

FEDERAL UNIVERSITY OF TECHNOLOGY OWERRI
 School of Agriculture and Agricultural Technology
 Department of Soil Science and Technology
 Harmattan semester Examinations 2015/2016

AGR 205: AGRICULTURAL CHEMISTRY
 CREDIT UNIT: 3 UNITS
 TIME: 3 HOURS

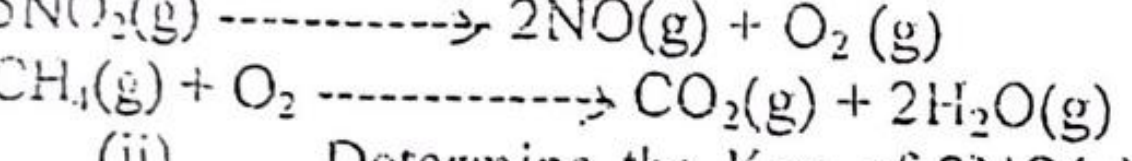
Instruction: Attempt any five questions

1(a) State the difference between
 (i) Atoms and isotopes (ii) Atomic number and Atomic mass (iii) Orbitals and Energy levels (iv) Electron configuration and Electronegativity

(b) A neutral atom in the 4th energy level has 10 neutrons. Determine (i) Maximum number of electrons (ii) Number of protons (iii) Atomic number (iv) mass number (v) Electron configuration and Electronegativity

2(a) What is an ion and outline the characteristic features (ii) What structures only differentiate triple from coordinate covalent bond (iii) Polar is polar covalent bond and state condition of its existence (iv) State the conditions (polar, non-polar, ionic and covalent) of these compounds: NaCl, HBr, MgO and H₂ if the electronegativity values are Na=0.9, Cl=3.0, H=2.1, Br=2.8, Mg=1.2, and O=3.5.

(b) State factors that affect rates of chemical reactions and hence the rate constant of the following reactions



(ii) Determine the Keq of 2NO(g) + O₂ ⇌ 2NO₂(g) if [NO₂] = 6.5 M, [NO] = 2.1M and [O₂] = 1.3 M

(iii) Concentration of H⁺ and C₂H₃O₂ for the dissociation of 0.05M acetic acid solution at 25°C if Ka = 1.8 x 10⁻⁵

3(a) What do you understand by the term oxidation-reduction reaction.

(b) Given a reaction Cr₂O₇²⁻(aq) + Fe²⁺(aq) → Cr³⁺(aq) + Fe³⁺(aq) indicate the oxidation and reduction halves of the reaction

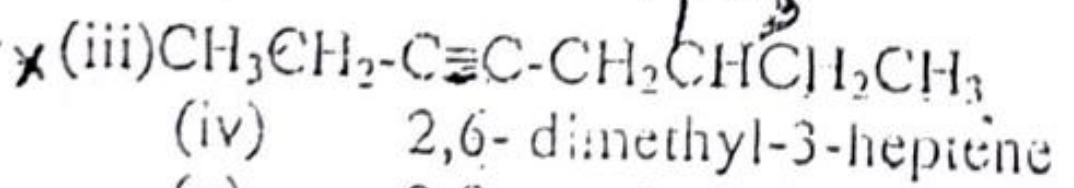
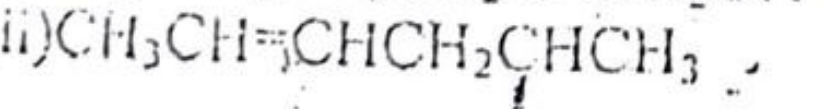
(c) State any four applications of oxidation and reduction in biochemical and industrial manufacturing process.

(d) Balance the following redox equation for an acidic reaction: CrO₇²⁻(aq) + HNO₂(aq) → Cr³⁺(aq) + NO₃(aq)

4 Write short note on the following
 (a) Atomic structure (b) chemical bonding of atoms (c) Atomic radius (d) Ionization energy (e) Electron affinity

5(a) What is an alcohol and explain its solubility in relation to the hydrophobic and hydrophilic properties

(b) Write the IUPAC names and structural formulae of the following compounds



(iv) 2,6-dimethyl-3-heptene

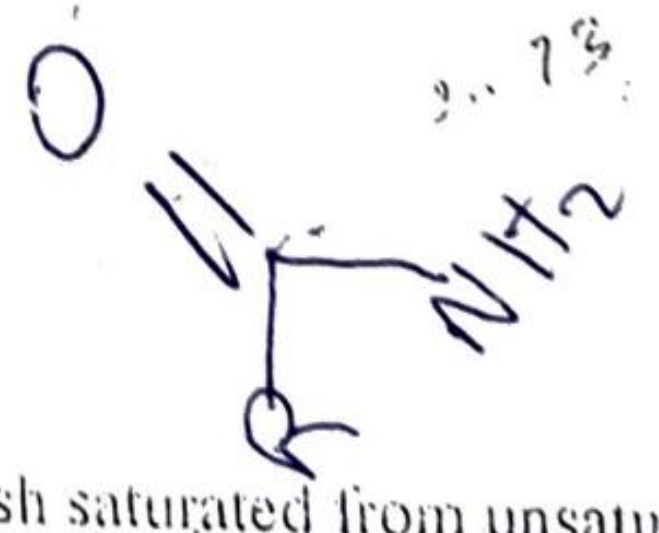
(v) 2 Buten-1, 4-diol

(c) Explain five industrial uses of phenol.

6(a) What are hydrocarbons and using appropriate examples distinguish saturated from unsaturated hydrocarbons

(b) With requisite examples, explain the term isomerism.

(c) Define the term phenols and show three possible reactions of phenol with metals or organic compounds



NOTE: At. Wt of Al = 27, H = 1, C = 12, Mg = 24, Na = 23 and K = 39
 2, 2 2, 1

MEP - BPH - H & D

FEDERAL UNIVERSITY OF TECHNOLOGY, OVERRI
SCHOOL OF AGRICULTURE AND AGRICULTURAL TECHNOLOGY
DEPARTMENT OF SOIL SCIENCE AND TECHNOLOGY

2018/2019 Harmattan Semester EXAMINATION

Course code: AGR 205

Course Title: AGRICULTURAL CHEMISTRY

Time: 2hrs, 30mins

Instruction: Answer four (4) questions. All questions carry equal marks

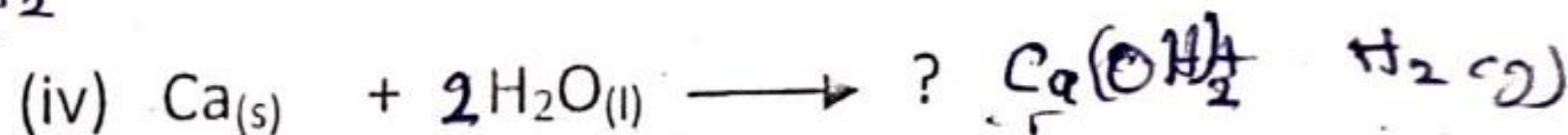
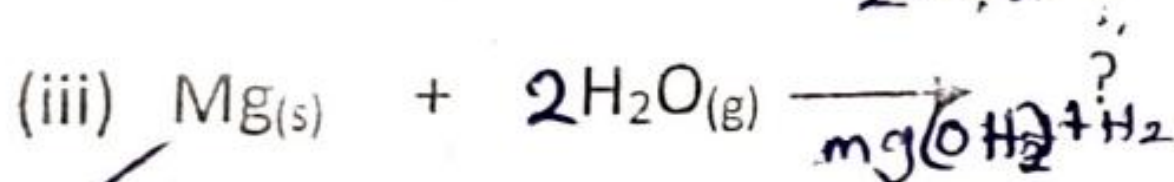
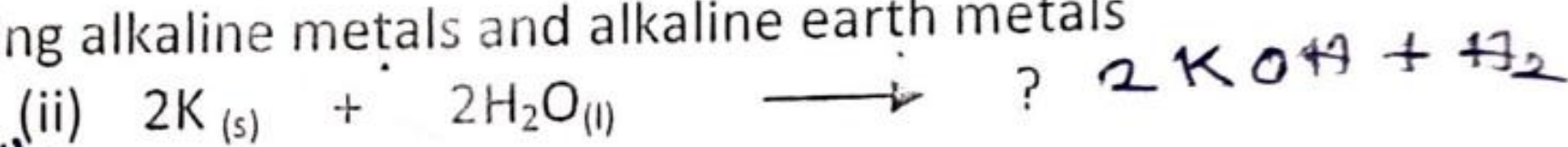
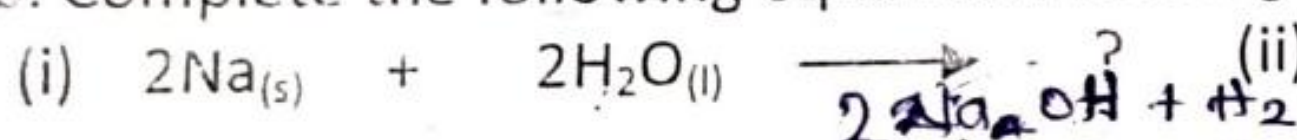
Question 1a. Define oxidation and reduction reaction in terms of electron transfer using appropriate chemical equation

1b. Differentiate between thermodynamics and kinetics with respect to reaction rate

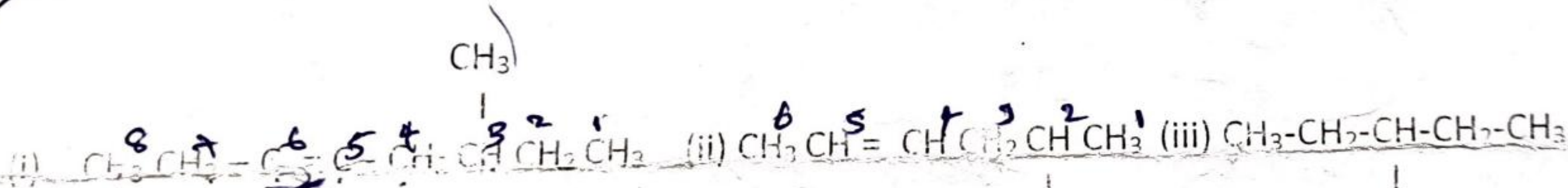
1c. What is tyndall effect?

2a. (i) Define chemical bond (ii) State the octet rule (iii) explain these terms: Electrovalent or ionic bonding and covalent bonding

2b. Complete the following equation involving alkaline metals and alkaline earth metals



3a. Give the correct IUPAC names of the following organic compounds



3-methyl-6-octanol

CH₃

CH₃

3b. Write the structural formula of the following compounds

(i) 2,2,3,3-tetramethyl butane (ii) 2,6-dimethyl-3-heptene

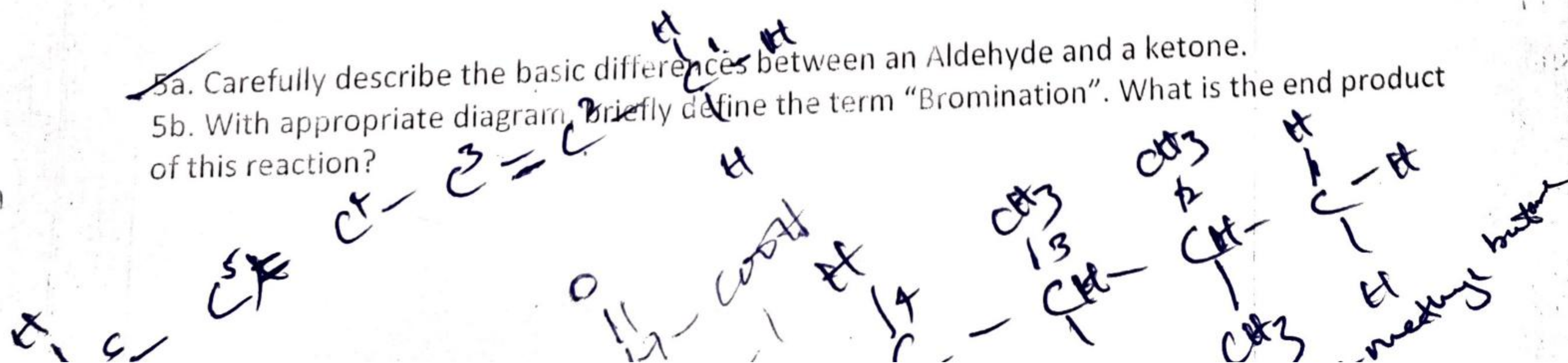
3c. Show reaction of two molecules of Bromine with (i) Alkyne (ii) Alkane

4a. Write the structures of the following (i) methyl-ethanoate (ii) Isopropyl butanoate (iii) 3,4,4-trimethyl pentanoic acids

4b. Draw the functional group of the following (i) Amides (ii) Carboxylic acids (iii) Esters

5a. Carefully describe the basic differences between an Aldehyde and a ketone.

5b. With appropriate diagram, briefly define the term "Bromination". What is the end product of this reaction?



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 2019/2020 Harattan Semester EXAMINATION

Course code: AGR 205

Course Title: AGRICULTURAL CHEMISTRY

Time: 2hrs, 30mins DATE OF EXAM: 12/03/21

Instruction: Answer question one (1) and any other four (4) questions

1a. Assuming the concentration of H^+ of a soil sample is 6.5×10^{-5} , Calculate the pH the soil.
 (Take $\log 6.5 = 0.813$; $\log 5 = 0.699$)

1b. What is the difference between thermodynamics and kinetics

1c. In the formation of Fe from Fe (iii) oxide as shown below;



Name the oxidizing and reducing agent in the above equation

2a. State five factors that influence reaction rate

2b. Explain the following terms with examples (i) Sol (ii) Emulsion (iii) Aerosol

2c. What is Tyndall effect?

3(a). What are hydrocarbons? Using requisite illustrations distinguish between saturated from unsaturated hydrocarbons

3b. Define the term isomerism and with relevant examples explain geometrical isomerism.

Write the structural formula for the following compounds: (i). 2,2-dimethyl butane (ii). 5-Methyl-2-hexene (iii) 6-Methyl-3-Octyne (iv) 2,6-dimethyl-3-heptene.

4(a) The simplest aliphatic ketone has the common name of -----

(b) A ketone in which the carbonyl group is attached to a benzene ring is named a -----

(c) Name five (5) common names of aldehydes that are derived from the names of the corresponding carboxylic acids by replacing 'ic' acid with structures.

(d). Aldehydes are compounds of the general formula -----

(e) Both Aldehydes and Ketones contain the carbonyl group ----- and are often referred to collectively as -----

(f) State the structures of Aldehydes and ketones

5a. Define acid and base according to the following scientists with suitable equation (i) Arrhenius (ii) Gilbert Lewis

5b. Explain how acid sulphate soils affect environmental values

6a. State the modern periodic law

6b. Define atomic number

6c Complete the following equations involving alkaline metals and alkaline earth metals

