Question Bank

Basic **O**rganic **C**hemistry (*1st Stage*)
Dr. Peshawa Osw

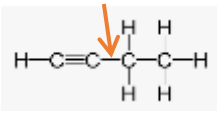
Q 1/ How many covalent bonds are predicted for each atom:
1. O 2. Al 3. Br 4. Si

Q 2/ Draw electron-dot pictures for:
1. LiBr 2. Na_2O 3. BeF_2 4. $AlCl_3$ 5. MgS

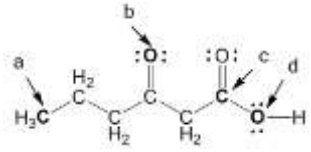
Q 3/ Label each bond in the following compounds as ionic or covalent:
1. F_2 2. CH_3CH_3 3. $NaNH_2$ 4. $NaOCH_3$

Q 4/ Indicate which of the following molecules is polar because it possesses a net dipole. Show the direction of the net dipole if one exists.
1. CF_4 2. CH_3Br 3. CH_2Br_2

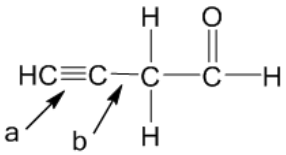
Q 5/ Compare the relative strengths for the indicated bonds:



Q 6/ Determine the type of hybridization for the 4 indicated atoms:



Q 7/ Arrange the 2 indicated bonds according to their relative strengths, then explain the reason for your answer:



Q 8/ Match the following compounds with their temperatures:

compounds	mp, °C
$(CH_3)_4C$	−17
$(CH_3)_2CHCH_2CH_3$	−160

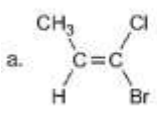
Q 9/ Draw the structures of all products expected from the monobromination of **isopentane** at room temperature, then circle the most probable one (major product).

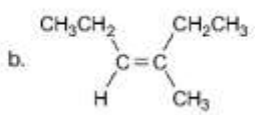
Q 10/ Starting from **ethyl chloride**, Prepare the following compounds:
Isohexane

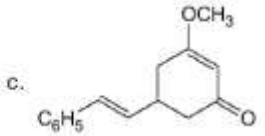
Q 11/ Draw a bond-line structure for each of the following compounds:
(a) 3-Isopropyl-2,4-dimethyl-2-pentene
(b) 4-Ethyl-2-methyl-2-hexene

Q 12/ Draw the structure corresponding to each IUPAC name.
(3*Z*)-4-ethyl-3-heptene

Q 13/ Label each C – C double bond as *E* or *Z* For the following compounds.







Q 14/ Explain why an alkyne often has a slightly higher boiling point than an alkene of similar molecular weight.

Q 15/ Convert each compound to 1-hexyne, $HC\equiv CCH_2CH_2CH_2CH_3$.

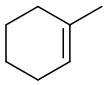
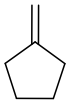
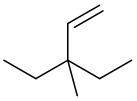
a. $Br_2CH(CH_2)_4CH_3$ b. $CH_2=CCl(CH_2)_3CH_3$ c. $CH_2=CH(CH_2)_3CH_3$

Q 16/ Circle the correct answer:

As the number of electrons between two nuclei increases, bonds become

a. taller and weaker. b. shorter and stronger. c. unchanged.

Q 17/ Classify each of the following alkenes as monosubstituted, disubstituted, trisubstituted or tetrasubstituted:

1. 
2. 
3. 
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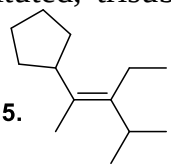
5. 

Q 18/ Draw the product formed when $CH_3CH_2C\equiv CH$ is treated with each of the following sets of reagents:

H_2O, H_2SO_4, $HgSO_4$.

Q 19/ Complete the following reactions (draw the structures **A**):

$$CH_3CH_3 + O_2 \xrightarrow{\text{Flame}} \mathbf{A}$$

Q 20/ How many products would be produced by monochlorination of 2,3,3-trimethylpentane.

Q 21/ Draw a Lewis structure for: (**Methanol**) and (**NaCl**).

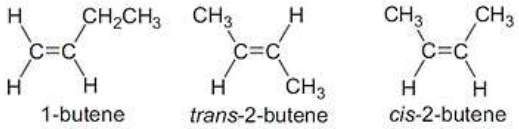
Q 22/ Indicate which of the following molecules is polar: (**CF_4**) and (**CH_2Br_2**).

Q 23/ Show the hybridization of ethene molecule using energy level diagram.

Q 24/ Rank the following molecules in order of increasing boiling point:

CH_3CH_2OH	$CH_3CH_2CH_3$	CH_3CHO
Ethanol	Propane	Ethanal

Q 25/ Rank the following alkenes according to stability:



Q 26/ Define the following:

Conformations

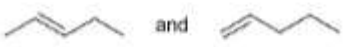
Q 27/ Fill in blanks:

…….. is based on the electrostatic attraction of two ions with opposite charges.

Q 28/ Provide a systematic name for each of the following hydrocarbons:

$(CH_3CH_2)_3CCH(CH_3)CH_2CH_2CH_3$

Q 29/ Label each pair of alkenes as constitutional isomers, stereoisomers or identical:

a.  and

c. 

Q 30/ Draw a stepwise mechanism for the following reactions:

Q 31/ Explain why?

Alkanes are very stable compounds.