Review Test 4

<table>
<tr><th>No</th><th>Items</th><th>P</th></tr>
<tr><td>1</td><td>Complete the blanks with symbol or formula of the substances which have respective characteristics given.
1. The atom which has the largest atomic volume in the third period is ……
2. The cation having $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6$ electron configuration is …….
3. The most active element in the second period forms an oxide with the formula of ……
4. Barium is stronger reducing agent than …….. in the group two of periodic table.
5. Acidic character of non metal oxides from left to right in periods …….
6. Number of molecules in 4.48 L of nitrogen dioxide gas at STP is ……..
7. Relative density of superior oxide of sulfur with respect to helium gas is …….</td><td>N
0
1
2
3
4
5
6
7</td></tr>
<tr><td>2</td><td>The hydrated form of iron (II) sulfate is used medically to treat iron deficiency, and also for industrial applications. It is composed of following elements;
Fe, S, O, H.
Complete the following statements in the table below for the elements contained in the iron (II) sulfate composition;
<table><tr><th>Element</th><th>Characteristics</th></tr><tr><td>Iron</td><td>1. The type of bond in free form is ……..
2. Formula of superior oxide is …….. and one field of use for this oxide in industry is ……..</td></tr><tr><td>Sulfur</td><td>3. Electron configuration of the atom is …….
4. The type of bond when combined with carbon is ……..</td></tr><tr><td>Oxygen</td><td>5. Chemical formula of a polar covalent compound is ……..
6. Chemical formula of a compound which has hydrogen bond is ……
7. Chemical formula of a compound which is a strong base is …….. and a physical property of this compound is ……</td></tr></table></td><td>N
0
1
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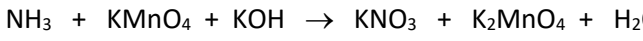
8
9</td></tr>
<tr><td>3</td><td>Potassium nitrate is used in fertilizers, tree stump removal rocket propellants and in fireworks. It is produced in the following redox reaction as follows;
 
Balance the reaction above indicating the oxidation states of all elements, write down half reactions, and determine oxidation and reduction processes, oxidant and reductant substances.
……
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……</td><td>N
0
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</table>

Review Test 4

4

Iron is found in nature as several oxides and can be processed in blast furnace to purify with carbon monoxide by following reaction;

$$Fe_2O_3(s) + 3CO(g) \rightleftarrows 2Fe(s) + 3CO_2(g) - Q$$

I. Equilibrium constant expression of the reaction is ……..

Which direction will the system shift (forward, backward, no change) when the following changes are applied;

	Changes	Direction of reaction to shift
1	Increase in volume of reaction container	
2	Decrease in concentration of carbon monoxide	
3	Increase in temperature	

II. Write one certain field of use for one of the substances in the reactants;
Substance …… is used …….

N 0 1 2 3 4 5

5

A mixture of calcium carbonate and calcium oxide is given;

Solve the problem:

A 44.6 g of the mixture is treated with 12.6% nitric acid solution by mass and as a result 5.6 L of carbon dioxide gas at STP is released.

A. Calculate the mass percent of calcium oxide in the mixture.

B. Calculate the volume of nitric acid solution necessary if the density of it is 1.25 g/mL.

Solution:

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……
……

Answer: A. ……**B.** ……..

N 0 1 2 3 4 5 6 7 8 9 10

6

Following substances are given;

Zinc, silver nitrate, potassium hydroxide, oxygen gas, copper () chloride, hydrochloric acid

Write down reaction equations with respect to given pattern by using ***only*** the substances **as reactants** above list.

1. Combination reaction: …… → ……

2. Double displacement reaction: …… → ……

3. Decomposition reaction: …… → ……

4. Substitution reaction: …… …… → ……

N 0 1 2 3 4 5 6 7 8

Review Test 4

7

For each of the statement in column A select one organic substance in column B and write the letter into the blanks with respect to.

A	**B**
……. 1. Can react with sodium metal.	a. methanal
……..2. Can be oxidized to obtain acetone.	b. pent-1,3-diene
……..3. An amphoteric organic compound.	c. glycerin
……..4. A hydrocarbon with a general formula of C_nH_{2n-2}.	d. amino acetic acid
……..5. The simplest aldehyde used in formalin.	e. propan-2-ol
……..6. A compound can be hydrolyzed.	f. starch
……..7. Can be identified with iodine.	g. sucrose

N 0 1 2 3 4 5 6 7

8

There are two organic compounds composed of same number of carbon atoms and one is the homologue of *methyl propanoate*.

A. For each substance complete the table below with respect to the given requirements.

	Organic Substance 1	Organic Substance 2
IUPAC Name	*Pent-1,3-diene*	
Condensed structural formulae		
Condensed structural formulae of one functional isomer		
IUPAC name of the functional isomer		

B. Write down the preparation reaction of methyl propanoate with condensed structural formulae of substances

……..

N 0 1 2 3 4 5 6 7 8 9

9

Following organic substances are given;

chlorine, copper(II) hydroxide, nitric acid, water, sodium hydroxide

Write down the reactions of substances below with **one of the reagent** above in each case by using condensed structural formulae.

1. *Acetic acid* ……

2. *Benzene* ……

3. *But-1-ene* ……

4. *Propanal* ……

N 0 1 2 3 4 5 6 7 8

Review Test 4

10	Methanol is the first member of alcohols family, very toxic and can cause blindness when taken in low quantities. **Solve the problem:** A 44.8 L of hydrogen gas at STP with enough carbon monoxide is required to prepare methanol. The methanol obtained then is treated with 450 g of 20% acetic acid solution. **A.** Calculate mass of ester obtained. **B.** Calculate the volume of carbon monoxide minimum must be necessary to use up all acetic acid. **Solution:** …….. …….. …….. …….. …….. …….. …….. …….. …….. …….. **Answer:A:** ……**B:** ……..	N 0 1 2 3 4 5 6 7 8 9 10 11 12
11	**Solve the problem:** A solution is prepared by using 1 g of sodium hydroxide in a 250 mL volumetric flask. **A.** Calculate the pH of the solution prepared. **B.** Calculate the volume of 10% sulfuric acid solution by mass and with a density of 1.1 g/mL must be used to neutralize completely 100 mL of sodium hydroxide solution prepared above. **Solution:** …….. …….. …….. …….. …….. …….. …….. …….. …….. **Answer:A**:…… **B**: ……..	N 0 1 2 3 4 5 6 7 8 9 10 11 12
12	**I.** Complete the following statements below; A. The identification reagent of anion in potassium carbonate is ……. B. The identification reagent of cation in magnesium chloride is ……. C. When lithium sulfate and barium bromide are treated, an analytical signal observed is …….. D. When sodium phosphate and …….. are treated a precipitate is formed, and solubility product constant expression of this precipitate is is : Ksp (……..) = ……. **II.** Select one of the identification reactions asked above and write down the reactions in the form of molecular, complete ionic and net ionic. ……ME ……CIE ……NIE	N 0 1 2 3 4 5 6 7 8 9 10 11 12