Review Test 2

<table>
<tr><th>No</th><th>Items</th><th>P</th></tr>
<tr><td>1</td><td>Encircle the letter T, if the statement is true, and the letter F, if it is false.
1. T F Atoms of the same element might contain different numbers of neutrons.
2. T F The element with a charge of +25 in its nucleus is found in “d-block” of periodic table.
3. T F The element which forms oxide with a composition similar to EO_2 has +4 oxidation state.
4. T F Oxide of magnesium metal has more basic character than that of barium metal.
5. T F Hydrogen compound of the element which has an electron configuration of $1s^2\ 2s^2\ 2p^5$ changes the color of litmus paper to blue in water solution.
6. T F A gaseous substance containing $12.04x10^{22}$ molecules occupies 44.8 L volume at STP.</td><td>N
0
1
2
3
4
5
6</td></tr>
<tr><td>2</td><td>Plaster of Paris is used similarly to clay, as it is easily shaped when wet, yet sets into a resilient and lightweight structure and to protect limbs with broken bones.
Complete the following sentences for the elements contained in the Plaster of Paris composition.
<table><tr><th>Chemical Element</th><th>Characteristics of Substances</th></tr><tr><td>Calcium</td><td>• Electron configuration of the ion …….
• The type of bond in the compound with oxygen is …… and has a physical character of ……..</td></tr><tr><td>Sulfur</td><td>• The compound with hydrogen has …….. bond in its molecules.
• Oxygen compound when dissolved in water makes …….. solution.</td></tr><tr><td>Oxygen</td><td>• Chemical formula of a compound formed by sharing common electrons is ……..
and used in ……..</td></tr><tr><td>Hydrogen</td><td>• Number of sigma and pi bonds in a gaseous compound of …… are ……..
and ……..</td></tr></table></td><td>N
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10</td></tr>
<tr><td>3</td><td>Potassium permanganate is used for a number of skin diseases including fungal infections and tropical ulcers. It is reacts with hydrochloric acids as follows;
$KMnO_4 + HCl \rightarrow MnCl_2 + Cl_2 + H_2O + KCl$
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
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7</td></tr>
<tr><td>4</td><td>Ammonia is an essential chemical in pharmacy and in most of the cleaning products, can react with oxygen gas as follows;
$4NH_3(g) + 5O_2(g) \overset{Fe_2O_3}{\rightleftarrows} 4NO(g) + 6H_2O(g) + Q$
Complete the table below by using equilibrium system above according to given information in the table.
<table><tr><th></th><th>Factors</th><th>Action</th><th>Direction of shifting the equilibrium reaction</th></tr><tr><td>1</td><td>Concentration of O_2</td><td>increase</td><td>……</td></tr><tr><td>2</td><td>…….</td><td>decrease</td><td>……</td></tr><tr><td>3</td><td>Temperature</td><td>……</td><td>……</td></tr><tr><td>4</td><td>…….</td><td>……</td><td>backward</td></tr><tr><td>5</td><td>Pressure</td><td>……</td><td>forward</td></tr></table></td><td>N
0
1
2
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4
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6
7
8</td></tr>
</table>

Review Test 2

5	Sodium carbonate is used significantly in glass industry as well as in soap making. **Solve the problem:** A student wants to analyze a 26.5 g sample of sodium carbonate with hydrochloric acid. The sample is put into excess hydrochloric acid solution and allowed to react completely. A colorless gas is produced and passed through 200 mL of 1 mol/L calcium hydroxide solution in order to obtain a white precipitate. **A.** Calculate the percent purity of sodium carbonate in the sample. **B.** Calculate the minimum volume of hydrochloric acid solution with a 1 mol/L concentration required to analyze this sample. **Solution:** …… …… …… …… …… …… …… …… …… …… …… **Answer: A.** ……**B.** ……	N 0 1 2 3 4 5 6 7 8 9 10
6	Following substances are given; *iron (II) chloride, water, copper(II) hydroxide, hydrogen gas ,calcium hydroxide* Write down reaction equations with respect to given pattern by using *one* substance above list in each case as I. reactant and II. product. **I. as a reactant**; **A.** Combination reaction: …… → …… **B.** Double displacement reaction: …… → …… **II. as a product**; **A.** Decomposition reaction: …… → …… **B.** Substitution reaction: …… …… → ……	N 0 1 2 3 4 5 6 7 8
7	For each of the statement in column A write down a condensed structural formula into the blanks in column B. **A** **B** 1. Used in formalin solution to prevent decay of death bodies. …… 2. It is a monohydric alcohol with a tertiary carbon atom. …… 3. Compound containing three carbon atoms and a carbonyl group. …… 4. Contain a C-C triple bond and can be obtained from inorganic source. …… 5. Can be identified with iron (III) chloride solution. …… 6. Polyhydric alcohol and can be used in explosive production. …… 7. Amphoteric compounds found in proteins. ……	N 0 1 2 3 4 5 6 7

Review Test 2

8 Butanal is a colorless flammable liquid with an unpleasant smell. It is miscible with most organic solvents.

I. Write down about this compound;

A. Condensed structural formula: **B.** molecular formula

……. …….

II. For two organic substances, complete the blank spaces of the table in accordance with the indicated characteristics.

	Characteristics of organic compound	Condensed structural formula
1	It is obtained from dehydration of monohydric alcohols and contains same number of carbon atoms	
2	It has a general formula of $C_nH_{2n}O_2$ and have the same number of hydrogen atoms as butanal.	

III. Select one of the compound in the table above and complete the spaces below;

A. Condensed structural formula of an isomer **B.** IUPAC name of the isomer

……. …….

N 0 1 2 3 4 5

9 Following organic substances are given;

acetylene, methane, ethyl propanoate, but-1-ene, phenol, chloroethane

Select two substances above and write down reactions by using condensed structural formulae for each reagents given below;

I. Na

A. ……

B. ……

II. H_2O

A. ……

B. ……

N 0 1 2 3 4 5 6 7 8

10 Amyl acetate is an ester used as a flavoring agent like bananas and apples as well as in the preparation of penicillin.

Solve the problem:

A 39 g of amyl acetate sample is completely hydrolyzed and 18 g ethanoic acid is obtained.

A. Determine the molecular formula of amyl acetate.

B. Write down the condensed structural formula of amyl acetate.

Solution:

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Answer:A: ……**B:** ……

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

Review Test 2

11	In an analytical chemistry laboratory for an acid-base titration a concentrated base solution is being used. **Solve the problem:** To prepare a potassium hydroxide solution 0.14 g of potassium hydroxide is dissolved in a 250-mL volumetric balloon flask. **A.** Calculate the pH of solution obtained. **B.** What is the mole number of potassium hydroxide in 10-mL of this solution? **Solution:** …… …… …… …… …… …… …… …… …… **Answer:A**:…… **B**: ……	N 0 1 2 3 4 5 6 7 8 9 10
12	There are two beakers with sodium carbonate and sodium chloride solutions without labels. In order to determine the solutions following reagents are given; H_2SO_4, $BaCl_2$, $AgNO_3$. Select the reagents and write identification reactions in the form of molecular, complete ionic, and net ionic. **A.** ……ME ……CIE ……NIE Analytical signal…… **B.** ……ME ……CIE ……NIE Analytical signal……	N 0 1 2 3 4 5 6 7 8 9 10 11 12