

THE UNIVERSITY OF ZAMBIA
SCHOOL OF NATURAL SCIENCES
DEPARTMENT OF CHEMISTRY

2019/2020 ACADEMIC YEAR

CHE1000: INTRODUCTORY CHEMISTRY
ORGANIC CHEMISTRY TUTORIAL SHEET 1

15th October, 2020

FOR THE WEEK BEGINNING 19th OCTOBER, 2020.

TOPICS COVERED: Bonding in organic compounds: review of hybridization, formation and types of single and multiple covalent bonds and their principal characteristics, description of σ - and π - bonds as (sp^n-s), (sp^m-sp^n), ($p-p$) σ - and π - bonds, molecular orbital (MO) diagrams (or pictures), differences between σ - and π - bonds. Types of C, H and N in organic compounds.

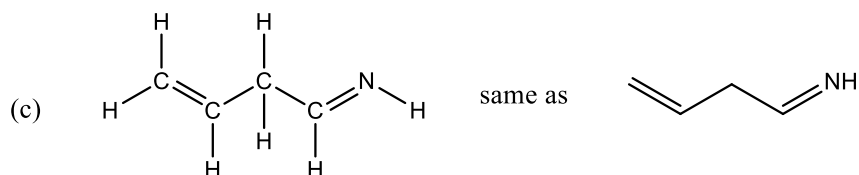
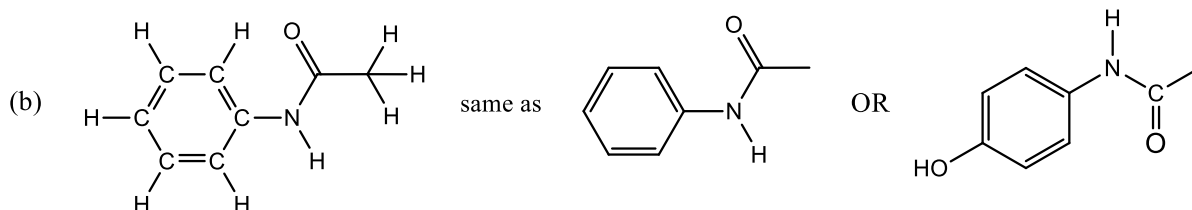
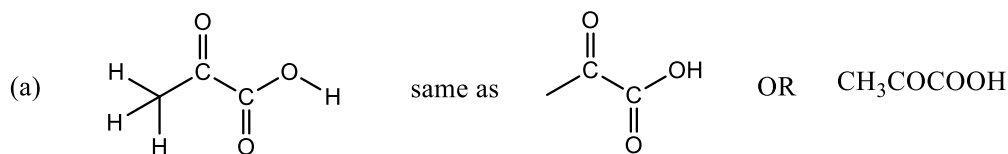
Instructions: Attempt all questions before your scheduled tutorial day and time.

Question 1

- (a) What is 'Organic Chemistry'?
- (b) With reference to hybridisation, how many types of carbons are found in millions of its compounds?. For each type of carbon, state how many other atoms are bonded to it and also the types of bonds (i.e. single bond/double bond/triple bond), including number of each type of bond.

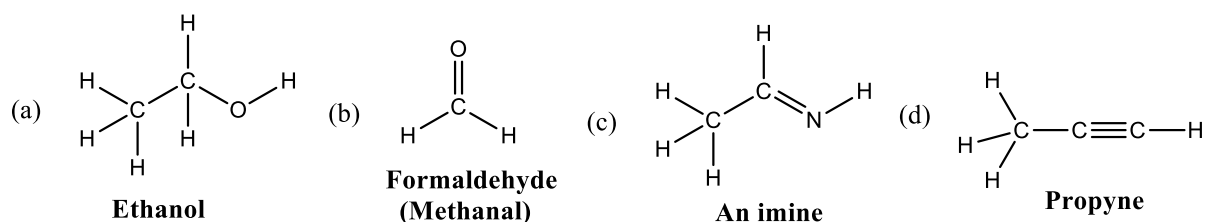
Question 2

Identify the types of bonds present as (sp^n-s), (sp^m-sp^n), ($p-p$) σ - and π - bonds, in the molecules shown below:



Question 3

Draw the molecular orbital diagram (picture) for the following molecules:



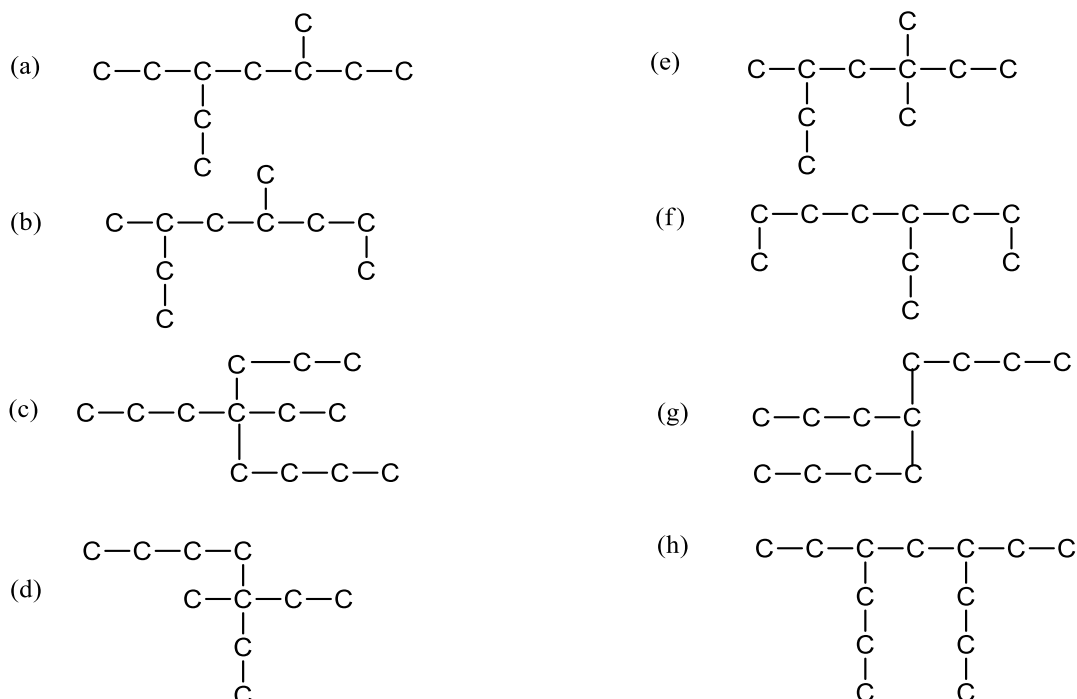
Question 4

Using the general formula for alkanes (C_nH_{2n+2}), answer the following questions:

- Number of carbon atoms present in an alkane which has 10 hydrogen atoms.
- Number of carbon atoms present in the structure of an alkane which has a total of 41 atoms.
- Total number of covalent bonds present in the alkane which has 7 carbon atoms.

Question 5

How many carbon atoms are present in the longest continuous carbon chain in each of the following skeletal structures?



Tutors:

- Kindly note that representation of organic compounds has not been done as yet.
- Please discuss Q1(b), Q2, Q3(a), Q3(d), Q4, Q5 and remaining questions in that order.