INTERSECONDARY SCHOOLS EXAMINATION SERIES

ISESE

FORM SIX MONTHLY TEST AUGUST

132/1 CHEMISTRY 1

TIME: 3 HRS

INSTRUCTIONS

1. This paper consists of section A and B with a total of ten (10) questions

2. Answer all question in section A and only (2) two question from section B

3. Cellular phones and any unauthorised materials are not allowed in the examination room

4. For your calculations you may use the following constants

- Rydberg constant (RH) = $1.09678X10^{7}m^{-1}$
- Gas constant, R = 8.314J mol^{-1} K^{-1} or 0.0821 atm mol-1 K^{-1} dm^{-3}
- GMV = 22.4 dm3
- Standard temperature, T = 273K
- Standard pressure = 760mmHg = 1 atm = $1.05x10^{5}$ N/ne = $1.05x\ 10^{5}$ Pa
- Plank's constant, h = $6.63\ x\ 10^{-34}$ Js.
- Freezing point of water = $0^{0}C$
- Velocity of light, C = $3X10^{8}$ m/s
- Atomic masses, H = 1, C = 12, O = 16, Cl = 35.5, K = 39, Ca= 40

SECTION A (70 MARKS)

Answer all questions from this section

1. a) What is soil colloids and how soil colloids are formed?

   b) Explain at least four significance of cation exchange capacity.

   c) A soil sample has a C.E.C of 25 meq per 100 mg of soil sample were shaken with 40cm^3 of 0.1M Hcl. After filtering and washing the soil the filtrate and washing were titrated against NaoH solution, 24cm^3 of 0.1M NaoH were required for complete neutralisation. Calculate the percentage base saturation of the soil sample

2. a) Write the electronic configuration for the given elements;-

   i) Sodium ii) Iron

   iii) Barium iv) Bromine

   b) i) What is an atomic orbital?

   ii) How does S- orbital differ from P- orbital?

   c) How does an orbit in Bohr's atomic theory and an orbital in the quantum theory differ?

3. a) The alpha particles emitted from radium have an energy of 4.8Ev. What is the de Brogile wavelength?

b) As a result of Heisenberg's uncertainty principle, what part of Bohr's theory of the atom is considered unrealistic?

c) Explain why Heisenberg's uncertainty principle or the wave nature of particles is not a practical way of examine the behaviour of microscopic object, but it is the most significant in describing the behaviour of electrons or systems on a very small scale

4. a) State the following laws;-

   i) Boyle's law ii) Graham's law of diffusion iii) Avogadro's law

   b) Show that the ideal gas equation constant R has got a value approximately equal to 8.314 mol-1K^{-1}

   c) i) Outline the two assumption of kinetic theory of gases that are not considered to be negligible under real gas behaviours.

   ii) At what conditions do real gases obey ideal gas equation?

5. a) Yellow phosphorus react with chlorine gas to form a yellow liquid fumes when exposed to air. Explain these observations

b) i) Explain why the metals magnesium and aluminium are good conductors of electricity

ii) Other than cost, give two reasons why aluminium is used for making electric cables while magnesium not?

c) Lithium, sodium and potassium belong to the same group of the periodic table

i) Arrange the elements in order of increasing ionisation energy

ii) Explain the trend in 2 (I) above

6. a) With relevant examples, explain why carbon atom is capable of forming millions of compound? (Give four points)

b) Show the reaction mechanism for the following organic reaction

$CH_3CH_2CL + NaoH \longrightarrow CH_3CH_2OH + Nacl$

c) With reasons, which one in the given pair is more acidic?

i) HCOOH and CH_3COOH ii) CH_2FCOOH and CH_3COOH
iii) CH_2FCOOH and $CH_2clCOOH$

7. a) What distinguishes Hess law from Born Haber cycle

b) How does the Born-Haber cycle explain the stability of ionic cpd?

c) Discuss the weakness shown by Born-Haber cycle

d) Write some examples of the Born- Haber cycle

SECTION B(30 MARKS)

Answer any two questions from this section

8. a) What do you understand about the following terms;-

i) Morality ii) Mole fraction

iii) Normality iv) Molarities

v) Strength vi) Mass fraction

b) Explain the condition for a solution to be ideal solution

c) Analyse four different osmotic processes taking place in plants and animals

d) How ideal solution and non-ideal solution differ each other.

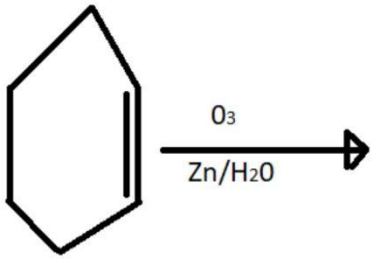
9. a) What meant when are action is described as ‘’having reached equilibrium’’? What does it mean regarding of the forward and reverse reaction rates and with regard to the amounts or concentrations of reactants and the products?

b) It is correct to say that the recently has ‘’stopped’’ when it has reached equilibrium? Explain your answer with specific examples

c) Why is chemical equilibrium described as a dynamic process? Describe this process in the context of a saturated solution of Nacl in water, and what occurring on a microscopic level?

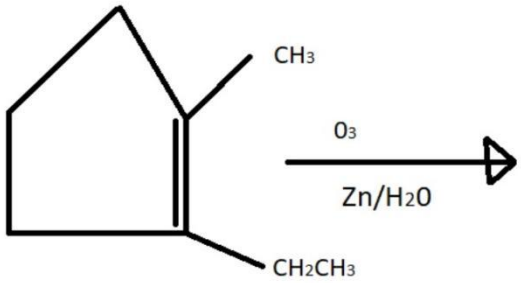
10. a) Complete the following organic reactions

i)



ii) $H_2C = C(CH_3)-CH = CH_2$ $\xrightarrow[Zn/H_2O]{03}$

iii)



b) A hydrocarbon C_6H_{12} decolonises bromine solution, dissolved in concentrated sulphuric acid, yields 2-methly pentane on hydrogenation, and on ozonolysis gives formaldehyde and 3-methyl butanol.

i) Write the structural formula of hydrocarbon

ii) Write all reactions involved

KWA MAHITAJI YA

1. MONTHLY TEST ZA ADVANCE KWA MASOMO YOTE
2. SERIES ZA ADVANCE ZA KILA SOMO
3. SERIES ZA O'LEVEL ZA KILA SOMO
WASILIANA NASI KWA NAMBA 0624 254 757

N.B
PIA U.B.N COOPERATION KWA KUSHIRIKIANA NA ISESE TUNAWAKARIBISHA WAKUU WA SHULE NA WATAALUMA KUJIUNGA KATIKA GROUP LETU LA MONTHLY TEST AMBALO UTAPATA MITIHANI YA ADVANCE YA KILA MWEZI PAMOJA NA MARKING ZAKE KWA GHARAMA YA TSH 100,000 (KWA MIEZI MITATU) NA TSH 150,000 (KWA MIEZI SITA)

KARIBUNI SANA