Kafrelsheikh University
Faculty of Science
Chemistry Department

Phase rule & kinetic theory of gases (Ch 205)
Second level (Chem.) First Term 2018/20172h-
Total Marks = 70-11-1-2018

Part I-Kinetic Theory of gases (35 Marks)

I-Choose the right answer from the following (each 2Marks):

1) The K.E. of O_2 molecules (M =32) at a particular temperature is 0.035 eV. The average l K.E. of N_2 Molecules (M = 28) at the same temperature is

(a) 0.028 eV (b) 0.055 eV (c) 0.035 eV (d) 0.075 eV

2) At a certain temperature, hydrogen molecules have r.m.s. velocity of 3 km/s. what is the r.m.s velocity of the oxygen molecules at the same temperature?

(a) 0.25 km/s (b) 0.5 km/s (c) 0.75 km/s (d) 6 km/s

3) What is the true for 3 moles of a gas?

(a) $3(C_P - C_V) = R$ (b) $C_P - C_V = 3R$ (c) $C_P - C_V = R$ (d) $C_P - 3C_V = R$

4) PV/3 = RT, then V represents volume of

(a) Any amount of gas (b) 2 moles of gas (c) 3 moles of gas (d) 4 moles of gas

5) The internal energy of one mole of an ideal gas depend upon

(a) Type of gas (c) Nature of gas (d) Density of gas d) none of these

6) A gas has pressure P. the kinetic energy of one mole per unit volume is K.E. which is correct

a) P = K.E (b)P = K.E/2 (c) P = 2/3K.E (d) P = 3/2K.E

7) According to kinetic theory of gasses at absolute zero temperature

(a) Water freezes (b) Helium freezes (c) Molecules motion stops d) none of them

8) A gas at a pressure P in a vessel. If the masses of all the molecules are halved and their velocities doubled, the resulting pressure P would be equal

(a) 4P (b) 2P (c) P d) P/2

9) The process of changing pressure with volume at constant temperature is

(a) Isochoric (b) Isothermal (c) Isobaric d) none of them

10) Which of the following properties of gas molecule the one that is same for all ideal gases at a particular temperature is

(a) Mass (b) Velocity (c) Momentum (d) Kinetic energy

11) The velocity of the molecules of an ideal gas is 100 m/s at a temperature of 100K. at what temperature is velocity will be doubted?

(a)200K (b)400K (c)300K (d) 50 K

II-Complete the following:

13) Calculate the mean-free path for a gas with diameter is 10×10^{-10} cm and the number density is 2×10^{30} molecules/m^3 (3 Marks)

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14) The quantum theory explained the variation of molar specific heat of gas molecules with temperature as follow (draw the representation only): (3 Marks)

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15) The mean free path depends on: (3 Marks)

1) ..... 2) .....

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3) ..... 4) .....

....

5) ..... 6) .....

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16) What is the energy transferred by heat to 10 moles of helium at constant pressure to raise the temperature from 30 to 50 °C? (For helium C_P = 20.8 J/mol·K) (4 Marks)

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Part B (Phase rule)

Question I- Choose the correct answer from the following: **(20 Marks)**

1. For a two component system in a single phase, the degree of freedom is (*a*) 0 (*b*) 1 (*c*) 2 (*d*) 3

2. A saturated solution of NaCl has one degree of freedom. It is
(*a*) monovariant (*b*) non-variant (*c*) bi-variant (*d*) none of these

3. For a bivariant system, the degrees of freedom are (*a*) 1 (*b*) 2 (*c*) 3 (*d*) 4

4. Which one of the following is not a heterogenous system?
(*a*) $CaCO_3(s) \leftrightarrow CaO(s) + CO_2(g)$ (*b*) Water vapour ↔ Water (*c*) $NH_4Cl(s) \leftrightarrow NH_3(g) + HCl(g)$ (*d*) $H_2 + I_2 \leftrightarrow 2HI$

5. For one component system, there does not exist a quadruple point as the number of degrees of freedom cannot be
(*a*) zero (*b*) –1 (*c*) 1 (*d*) 2

6. A dilatometer is an apparatus used to measure
(*a*) transition temperature (*b*) triple point (*c*) eutectic point (*d*) all of these

7. The transition temperature of a substance is that temperature at which
(*a*) one enantiomer changes into another enantiomer (*b*) one allotropic form changes to another
(*c*) all the three phases (solid, liquid and gas) can co-exist in equilibrium (*d*) none of the above

8. For a three phase system with one component, the degree of freedom according to phase rule is
(*a*) 0 (*b*) 1 (*c*) 2 (*d*) 3

9. A piece of molten ice is placed in a beaker covered with a water glass. How many phases are present in the system? (*a*) 0 (*b*) 1 (*c*) 2 (*d*) 3

10. The number of components in a solution of common salt is (*a*) 0 (*b*) 1 (*c*) 2 (*d*) 3

11. The decomposition of NH_4Cl is represented by the equation

$$NH_4Cl(s) \leftrightarrow NH_3(g) + HCl(g)$$

The number of components present in the system is (*a*) 0 (*b*) 1 (*c*) 2 (*d*) 3

12. The number of components present in the following systems
(*i*) Water ↔ Water vapour (*ii*) KCl + Water ↔ KCl hydrate
(*a*) 1 and 1 (*b*) 1 and 2 (*c*) 2 and 1 (*d*) 2 and 3

13. The total number of variable factors which must be specified so that the remaining variables are fixed automatically and the system is completely defined. It is known as
(*a*) a phase (*b*) a component (*c*) degrees of freedom (*d*) none of these

14. On a two component solid-liquid phase diagram, a tie line indicates which of the following?
(a) A region where the temperature is constant (b) A region where the composition is constant
(c) An area below which only the solid phase exists (d) An area above which only the liquid phase exists

15. Above the following line, liquid phase exist for all compositions in a phase diagram.
(a) Tie-line (b) Solvus (c) Solidus (d) Liquidus

16. The boundary line between (liquid) and (liquid+solid) regions must be part of _____.
(a) Solvus (b) Solidus (c) Liquidus (d) Tie-line

17. The boundary line between (liquid+solid) and (solid) regions must be part of _____.
(a) Solvus (b) Solidus (c) Liquidus (d) Tie-line

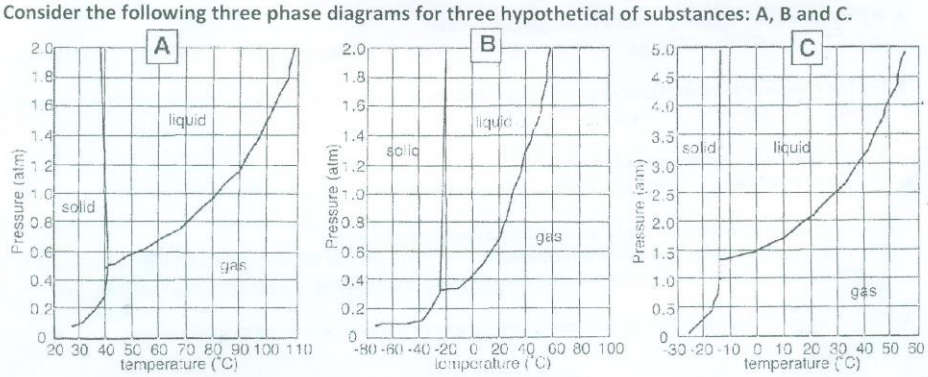
18. Relative amounts of phases in a region can be deduced using
(a) Phase rule (b) Lever rule (c) Either (d) None

19. Line joining liquid phase with liquid and solid phase mixture is known as :
(a) Liquidus (b) Solidus (c) Tie line (d) None of the mentioned

20. Line joining solid phase with liquid and solid phase mixture is known as:
(a) Liquidus (b) Solidus c) Tie line d) None of the mentioned

Question II: **(15 Marks)**

Consider the following three phase diagrams for three hypothetical of substances: A, B and C.



A- What is the stable state(s) [solid (*s*), liquid (*l*) or gas(*g*)] for substance **A** at room conditions (1.0 atm & 25°C)? ---------.for **B**----------. And for **C**----------.

B- At 1.6 atm and 50°C, what is/are the stable state(s) for **A**?----------,for **B**?----------and for **C**?----------.

C- At 1.0 atm what are the melting point(m.p.),boiling point(b.p.) and sublimation point(s.p.) for each of the three substances? (use "NA" for not applicable).

A			B			C		
m.p.	**b.p.**	**s.p.**	**m.p.**	**b.p.**	**s.p.**	**m.p.**	**b.p.**	**s.p.**

D- As pressure increases, what happens [increase(↑) , decrease(↓) or stable (—)] to the b.p. of A------, of B?------ and of C?----------.

E- As pressure increases, what happens [(↑), (↓) or (—)] to the melting point of A-----of B?------and of C?-------.

F- At 50°C, what pressure is required to condense gaseous A into a liquid?-----, B into a liquid?----,and of C?------.

G- Some solid A is at 0.6 atm & 40°C. What would happen (melt, boil, freeze.....?) if the pressure were increased? ----------.if the pressure were decreased?--------- .

H- Some liquid B is at 0.4 atm & -20°C. What would happen (melt, boil, freeze.....?) if the pressure were increased? ----------. if the pressure were decreased?------ .

I- According to the graphs above, arrange the density of the three substances and give reason(s).

Kafrelsheikh University Faculty of Science Chemistry Department Second level (Chem.) Summer Term		Time: 2h Subject: Reaction Mechanism 1 (Ch 341) Total Marks: 100 (70 Written. 10 Oral, 20 Exercises) Date: 27/12 /2017 Exam in three pages (Double Face)

+ USE A PEN, NOT A PENCIL.

+ QUESTIONS WILL BE GRADED ON BOTH HOW CORRECT AND HOW COMPLETE YOUR ANSWER IS.

Answer the following questions (total marks 70)

Question1 (22 Marks)

I. **Explain the type of hybridization of carbon atom in the functional group with drawing the expected orbitals shapes:- (9 Marks)**

Structure	Electronic distribution	Type of Hybridization	Orbital shapes, Bond angel
i) Cyclopentene			
ii) Methylamine			
iii) acetaldehyde			

II. **Which of the following molecules and ions are Electrophiles? Why? (4 Marks)**

A	B	C	D	E	F	G	H
CH_4	H_2O	$CH{\equiv}C^-$	$H_2C{=}CH_2$	BF_3	$NO_2^{(+)}$	NH_3	$Cl^{(+)}$

III. **Arrange the following bases in order of decreasing acidity or basicity, explain your answer (9 Marks)**

a) **3-Chloroprpionic acid, propionic acid, triflouroacetic acid, flouroacetic acid.**

Arrangement is:

.....

Because of

b) **Aniline, Pyridine, Pyrrol, Dimethyl amine, Trimethyl amine.**

Arrangement is:

.....

Because of

c) **Phenol, *o*-nitrophenol, 2,4-Dinitrophenol, *o*-cresol, Picric acid, methanol.**

d) **Arrangement is:**

e) .....

f) **Because of**

g)

Question 2 (25 Marks)

i) **Explain Why?? (9 Marks)**

- **Benzene is more stable than the hypothetical 1,3,5-cyclohexatriene**

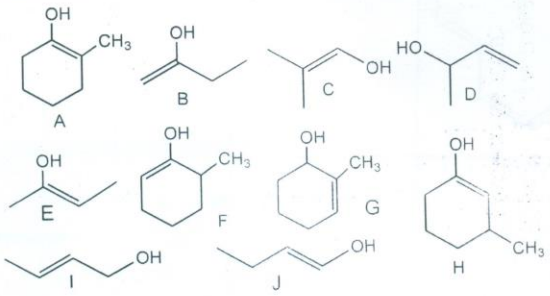
  Because of

- **Nitration of chlorobenzene gives a mixture of two products?**

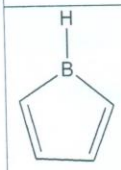
  Because of

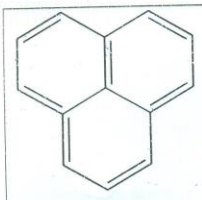
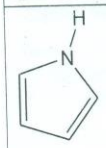
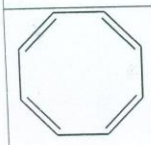
- **Liquid water is denser than solid water?**
- **Because of**

ii) Which of the next compounds A through K are enol tautomers of 2-butanone? Explain your answer (4 Marks)



iii) Which compound is aromatic, non-aromatic and anti-aromatic explain the reasons:- (12 Marks)

Compounds	Aromatic Because	Anti-aromatic Because	Non-aromatic Because
			
			

Question 3 (23 Marks)

i) Choose the correct answer (12 Marks)

i) Which of those molecules has NOT net dipole: **(WHY)**

a) BHF_2 **b)** HCl_3C **c)** H_2O **d)** CO_2

Because .....

ii) In which compound interamolecular hydrogen bonding is possible: **(WHY)**

a) Ethyl alcohol **b)** m-nitrophenol c) o- nitrophenol

d) All of these

Because

iii) Which compound has maximum boiling point? **(WHY)**

a) Benzene **b)** Ethylene **c)** Propanaldehyde **d)** Acetone

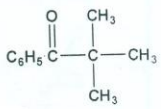
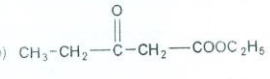
Because

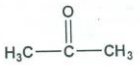
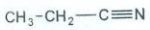
iv) Which cation is more stable and **why**?

a)  **b)** 

Because

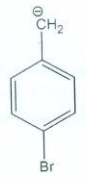
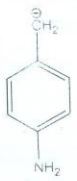
v) Which one of the following compounds will show maximum tautomerism, **Why**?

(a)  (b) 

(c)  (d) 

Because

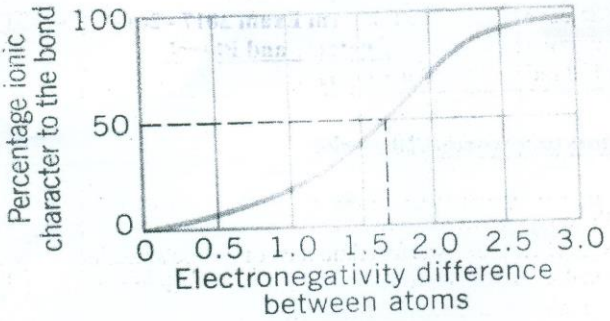
vi) Which carbocarbanion is the most stable, why?

a)  c)  b)  d) 

Because

ii) Using the percentage of polarity curve and Δ EN value of each atom Identify the type of bonds of each of the following bonds: (EN values Mg: 1.3, O: 3.5, C: 2.5, H: 2.1, N:

3.0, Cl: 3.0 **(6 Marks)**



Molecule	Δ EN difference	% of polarity	Type of bonds
Mg-O			
O-F			
N-Cl			

iii) Explain Type of bonds and attraction forces found in each of the following compounds **(5 Marks)**

Molecule	Types of bonds & possible attraction forces	Attraction forces shapes
i) Hydrogen bromide		
ii) Solution of sodium acetate in water		

The End of exam مع أطيب أمنياتي بالنجاح والتفوق

المستوى الثانى الفترة المسائية الاثنين ١٨/ ١/ ٢٠١٨ (ك.كيمياء)

Kafrelsheikh University
Faculty of Science
Level: 2nd year
Solid State Chemistry (C210)

Date: 18. 1. 2018
Time allowed: 2 H
Full Mark: 70 Mark
Final Exam.

Answer the following questions.

Question number (I) complete the following: (40 marks)

1- Most metals and alkali halides.....easily upon cooling through the freezing temperature. Because the structural .....from the liquid to the crystalline state is .....and bonding is non .....

2- CaF_2 are adopt as .....structure with cubic unit cell, where a=.....and Z=.....

3- The structure of glass named....., which is very similar to the structure of.....

4- The color of rubies is thus totally dependent upon ..... defects.

5- In triclinic system, the axial relationships are ..... and .....

6- For large organic and polymeric liquids, crystallization is difficult because of their.....

7- The position of an atom at the center of c-axis is specified as .....where the atom at the center of face lie between a- and c-axis is specified as .....

8- When determine the number of atoms in a unit cell, an atom in a center of face counts as.....atom.

9- Addition of Na_2O to silica glass named network ....., with increase in the amount of Na_2O the average number of O-Si bonds.....The principal effect of Na_2O is to lower .....and..... temperature.

10- When a liquid of pure metal is cooled to below its freezing point, it usually changes to.....

11- Addition of ions of transition metals to glass give color due to electronic excitation in.....

12- Point defects that form in a crystal exposed to radioactivity are called.....where addition of impurity by certain percent are called .....

13- The viscosity of liquids is a measure of their ..... to flow.

14- T_g transition point, the temperature at which a super cooled liquid change to.....

15- In hexagonal system, the axial relationships are .....and .....

16- Defects play an important part in both the..... and.....behavior of solids.

17- All glasses are immune to oxidation because their atoms are fully .....

18- Polycrystalline glass, is commonly produced by adding ..... to the glass batch

19- Glass is normally colorless due to the fact that all electrons are.....

20- On glass formation fast cooling for liquid phase, the value of T_g is.....

21- Inorganic silicates form glasses upon cooling this is related to.....and.....

22- A metal atom X on an M site in a crystal MY would be written..... while M_i means .....

23- The 7 crystal systems are named according to the relationship between ..... and the.....

Question number (II): (25 marks)

a) Compare in table between the **Face-centered cubic** structure and **halite** structure (unit cell, lattice parameter and atom position) with **draw**.

b) Write short notes on TiO_2 structure (unit cell, lattice parameter and atom position) with draw.

c) Write short notes on **n-type** and **p-type** semiconductors.

d) A metal difluoride, MF_2, adopts the tetragonal Rutile structure, with lattice parameters a= 0.4621 nm, c=0.3052 nm and density=3148 kg m^{-3}. The molar mass of fluorine=18.998 g mol· Estimate the molar mass of the metal. (N_A=6.02214 × 10^{23} mol^{-1}).

Question number (III): Define the following terms: (5 marks)

a) Annealing of glass b) Volume defects. C) Crystals.

With all my best wishes
Dr. Aly Nassar

(المستوى الثانى الفترة المسائية الإثنين ٢٠١٨/١١/١٥)

Kafrelsheikh University **Faculty of Science**		**Level: Two** **Program: Chemistry**
Time allowed: 2 hours	**1st Term (2017/2018)**	**Analytical Chemistry**

Answer the following questions:

First question

a) Give full account on the theories of acids and basis.

b) A solution is prepared by mixing 0.10 L of 0.12 M sodium chloride with 0.23 L of a 0.18 M magnesium chloride solution. What volume of a 0.20 M silver nitrate solution is required to precipitate all of the chloride ion as silver chloride?

(20 marks)

Second question

a) Compare between Volhard and Fajan methods for the determination of chloride ion in its solutions.

b) 100.0 mL of a waste water solution is diluted to 250.0 mL and titrated with 0.1106 M NaOH. Equivalence is reached after addition of 9.62 mL of the sodium hydroxide solution. What is the pH of the original waste water solution?

(20 marks)

Third question

a) Write short notes on the stability of metal complexes, mentioning the factors affecting stability constant.

b) Determine which salt ($CaCO_3$ or Ag_2CO_3) is more soluble in water in units of mol L^{-1}? [$CaCO_3$: $K_{sp} = 2.8 \times 10^{-9}$ & Ag_2CO_3: $K_{sp} = 8.1 \times 10^{-12}$]

(15 marks)

Fourth question

a) Give the reason for:

(1) Ammonia buffer should be used in all EDTA titrations.

(2) In Volhard's method for determination of Cl^- ion, primary precipitate of AgCl should be treated before preceding the experiment.

b) Define the common ion effect. What will be observed if a few drops of NaCl solution are added to the following clear solution? Explain your answer.

$$CaF_2(s) \text{ <=====> } Ca^{2+}(aq) + 2F^-(aq)$$

(15 marks)

Best wishes…

Kafr El-Sheikh University
Faculty of Science
Chemistry Department
Second Year of Chemistry and others
Final exam

Date: 4/1/2018
Time of exam: 2 hours
Chemistry of the main grou elements
Score: 70

Write your answer in the answer sheet

Question No.I: Choose the number of the more correct answer (30 درجة)

1 – The electronic configuration of the outermost energy levels of group IIIA elements may be represented as: a) ns^2np^2 b) ns^1np^2 c) ns^2np^1 d) ns^2np^3

2 - The s-block elements mostly form: a) ionic compounds b) Covalent compounds
c) Coordination d) All of the above

3- The existence of one element in different forms, having different physical properties, but similar chemical properties is known as: a) Isotopes b) Isomerism
c) Allotropy d) Isobars

4 - The 'p' block elements enter into chemical combinations by:
a) Gaining or sharing the valence electrons b) gaining the valence electrons
c) Sharing the valence electrons d) Losing the valence electrons

5 - The tendency of an element in its atomic form to release electrons is known as:
a) The electronegative character b) The electropositive character
c) The electron affinity d) none of the above

6- In the same period as the atomic radius decreases the Electronegativity increases and consequently the metallic character: a) Increases b) Decreases
c) Almost the same d) slightly increases

7 - Alkali metals form cations readily by losing the valence electrons due to their:
a) Low ionization energies b) large atomic sizes c) Low density d) a and b

8- The atomic and ionic radii of alkaline Earth metals are smaller than the corresponding members of the alkali metals due to the fact of Group 2 elements having:
a) A lower nuclear charge b) a higher nuclear charge
c) Higher ionization potential d) higher electron affinity

9- The most abundant isotope of hydrogen is: a) protium b) deuterium c) tritium
d) Nascent hydrogen

10- The basic strength of the oxides of the group IIIA elements follows the order:
a) $B_2O_3 < Al_2O_3 < Ga_2O_3 < In_2O_3 < Tl_2O_3$ b) $B_2O_3 < Al_2O_3 \geq Ga_2O_3 < In_2O_3 < Tl_2O_3$
c) $B_2O_3 > Al_2O_3 > Ga_2O_3 > In_2O_3 > Tl_2O_3$ d) $B_2O_3 < Al_2O_3 < Ga_2O_3 \geq In_2O_3 < Tl_2O_3$

11- The trihalides of group 13 elements are: a) strong Lewis acids
a) Inorganic Lewis base c) weak Lewis acids d) weak Lewis base

12- The electronic configuration in the valence shells of the carbon family elements is:
a) ns^1np^3 b) ns^2np^2 c) ns^2np^3 d) ns^1np^4

- Oxides of non-metals react with water to give the corresponding: a) Alkaline solution mineral acid solution c) Neutral solution d) Basic solution

4- The tendency of an element to form bonds with itself is known as:
Catenation b) Allotropy c) Isomerism d) polymerization

5- The scientific name of baking soda is: a) Sodium bicarbonate
) Sodium hydrogen carbonate c) Sodium carbonate d) Al of the above

6– The molecular formula of washing soda is: a) Na_2CO_3
) Na_2CO_3 $10H_2O$ c) Na_2CO_3 $NaHCO_3$ H_2O d) b or c

17- Carbonic acid being a dibasic acid, forms two sets of: a) HCO_3^- and CO_3^{2-}
b) HCO_3^{-2} and CO_3^- c) HCO_4^- and CO_3^{2-} d) HCO_3^{-2} and CO_3^{2-}

18- The molecular formula of silica is: a) SiO_3 b) SiO_4 c) SiO_2 d) SiO

19- The electronic configuration in the valence shells of the elements of group 15 is: a) ns^2np^2 b) ns^1np^3 c) ns^2np^3 d) ns^2np^4

20- The oxidation state of nitrogen atom in nitric acid (HNO_3) is:
a) +1 b) +4 c) +5 d) +3

The chemical formula of nitrous oxide is: a) NO b) N_2O c) NO_2 d) N_2O_3

21 - Ammonia molecule has a strong tendency to donate its lone pair of electrons of nitrogen to other molecules. Thus, it acts like: a) a strong Lewis base
b) Weak Lewis base c) a strong Lewis acid d) weal Lewis acid

22- The chemical formula of phosphorus(III) oxide is:
a) P_4O_6 b) P_4O_5 c) P_5O_6 d) P_2O_6

23- In nature sulpher element can be found as: a) pure element b) sulfide
c) Sulfate d) All of the above

24- The compound of sulpher which added to natural gas (CH_4) used in homes for cooking and heating is: a) SO_2 b) H_2S c) SO_3 d) none of the above

25- The molecular formula of Iodic acid is: a) HIO_4 b) HIO_2 c) HIO_3 d) HIO

26- The oxidation state of chlorine atom in HClO is: a) +2 b) +1 c) +5 d) -1

27- At room temperature the physical state of elemental bromine is: a) brown gas
b) A fuming red-brown liquid c) Red solid d) none of the above

28- The chemical formula of ortho phosphoric acid is: a) H_2PO_3 b) H_3PO_4
c) H_3PO_3 d) $H_4P_2O_7$

29- The electronic configuration of the outermost energy levels of the group 17 elements may be represented as: a) ns^2np^5 b) ns^2np^6 c) ns^2np^4 d) ns^1np^5

30– Fluorine is found in the -1 valence state, but exhibits valence state of 0 when bonded to: a) Oxygen atom b) Nitrogen atom c) another fluorine atom d) phosphorus atom

Question No. II: Check True (√) or False (X) and for the false write the correct answer (10 درجات)

1- Solid water is greater dense than liquid water. ( )

2- Alkaline earth metals have lowest ionization potential in each period in the periodic table. ( )

3- For group IIIA elements their chlorides, bromides and iodides are essentially covalent compounds with low melting points. ( )

4- Carbon monoxide is formed, when complete combustion of carbon or carbon containing fuels takes place. ( )

5- The hardest natural substance known is Quartz. ( )

6- In diamond, the carbon atoms are arranged in flat parallel layers as regular hexagons and each carbon in these layers is bonded to three others by single covalent bonds. ( )

7- Iodine adopts a broad range of valences states, commonly ranging from I^{7+} to I^-. ( )

8- The prefix pyro-acid is generally used for the acid having lower oxygen content than the parent acid. ( )

9- Both liquid and solid oxygen are diamagnetic substances. ( )

10- Sulpher is insoluble in water but soluble in liquids like benzene C_6H_6. ( )

Question No III: Complete the following: (20 درجة)

1- When water contains calcium and magnesium hydrogen carbonates it said to be .....

2- The temporary hardness of water can easily remove by ..... and adding .....

3- Atoms of the same element having the same atomic number, but different mass number are known as .....

4- Alkali metals are very reactive even at room temperature in contact with air so they are stored in .....

5- Just like ..... hydrogen needs one electron to attain the configuration of nearest noble gas.

6- The weak attractions between the partially negative oxygen of one water molecule and the partially positive hydrogen of a different water molecule is called .....

7- The solubility of elemental iodine in water can be increased by the addition of....., due to formation of the ..... anion.

8- Group 2 elements react with air or oxygen slowly upon heating to form oxides (MO), except ..... and ....., which form .....

9- The second most electronegative element known is .....and the first being .....

10- Group IIIA elements in their compounds exhibit the oxidation state of ..... and .....

11- Aluminum dissolves in the concentrated aqueous NaOH solution forming sodium .....

12- Tetra basic boric acid, $H_2B_4O_7$, reacts with NaOH or Na_2CO_3 forming .....

13- The oxidation states of group 4 elements are usually .....and .....

14- Diamonds and graphite are two crystalline ..... of carbon.

15- Producer gas is a mixture of ..... while water gas is a mixture of .....

16- Solidified carbon dioxide is called .....

17- The most prevalent type of glass, used for centuries in windows and drinking vessels, is soda-lime glass, made of about 75% ..... plus .....and several minor additives.

18- Nitric acid is colorless when pure, older samples tend to attain a yellow cast due to.....

19- It may be noted that fluorine does not form oxoacids because .....

20- Chlorine is widely used for purifying water owing to its .....

Question No. IV: answer the following (10 درجات)

A) Why does for dilution of sulphuric acid, always acid is to be added to H_2O slowly, and not water to acid?

B) Why the ionization energies of the elements of oxygen family are less than those of nitrogen family?

C) Sulphuric acid is manufactured by contact process; Write the equations of the reactions involved.

Answer sheet

Q. I	Answer	Q. I	Answer	Q. I	Answer
1		11		21	
2		12		22	
3		13		23	
4		14		24	
5		15		25	
6		16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

Q. II	Answer (√) or (X)	Q. II	Answer (√) or (X)
1	.....	6	.....
2	.....	7	.....
3	.....	8	.....
4	.....	9	.....
5	.....	10	.....

Q. III	Answer	Q. III	Answer
1	.....	11	.....
2	.....	12	.....
3	.....	13	.....
4	.....	14	.....
5	.....	15	.....
6	.....	16	.....
7	.....	17	.....
8	.....	18	.....
9	.....	19	.....
10	.....	20	.....