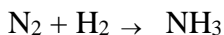


Part A: Multiple Choice (30 marks)

Write the letter of the choice that best answers the following questions in the appropriate blank on your answer sheet.

(1) The coefficients are missing from the following reaction equation:



The order of the missing coefficients is _____.

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

(2) How many moles of oxygen is present in 32 g of oxygen gas?

- (a) 1.0 moles
(c) 3.0 moles
- (b) 2.0 moles
(d) 4.0 moles

(3) What is the percent by volume of 400 mL of a solution that contains 80mL of calcium chloride, CaCl_2 ?

- (a) 10%
(c) 30%
- (b) 20%
(d) 40%

(4) What is the molarity of 500 mL of solution in which 5.0 moles of sodium bromide is dissolved?

- (a) 0.25M
(c) 5.0 M
- (b) 2.5 M
(d) 10M

(5) A solution that has the maximum solute dissolved in the solvent is called

- (a) concentrated
(c) limiting reagent
- (b) dilute
(d) saturated

(6) The mass of one mole of magnesium hydroxide is:

- (a) 58.33 g/mol
(c) 40.31 g/mol
- (b) 41.32 g/mol
(d) 42.33 g/mol

(7) Which gas sample will occupy the most volume at STP?

- (a) 2.0 mol of NH_3
(c) 3.0 mol of H_2
- (b) 4.0 mol of O_2
(d) 1.0 mol of CO_2

(8) 10.0g of a metallic element are found to contain 0.435 mol of that element. Which metal must it be?

- (a) Ca
(c) Mg
- (b) K
(d) Na

(9) How many moles of CaBr_2 are there in 5.0 grams of CaBr_2 ?

- (a) 2.5×10^{-2} mol
(c) 4.0×10^1 mol
- (b) 4.2×10^{-2} mol
(d) 1.0×10^1 mol

(10) The mass of 0.250 mol of chromium (II) sulfate is:

- (a) 34.02g
(c) 50.02g
- (b) 21.02g
(d) 37.02g

(11) What are ionic bonds?

- (a) the sharing of electrons between two nuclei
(b) bonds between metal atoms and non-metal atoms
(c) a cloud of electrons surrounding many nuclei
(d) the attraction of positive ions to negative ions

(12) Which of the following will have the HIGHEST boiling point?

- (a) NH_3
(c) SiC_2
- (b) C_2H_2
(d) NaCl

(13) Which of the following will have the HIGHEST boiling point?

- (a) C₅H₈ (b) C₂H₂
(c) C₃H₆ (d) C₁₀H₂₂

(14) Which of the following is the correct electron dot diagram for nitrogen?

- (a) $\begin{array}{c} \cdot\cdot \\ N : \end{array}$ (b) $\begin{array}{c} \cdot\cdot \\ \cdot N \cdot \\ \cdot \\ \cdot \end{array}$
(c) $\begin{array}{c} \cdot\cdot \\ N : \\ \cdot \end{array}$ (d) $\begin{array}{c} \cdot\cdot \\ \cdot N \cdot \\ \cdot \\ \cdot \end{array}$

(15) Which of the following elements will conduct electricity?

- (a) Chlorine (b) Germanium
(c) Krypton (d) Silicon

(16) The correct formula for sulphurous acid is _____.

- (a) H₂SO₄ (b) H₂SO₃
(c) H₂SO₂ (d) H₂S

(17) How many electrons are in O²⁻ ions?

- (a) 6 (b) 8
(c) 10 (d) 12

(18) What is NOT a property of a molecular compound?

- (a) Crystalline solid at room temperature
(b) Low melting point
(c) Low solubility in water
(d) No electrical conductivity

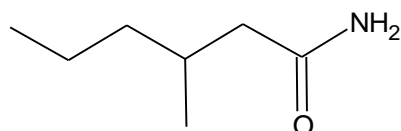
(19) Which of the following does NOT have hydrogen bonding?

- (a) HF (b) CH₄
(c) H₂O (d) NH₃

(20) Which of the following temperatures is most likely the melting point of NaCl?

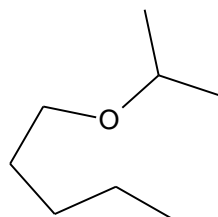
- (a) -100 C^o (b) 25 C^o
(c) 200 C^o (d) 750 C^o

(21) Name the following molecule



- (a) 3 - methylhexanamide (b) 4 - methylhexanamide
(c) hexanamide (d) 3 - methylhexanamine

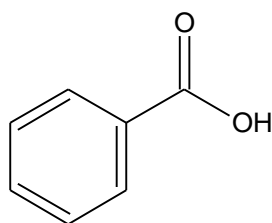
(22) Name the following molecule



- (a) Isopropyl pentanoate (b) Isopropyl pentyl ether
(c) 2 - methyl - 3 octanol (d) Pentyl propyl ether

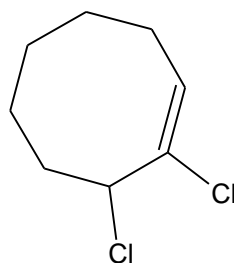
Name: _____

(23) Name the following molecule



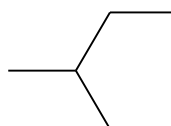
- (a) 1-carboxylic benene
(b) Benzene acid
(c) Benzahol
(d) Benzoic acid

(24) Name the following molecule



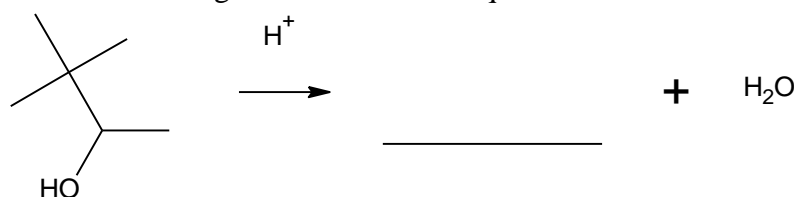
- (a) 1,8 - dichlorocyclooctene
(b) 2,3 - dichlorocyclooctene
(c) 1,2 - dichlorocyclooctene
(d) 1,2 - dichloro-2-cyclooctene

(25) Which of the following is NOT a product of the reaction between the molecule to the right and bromine?



- (a) 1 - bromo - 3 - methylbutane
(b) 1 - bromo - 2 - methylbutane
(c) 4 - bromo - 2 - methylbutane
(d) 2 - bromo - 2 - methylbutane

Use the following reaction to answer questions 26-29



(26) What is the missing product for the reaction above?

- (a) 
- (b) 
- (c) 
- (d) 

(27) What is the name of the reactant above?

- (a) 2,2 - dimethyl - 3 - butanol
(b) 2,2 - dimethyl - 3 - butanal
(c) 3,3 - dimethyl - 2- butanol
(d) methyl isopropyl ether

(28) What type of reaction is the reaction above?

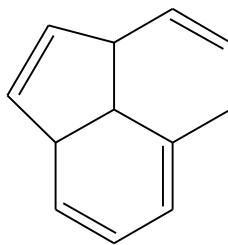
- (a) Addition
(b) Combustion
(c) Elimination
(d) Substitution

(29) What does the H⁺ represent?

- (a) Adding hydrogen
(b) In acidic media
(c) In basic media
(d) Losing Hydrogen

Name: _____

(30) How many units of unsaturation are there in the following molecule?



- (a) 5
(c) 7

- (b) 6
(d) 8

Part B: Constructed Response (70 marks)

Answer all of the following questions in the space provided. Question values are given in parenthesis.

(1) Complete the following table. Please ensure you write ALL isotope information required in the symbol section. (9)

Symbol	# protons	# electrons	#neutrons
^{235}U		90	
	11	10	15
$2-$	66		102
$^{75} 3-$	39		

(2) Draw electron dot diagrams, stick diagrams and state the shape around each central atom for the following molecules (6)

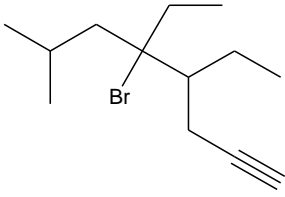
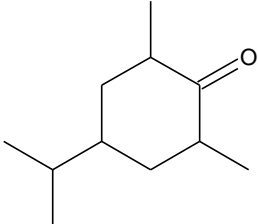
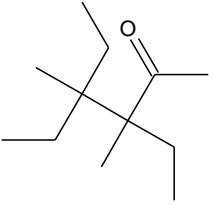
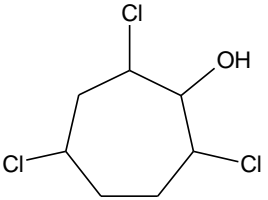
(a) OBr_2

(b) FCN

(c) C_2F_4

Name: _____

(3) Name the following molecules (4)

Structure	Name
	
	
	
	

(4) What type of bonding is present in each of the following compounds? (3)

(a) CaS

(b) Al

(c) PH₃

(d) SiO₂

(e) NH₄Br

(f) ZnCu

(5) Write electron configurations for the following atoms (3)

(a) Be

(b) In

(c) Ca

Name: _____

(5) For each of the following pairs of molecules, use intermolecular forces to decide which will have the HIGHER boiling point. EXPLAIN YOUR CHOICE!! (6)

(a) C_3H_8 and CH_3Cl

(b) C_3H_6OH and C_4H_9F

(6) Complete five (5) of the following seven (7) reactions by identifying reaction type, and predicting products. (10)

(a) 2-chloropropane + Cl_2 Reaction Type: _____

(b) 2-bromo-3,3-dimethylpentane in base Reaction Type: _____

(c) 2,3-dimethylcyclohexene + water Reaction Type: _____

(d) o-diisopropylbenzene + oxygen
(balance this reaction) Reaction Type: _____

Name: _____

(e) heptanoic acid + 1-butanol

Reaction Type: _____

(f) 3-pentanol in acid

Reaction Type: _____

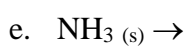
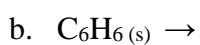
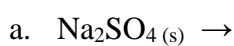
(g) 1-chlorobenzene + iodine

Reaction Type: _____

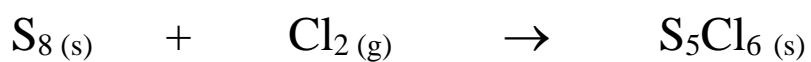
(7) What is the percent composition of diethyl ether? (4)

(8) Stephanie is trying to find out the concentration of Lead in the lake near here home. She conducts an experiment and finds that the concentration is 205 ppm. What is the concentration of lead ions in her lake in moles per litre (Molarity)? (6)

(9) Write dissociation equations for each of the following compounds (5)



(10) Use the following reaction that occurs at STP to answer the following question:



What mass of pentasulphur hexachloride is produced if 25.5 L of chlorine gas reacts with 200.0 g of sulphur? (8)

(11) Find the formula of a compound that is 27.2% N, 3.9% H and 68.9% Cl if the compound has a molar mass of 154.44 g/mol (6)

Name: _____

Multiple Choice Answer Sheet

Name: _____

1	_____	21	_____	41	_____
2	_____	22	_____	42	_____
3	_____	23	_____	43	_____
4	_____	24	_____	44	_____
5	_____	25	_____	45	_____
6	_____	26	_____	46	_____
7	_____	27	_____	47	_____
8	_____	28	_____	48	_____
9	_____	29	_____	49	_____
10	_____	30	_____	50	_____
11	_____	31	_____		
12	_____	32	_____		
13	_____	33	_____		
14	_____	34	_____		
15	_____	35	_____		
16	_____	36	_____		
17	_____	37	_____		
18	_____	38	_____		
19	_____	39	_____		
20	_____	40	_____		