

CHEM 102
Organic chemistry
(Test past questions)

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1. Draw and label molecular structures to illustrate cis and trans isomerism.



where P, R and Q = different alkyl group or hydrogen

2. How many σ bonds are there in hexane?

19 ②

3. Name the following alkyl substituents:



4. Draw the structure and give the systematic name of a compound with molecular formula C_5H_{12} that has

(a) Only primary and secondary hydrogens.



(b) Only primary hydrogens.



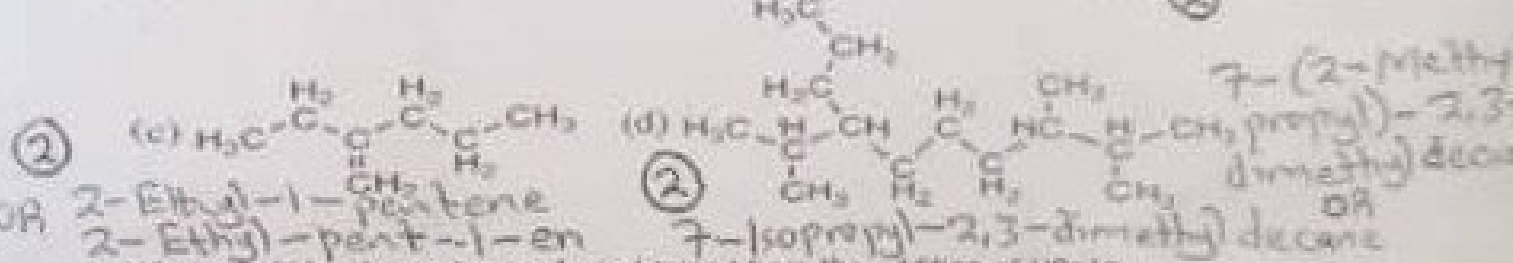
(c) One tertiary hydrogen and two secondary hydrogens.



5. Give the IUPAC names of the following compounds.

(a) $\text{CH}_2=\text{CHCH}_2\text{CH}_2\text{CH}_2\text{C}\equiv\text{CH}$ 1-Octen-6-yne OR Oct-1-en-6-yne ②

(b) $\text{CH}_2\text{CH}=\text{CHC}\equiv\text{CH}$ 2-Hexen-4-yne OR Hex-2-en-4-yne ②



6. What would be the major product obtained from the addition of HBr to



7. Complete the following reactions:



8. Which of the following compounds do not exist or are not possible?



2pm, Monday, 22 February 2021

PAPER 8

CHM 100 TEST

Note: 'ene' can be accepted in place of 'en' place



RIVERS STATE UNIVERSITY

DEPARTMENT OF CHEMISTRY

CHE 101: GENERAL CHEMISTRY II: SECOND SEMESTER EXAM, 2020-2021 (PARTIAL EXAMINATION)

PAPER 3

DATE: 10-24-2021

TIME: 10-24-2021

PAGE: 35

INSTRUCTIONS: ATTEMPT ALL QUESTIONS

Name: Daniel O. Okeke

Matr. No.: 10-24-2021

Department: Chemistry

Faculty: Science

1. Draw and label molecular structures for butane, 2-methylpropane, and 2,2-dimethylpropane.

2. How many σ bonds are there in butane?

3. Name the following alkyl substituents:

(a) CH_3

(b) CH_2CH_3

(c) $\text{CH}_2\text{CH}_2\text{CH}_3$

(d) $\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$

4. Draw the structure and give the systematic name of a compound with molecular formula C_4H_{10} that has

(a) Only primary and secondary hydrogens.

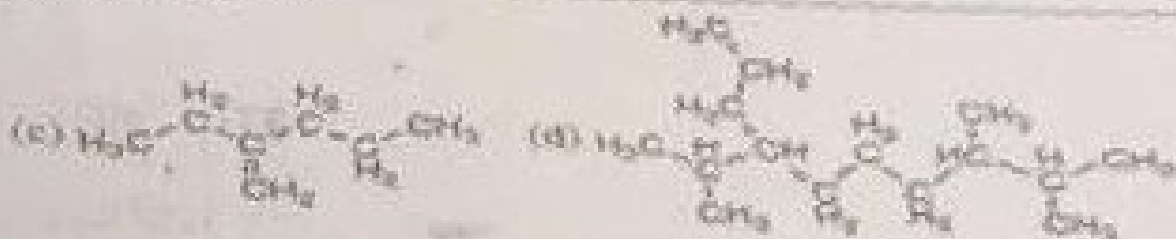
(b) Only primary hydrogens.

(c) One tertiary hydrogen and two secondary hydrogens.

5. Give the IUPAC names of the following compounds.

(a) $\text{CH}_3\text{CH}=\text{CHCH}_2\text{CH}_2\text{CH}_2\text{COCH}_3$

(b) $\text{CH}_3\text{CH}=\text{CHCH}(\text{CH}_3)_2$



6. What would be the major product obtained from the addition of HBr to



7. Complete the following reactions:



8. Which of the following compounds do not exist or are not possible?

(a) 4-Propene

(b) 3-Ethyne

(c) 1-Propene



RIVERS STATE UNIVERSITY
DEPARTMENT OF CHEMISTRY

CHEM 302: ORGANIC CHEMISTRY III SECOND SEMESTER TEST, THREE CREDIT UNITS, 25/20/2021 SESSION

OPTION B

INSTRUCTION: ATTEMPT ALL QUESTIONS

NAME: _____

Department: _____

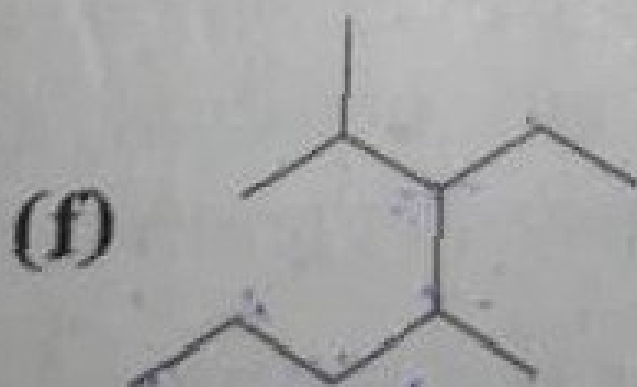
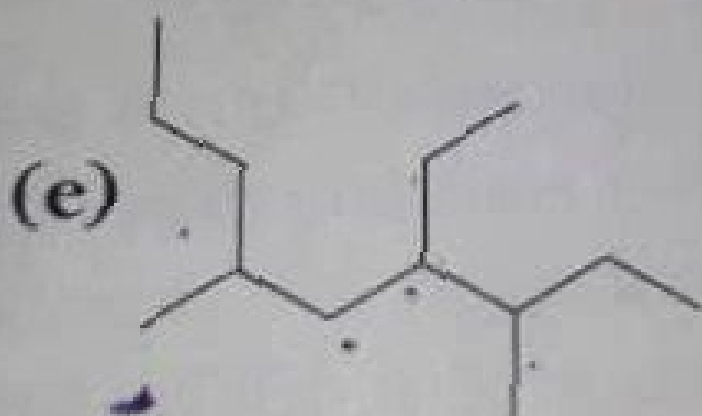
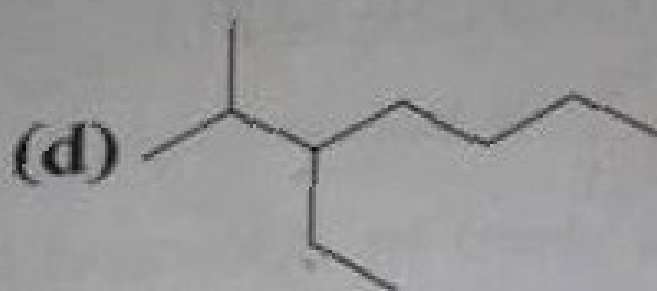
Faculty: _____

Seat No: _____

1. The name of the German Chemist who synthesized the first organic compound from inorganic materials is _____.
2. Hydrocarbons can be grouped into two large categories: _____ and _____.
3. The series of compounds having the same general formula with successive members differing by CH_2 unit is called a _____ series.
4. _____ and _____ species are formed by heterolytic cleavage of CH_3CH_3 .
5. Ethene and ethyne are both hydrocarbons having only two carbons each, but they have different bond angles and shapes. They are _____ and _____ for ethene while ethyne has _____ and _____ respectively.
6. The benzene ring is unusually chemically stable due to _____.
7. According to the systematic (IUPAC) nomenclature, the first step in naming organic compounds is to identify the longest continuous _____ containing the _____ group.
8. 1,3-Butadiene has _____ sigma bond(s) and _____ π bond(s).
9. Dehydrohalogenation of 2-bromobutane employing KOH_{alc} will yield _____ and _____.
10. For a compound to be said to be aromatic, it must be cyclic, fully conjugated, planar and _____.
11. The reversible rearrangement of enol to ketone or aldehyde is known as _____.
12. Give the structures of the following compounds:
 - a. Dichlorodifluoromethane
 - b. 2,5-Dimethyl-3-heptene
 - c. 3-hexyne
 - d. 2,4,6-Trinitrophenol

2 pm Monday, 6th December 2021

ect IUPAC name for each of the following





RIVERS STATE UNIVERSITY
DEPARTMENT OF CHEMISTRY

CHM 202: GENERAL CHEMISTRY III SECOND SEMESTER 2021. THREE HOURS' WRITTEN EXAMINATION

OPTION B

Time: 3 hours

INSTRUCTIONS: ATTEMPT ALL QUESTIONS

Name: _____ Halls: No. _____
 Department: _____ Faculty: _____ Seat No: _____

1. The name of the German Chemist who synthesised the first organic compound from inorganic material is _____
2. Hydrocarbons can be grouped into two large categories: _____ and _____
3. The series of compounds having the same general formulae with successive members differing by $-CH_2-$ unit is called a _____ series.
4. _____ and _____ species are formed by heterolytic cleavage of CH_3CH_2Br .
5. Ethene and ethyne are both hydrocarbons having only two carbons each, but they have different bond angles and shapes. They are _____ and _____ for ethene while ethyne has _____ and _____ respectively.
6. The benzene ring is unusually chemically stable due to _____
7. According to the systematic (IUPAC) nomenclature, the first step in naming organic compounds is to identify the longest continuous _____ containing the _____ group.
8. 1,3-Butadiene has _____ sigma bond(s) and _____ pi bond(s).
9. Dehydrohalogenation of 2-bromobutane employing $KOH_{(aq)}$ will yield _____ and _____
10. For a compound to be said to be aromatic, it must be cyclic, fully conjugated, planar and _____
11. The reversible rearrangement of enol to ketone or aldehyde is known as _____
12. Give the structures of the following compounds:
 - a. Dichlorodifluoromethane
 - b. 2,5-Dimethyl-3-hexene
 - c. 3-Hexyne
 - d. 2,4,6-Trinitrophenol



RIVERS STATE UNIVERSITY
DEPARTMENT OF CHEMISTRY
GENERAL CHEMISTRY III SECOND SEMESTER TEST, THREE CREDIT UNITS, 2020/21

ATTEMPT ALL QUESTIONS

OPTION A

NAME: CIVIL

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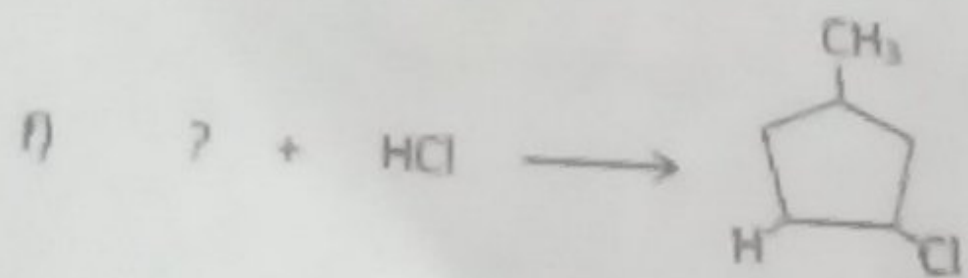
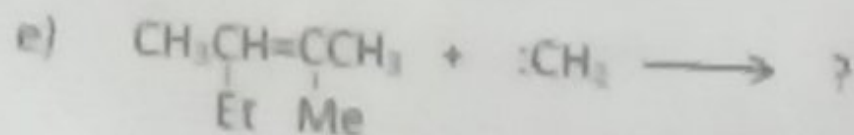
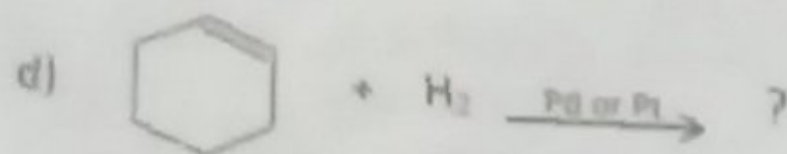
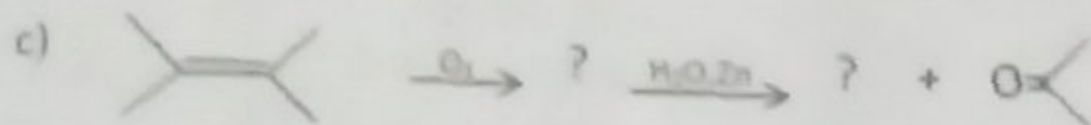
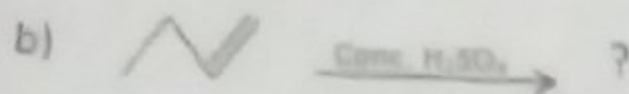
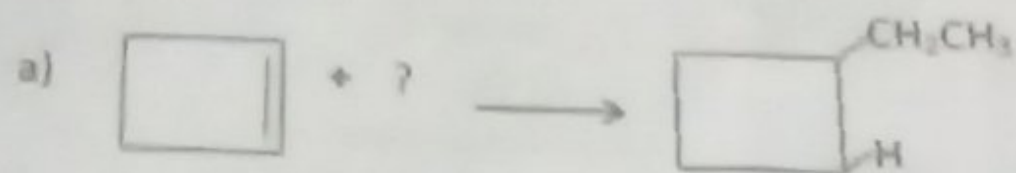
Faculty

Matric No: DE 2020/01

- _____ is the name of the first organic compound synthesized in the lab.
2. The doctrine or theory of _____ states that 'organic compounds originate from living things'.
3. An atom or a group of atoms which is responsible for the chemical properties of a compound is _____ of the compound.
4. _____ and _____ species are products of homolytic cleavage of Cl_2 .
5. Both benzene and cyclohexane have six carbon atoms and a ring structure, but they have different bond angles. Their bond angles are _____ and _____ respectively.
6. Aliphatic isomerism gives rise to cis and trans or E and Z isomers.
7. Dienes are classified into _____ according to the arrangement of the double bonds.
8. The reaction of but-1-ene with hydrogen iodide gives 1-iodobutane and 2-iodobutane as products. According to Markovnikoff's rule, which of the products predominates? _____
9. _____ and _____ are two isomers of C_4H_{10} .
10. Cyclobutene has _____ sigma bond(s) and _____ pi bond(s).
11. In benzene derivatives, 1,2-disubstitution is referred to as ortho substitution while 1,4-disubstitution is para substitution.
12. Give the structures of the following compounds:
- a. 2,2,4-Trimethyl pentane $\text{CH}_3\text{C}(\text{CH}_3)_2\text{CH}_2\text{CH}(\text{CH}_3)_2$ (a)
- b. 1,5-Heptadiene $\text{CH}_2=\text{CHCH}_2\text{CH}_2\text{CH}=\text{CHCH}_3$ (b)
- c. 5-Hepten-1-yne $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}=\text{CHCH}_3$
- d. Toluene C_6H_5

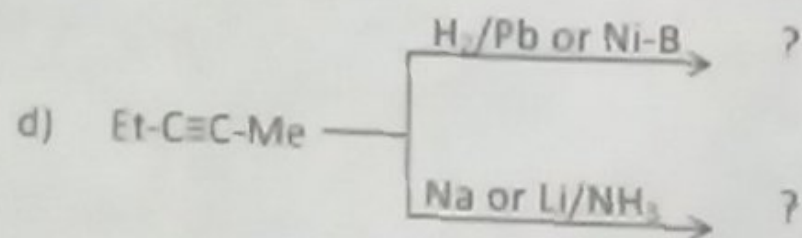
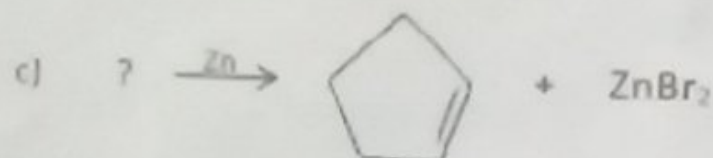
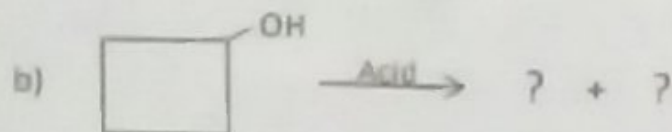
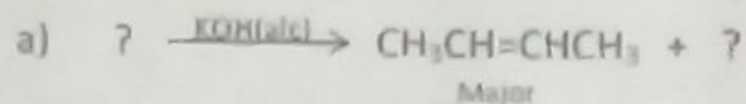
Review questions

Insert the missing reagent in the following equations

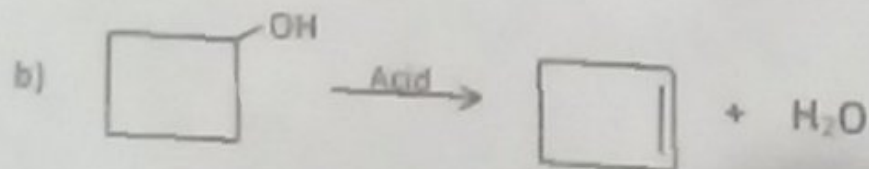
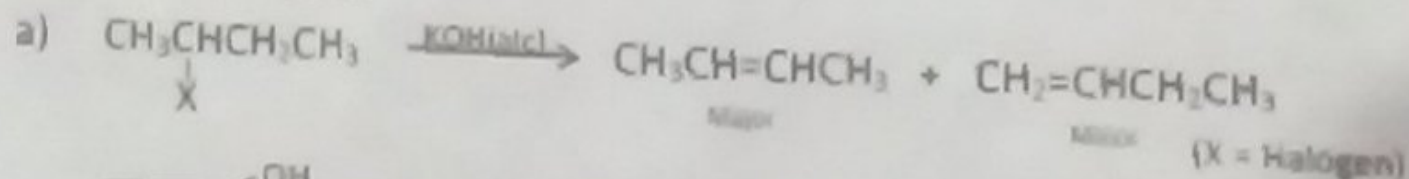


Review question

Insert the missing reagent in the following equation



Answers



RIVERS STATE UNIVERSITY

DEPARTMENT OF CHEMISTRY

SYNOPSIS OF GENERAL CHEMISTRY III (CHM 102) FOR 2021/2022 SESSION

DATE	WEEK	TOPIC/HIGHLIGHT
25/07/2022	1	Introduction Historical development of Organic Chemistry (including 'The doctrine of Vitalism' and synthesis of urea by Friedrich Wohler). Importance of Organic Chemistry. Nomenclature and classes of organic compounds.
01/08/2022	2	Electronic theory Covalent bond, Bond cleavages, Bond length, Bond angles and Polarity of bond. Hybridization
08/08/2022	3	Saturated Hydrocarbons Homologous series, Isomerism, Nomenclature (IUPAC), Preparations and Substitution reactions.
15/08/2022	4	Unsaturated Hydrocarbons I – Alkenes Nomenclature (IUPAC), Geometric isomerism, Preparations (including Elimination reactions - Dehydrohalogenation, Dehydration, Dehalogenation- and Reduction of alkynes).
22/08/2022	5	Unsaturated Hydrocarbons II – Alkenes Reactions (including Addition reactions – Hydrogenation, Halogenation, Hydration, Hydroxylation; Markovnikoff addition, Ozonolysis, Polymerization, Dimerization, Halohydrin formation, Oxymercuration-demercuration, Hydroboration-oxidation, Halogenation/Allylic substitution and Addition of free radicals).
29/08/2022	6	Unsaturated Hydrocarbons III - Alkynes Nomenclature (IUPAC), Preparation (including Alkylation of acetylene and terminal alkynes, Elimination reactions), Reactions (with hydrogen, halogens, water and hydrogen halides), Formation of acetylide ion with heavy metals (like silver and copper), Tautomerism and Ozonolysis.
05/09/2022	7	Aromatic Hydrocarbons – Benzene Aromaticity/Aromatic character, Nomenclature (IUPAC) - <i>ortho</i> , <i>meta</i> , <i>para</i> . Preparation (dehydrogenation of cyclohexane and dehydrogenation with cyclization of aliphatic hydrocarbons). Reactions - Electrophilic Aromatic Substitution (Nitration, Halogenation, Friedel-Crafts alkylation, Friedel-Crafts acylation, Sulphonation, Protonation and diazo coupling).
CONTINUOUS ASSESSMENT		
12/09/2022	8	Introduction to Stereochemistry Chirality, Stereogenic center, Optical activity, Polarimeter, E and Z system of nomenclature (The Cahn-Ingold-Prelog priority rules).
19/09/2022	9	Chemistry of some metals - Iron and Aluminum Properties, Extraction, Electrolysis and Uses. Some Alloys.
26/09/2022	10	Chemistry of some non-metals - Oxygen and Chlorine Properties, Preparation and Uses. Structure of Solids
03/10/2022	11	REVISION and EXAMINATION

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