitrogen trioxide.

23) What is the correct formula for magnesium chloride?
A) MgCl B) Mg_2Cl C) $MgCl_2$ D) Mg_2Cl_2

24) An atom of an element in family VIA will have what charge when it is ionized?
A) +1 B) −1 C) +2 D) −2

25) The correct name for the compound CS_2 is
A) dicarbon disulfide. B) carbon disulfite. C) carbon disulfide. D) monocarbon trisulfide.

26) What is the formula for the compound aluminum bromide?
A) $AlBr_2$ B)$AlBr_3$ C) Al_2Br_3 D) Al_3Br

27) What is the chemical name of $Pb_3(PO_4)_4$?
A) lead (IV) phosphate B) lead(III) phosphate
C) lead phosphate D) lead triphosphide

28) BONUS: Besides ammonium, most polyatomic aions are?
A) negative B) misundertood C) neutral D) complicated

29) The correct name for $CaCO_3$ is
A) calcium monocarbonate. B) calcium carbon trioxide.

C) calcium carbonate. D) calcium(II) carbonate.

30) The correct name for the ionic compound $KClO_3$ is _____.
A) potassium chloride B) potassium chlorate
C) potassium chlorine oxide D) potassium chlorite

31) What is the correct name for the following compound, $(NH_4)_3PO_4$?
A) ammonium phosphate B) triammonium phosphate
C) nitrogen tetrahydride phosphorous D) ammonium phosphide

32) The correct name for the compound N_2O_4 is _____.
A) nitrogen oxide B) nitrogen (IV) oxide
C) nitrooxide D) dinitrogen tetroxide

33) Which of the following compounds has a name which contains the prefix di-?
A) SO_2 B) NBr_3 C) $Al(NO_3)_3$ D) K_2S

34) Which of the following is an example of a physical change?
A) charcoal being converted into ash
B) iron metal reacting with oxygen to form rust
C) water boiling and being converted into steam

35) What is the correct name for Cl_2O_7?
A) chlorine oxide B) dichlorine heptoxide
C) chloric acid D) dichloride oxide

36) The chemical formula for heptasulfur dioxide is _____.
A) S_7O_2 B) O_2S C) S_2O_7 D) SO_2

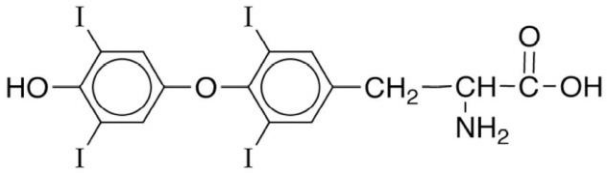
37) What is the name of the following compound? **$CaCl_2$**
A) calcium chloride B) dicalcium chloride C) dichlorocalcium
D) calc two E) carbon chloride

38) What is the name of the following compound? **NaF**
A) sodium fluoride B) sodium phosphide C) natural fosfate
D) natrium fluoride E) nitrogen afleck

39) Is it at all possible for a hydrogen nucleus to emit an alpha particle?
A) yes, but it does not occur very frequently
B) no, because it would require the nuclear fission of hydrogen, which is impossible
C) no, because it does not contain enough nucleons
D) yes, because alpha particles are the simplest form of radiation

40) BONUS– The formula of tin(I) chromate is
A) $Sn(CrO_4)_2$ B) Sn_2CrO_4 C) $SnCrO_4$ D) $Sn_2(CrO_4)_2$

41. BONUS-What functional group is *not* present in the following structure for thyroxine (thyroid hormone)?



A) amide B) carboxylic acid C) etherD) organic halide E) phenol

YOU MUST SHOW YOUR WORK FOR THE FOLLOWING PROBLEMS TO RECEIVE CREDIT

1) List three examples of where the types of nuclear decay are used in helpful ways.

2) Please complete the following table:

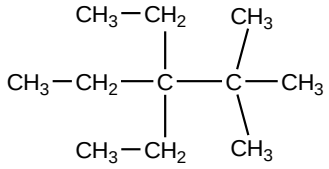
Atomic Notation	Atomic Number	Mass Number	Number of p^+	Number of n^o	Number of e^-
			8	**10**	
				74	**53**

3) Write the structure or name of the following organic compounds

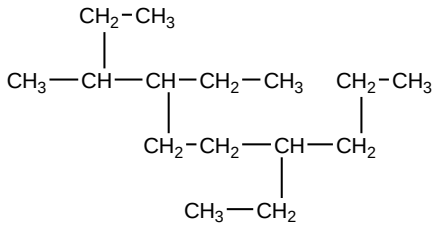
B) 4-propylheptane

C) 3-ethyl-2,3,6,7-tetramethylnonane

D)



E)



4) Write the equation for the alpha decay for these two elements

A) ^{209}At → B) ^{237}U →

5) Write the equation for the beta decay for these two elements

A) ^{140}Ba → B) ^{60}Co →

Solve the following half-life problems

6) A radioactive element has a half-life of 20 days. How much of a 16mg sample would be left after 80 days?

7. Carbon-14 has a half-life of 37530 years. If an original sample was 100mg and it is now 0.781 mg of C-14, how old is your sample?

8. In a few sentences, explain how a nuclear power plant works

9. Write the Lewis Dot Structures, LDS, for the following compounds and state their polarity

	Electron dot structures	**Molecular Shape**	**Polar (P) or nonpolar (NP)**
CH_3Cl			
C_2H_6			
CS_2			
OF_2			

10. Name or give the formula for the following:

A). Titanium (IV) bicarbonate_____

B). Lead (II) phosphite _____

C). Lithium nitride _____

11. Bonus - Match the name of the functional group with its structure (not all will be used, those that are used are used only once). Write the number of the structure on the right next to the name on the left.

a) aldehyde _____

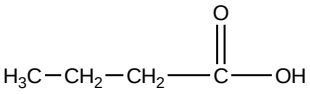
b) carboxylic acid _____

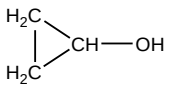
c) amine _____

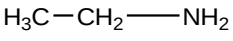
d) organic halide _____

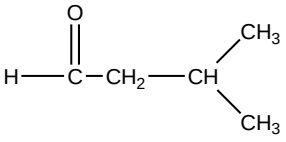
e) ester _____

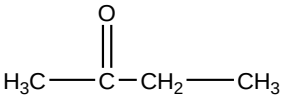
f) ketone _____

1) 

2) 

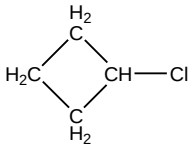
3) 

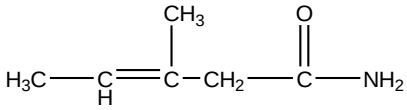
4) 

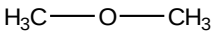
5) 

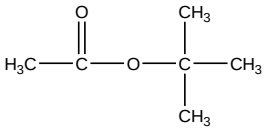
g) alcohol _____

h) ether _____

6) 

7) 

8) 

9) 

Prefixes

mono = 1
di = 2
tri = 3
tetra = 4
penta = 5
hexa = 6
hepta = 7
octa = 8
nona = 9
deca = 10

NH_4^+	ammonium
H_3O^+	hydronium
$C_2H_3O_2^-$	acetate
CO_3^{2-}	carbonate
CrO_4^{2-}	chromate
CN^-	cyanide
HCO_3^-	hydrogen carbonate / bicarbonate
HPO_4^{2-}	hydrogen phosphate / biphosphate
HSO_4^-	hydrogen sulfate / bisulfate
HSO_3^-	hydrogen sulfite / bisulfite
OH^-	hydroxide
NO_3^-	nitrate
NO_2^-	nitrite
MnO_4^-	permanganate
PO_4^{3-}	phosphate
PO_3^{3-}	phosphite
SO_4^{2-}	sulfate
SO_3^{2-}	sulfite
BrO^-	hypobromite
BrO_2^-	bromite
BrO_3^-	bromate
BrO_4^-	perbromate
ClO^-	hypochlorite
ClO_2^-	chlorite
ClO_3^-	chlorate
ClO_4^-	perchlorate
IO^-	hypoiodite
IO_3^-	iodate
IO_2^-	iodite
IO_4^-	periodate
O_2^{2-}	peroxide

Name	Formula	Name	Formula
Methane	CH_4	Hexane	$CH_3CH_2CH_2CH_2CH_2CH_3$
Ethane	CH_3CH_3	Heptane	$CH_3CH_2CH_2CH_2CH_2CH_2CH_3$
Propane	$CH_3CH_2CH_3$	Octane	$CH_3CH_2CH_2CH_2CH_2CH_2CH_2CH_3$
Butane	$CH_3CH_2CH_2CH_3$	Nonane	$CH_3CH_2CH_2CH_2CH_2CH_2CH_2CH_2CH_3$
Pentane	$CH_3CH_2CH_2CH_2CH_3$	Decane	$CH_3CH_2CH_2CH_2CH_2CH_2CH_2CH_2CH_2CH_3$