Review Test 3

<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 Atom of the element placed in 4th period group 4, secondary subgroup in the periodic table contain 26 neutrons in its nucleus.
2. T F Element having $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^5$ electron configuration forms a superior oxide similar to E_2O_3.
3. T F The most electronegative element in the 3rd period has stronger oxidizing ability than bromine.
4. T F Calcium ions have the same number of electrons as argon atom.
5. T F Relative density of neon gas is lower than that of methane gas with respect to air.
6. T F Number of atoms in 22.4 L of carbon monoxide and 11.2 L of nitrogen gas are the same.</td><td>N
0
1
2
3
4
5
6</td></tr>
<tr><td>2</td><td>Detergents are artificial cleaners, more active than soaps, and even soluble in hard water. The most common detergent are alkyl benzenesulfonate composed of following elements;
C, H, O, S, Na.
Compose and write down the formula of substances by using elements above which have following proposed characteristics in the table below;
<table>
<tr><th></th><th>Characteristics of substance</th><th>Chemical formula</th></tr>
<tr><td>1</td><td>Only nonpolar covalent bonds exist between atoms of the substance</td><td></td></tr>
<tr><td>2</td><td>There are only sigma “σ” bonds between atoms of the substance</td><td></td></tr>
<tr><td>3</td><td>Substance has crystalline ionic lattice structure in solid state</td><td></td></tr>
<tr><td>4</td><td>Hydrogen bonds are formed between the molecules of substance</td><td></td></tr>
<tr><td>5</td><td>It is an oxide with more basic character than aluminum oxide</td><td></td></tr>
<tr><td>6</td><td>Compound has an ion with an electron configuration of $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6$</td><td></td></tr>
<tr><td>7</td><td>It is a gas heavier than air</td><td></td></tr>
<tr><td>8</td><td>It is a raw material used in glass production</td><td></td></tr>
<tr><td>9</td><td>It forms an alloy with iron to make steel.</td><td></td></tr>
</table></td><td>N
0
1
2
3
4
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7
8
9</td></tr>
<tr><td>3</td><td>Potassium chromate is an oxidizing agent in organic synthesis and used to test for silver ion. It is produced in the following redox reaction as follows;
$CrCl_3 + Br_2 + KOH \rightarrow K_2CrO_4 + KBr + KCl + H_2O$
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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6
7</td></tr>
<tr><td>4</td><td>Phosgene gas,$COCl_2$, is very poisonous and was used as a chemical weapon during World War I where it was responsible for 85,000 deaths, can be prepared by following reaction;
$CO(g) + Cl_2(g) \rightleftarrows COCl_2(g) - Q$
I. Complete the following statements;
In order to shift the direction of equilibrium system forward, it is necessary;
A. to increase …….. and ……
B. to decrease …… and ……
II. Write one certain field of use for one of the substances in the reactants;
Substance …… is used ……</td><td>N
0
1
2
3
4
5</td></tr>
</table>

Review Test 3

5	Iron can be obtained from its oxides by reduction method in blast furnace. **Solve the problem:** A 320 g superior oxide of iron was wanted to reduce to iron metal by carbon monoxide which was obtained from 36 g carbon. **A.** Calculate mass of iron obtained by reduction of this oxide. **B.** Calculate the mass of additional carbon necessary to reduce completely this oxide. **Solution:** …… …… …… …… …… …… …… …… …… …… …… **Answer: A.** ……**B.** ……	N 0 1 2 3 4 5 6 7 8 9 10
6	Following substances are given; *calcium, copper(II)chloride, potassium oxide, nitric acid, silver nitrate, water* 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
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. Used to obtain rubber by polymerization. — a. glucose …….2. Can be used in esterification reaction. — b. methylbenzene …….3. Belongs to homologue series with general formula of $C_nH_{2n+2}O$. — c. aniline …….4. Can be reduced by Ag_2O in ammonia. — d. vinyl chloride …….5. Primary compound to obtain TNT. — e. ethanol …….6. Used to obtain plastic chairs. — f. acetic acid …….7. Aromatic compound with basic character. — g. but-1,3-diene	N 0 1 2 3 4 5 6 7

Review Test 3

8 Lactic acid, named as 2-hydroxyl propanoic acid, is obtained by fermentation of lactose

I. Write down about this compound;

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

……. …….

II. Lactic acid is one of the organic compound with mixed functional groups. Complete the table below with respect to two functional groups.

	Formula of functional groups	Name of functional groups	Family of organic substances with respective group	Condensed structural formula of one example with respective group	IUPAC name of the example structure
1					
2					

N 0 1 2 3 4 5 6 7 8 9 10 11 12

9 Following organic substances are given;

Water, hydrogen, silver oxide(in ammonia), bromine, methanol, potassium oxide

Write down the reaction of formic acid with **one of the reagent** above in each case by using condensed structural formulae.

1. ……

2. ……

3. ……

N 0 1 2 3 4 5 6

10 Formalin solutions, 40% formaldehyde by mass, are used to preserve death bodies for presentation in biology laboratories.

Solve the problem:

A 64 g of methanol was oxidized with copper (II) oxide with 80% reaction efficiency. Aldehyde obtained was then used to make formalin solution.

A. Calculate the volume of formalin if its density is 1.12 g/mL.

B. Calculate the volume of water to prepare this solution.

Solution:

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Answer:A: ……**B:** ……..

N 0 1 2 3 4 5 6 7 8 9 10 11 12

Review Test 3

11	Acetic acid has a distinctive sour taste and pungent smell, is a weak acid dissolves partially in water. It is used to prepare vinegar not less than 4% by volume, is good to prepare pickles. **Solve the problem:** A chemist prepares vinegar by using 1.5 g acetic acid in 250-mL volumetric flask. **A.** Calculate the pH of solution obtained if acetic acid dissociates by 10% into ions. **B.** Determine the vinegar prepared with a density of 0.96 g/mL if it is in desired concentration. **Solution:** …… …… …… …… …… …… …… …… …… **Answer:A**:…… **B**: ……	N 0 1 2 3 4 5 6 7 8 9 10 11 12
12	A student wants to analyze ammonium chloride in a water sample. following reagents are given for this analysis; HNO_3, $NaOH$, $AgNO_3$, $ZnSO_4$ Select the reagents and write identification reactions of ions in ammonium nitrate in the form of molecular, complete ionic, and net ionic. **A. for cation …….** ……ME ……CIE ……NIE Analytical signal…….. **B. for anion ……** ……ME ……CIE ……NIE Analytical signal……	N 0 1 2 3 4 5 6 7 8 9 10 11 12