23 K/U	12 Comm	12 App	8 T/I

Organic Unit Test

Name _____

Part A: Multiple Choice

Identify the choice that best completes the statement or answers the question. (10 marks)

1. How many isomers are there with the formula C_3H_5Br? Include both structural and goemetric isomers.
   a) 2
   b) 3
   c) 4
   d) 5
   e) 6

2. Which of the following will yield a carboxylic acid upon oxidation?
   a) a secondary alcohol
   b) an aldehyde
   c) a cycloalkane
   d) a ketone
   e) a tertiary alcohol

3. For which of the following compound(s) are cis and trans isomers possible?
   a) 2,3-dimethyl-2-butene
   b) 3-methyl-2-pentene
   c) 1-chloro-4-methyl-2-pentyne
   d) 1,3,5-trichlorobenzene
   e) all can exhibit cis/trans isomersism

4. When both hydrogens of water are replaced by alkyl groups, the compound becomes:
   a) an aldehyde
   b) a ketone
   c) an ether
   d) a secondary alcohol
   e) a carboxylic acid

5. Which one of the following acyclic compounds is a member of the alkyne family?
   a) C_3H_6
   b) C_4H_8
   c) C_7H_{14}
   d) C_6H_{10}
   e) C_5H_{12}

6. 2-propanol is a :
   a) primary alcohol
   b) secondary alcohol
   c) tertiary alcohol
   d) ketone
   e) ether

7. Which one of the following acyclic compounds is unsaturated?
   a) C_6H_{14}
   b) C_4H_8
   c) C_3H_8
   d) CH_4
   e) C_2H_6

8. The general formula for a cyclic alkane is:
   a) $C_{2n}H_n$
   b) C_nH_n
   c) C_nH_{2n+2}
   d) C_nH_{2n}
   e) C_nH_{2n-2}

9. Which of the following is an isomer of 2-butene?
   a) 2-methylpropane
   b) cyclobutene
   c) 2-methylbutene
   d) methylcyclopropane
   e) 1,3-dimethylpropane

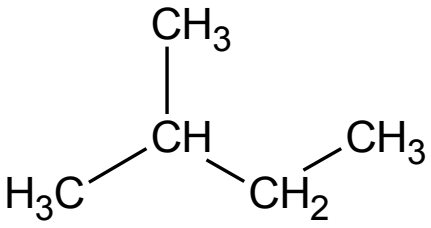
10. Cis-trans isomers are possible because of:
   a) free rotation about a single bond
   b) carbon bonding orbitals are tetrahedral
   c) there is no rotation about single bonded carbons
   d) there is no rotation about double bonded carbons
   e) organic molecules can resonate

Part B: Short Answer

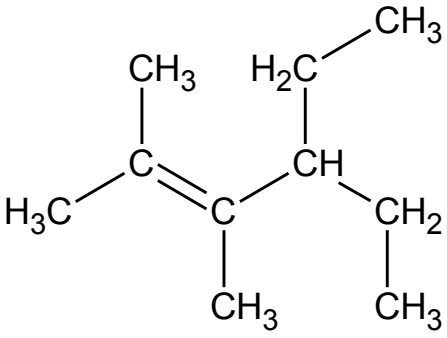
Answer all of the questions in the space provided. Marks for each question are indicated.

1. Give the proper IUPAC name for the following

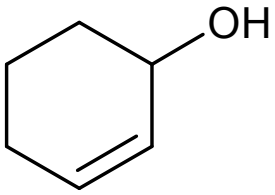
a) (2 marks)



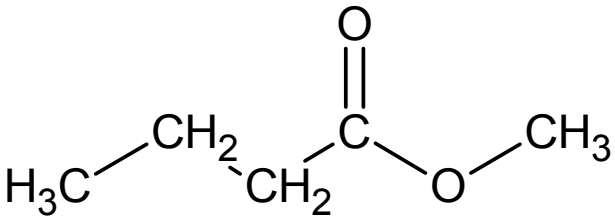
b) (3 marks)



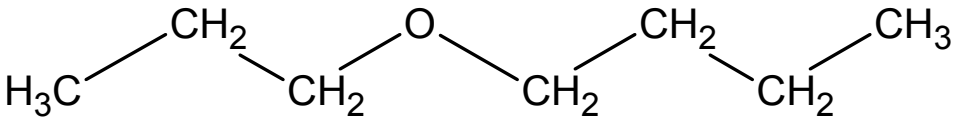
c) (3 marks)



d) (3 marks)



e) (2 marks)



2. Explain why the following names are wrong according to IUPAC .

a) 2-methyl-3-chloro-3-butene (2 marks)

b) cis 3-bromo-5-ethyl-1-hexyne (2 marks)

3. Draw the following structures. (8 marks)

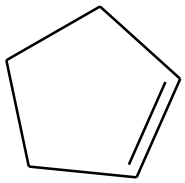
a) 2-methylheptanal

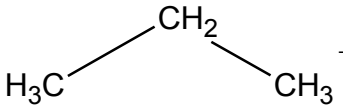
b) 1-bromobenzene

c) 1,4-diaminobutane

d) 2-chloropentanoic acid

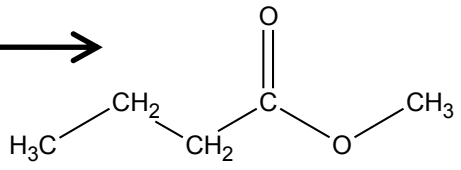
4. Fill in ALL of the missing components to make the reaction complete. Draw **STRUCTURAL** diagrams where possible. Do NOT balance. Naming of the compounds is *NOT* necessary. (12 marks)

a)  + Br_2 ⟶

b)  + OXYGEN $\xrightarrow{\text{heat}}$

c) 2-methyl butane + F-F ⟶

d) + Strong H_2SO_4 ⟶ 2-butene + H_2O

e) CH_3OH + ⟶  + H_2O

f) 2-propanone + Heat, Pressure, H_2 ,Pt ⟶

5. Please choose **ONE** of the following questions. **ONLY** complete the question you are most confident.

A compound of formula C_3H_8O exists as two isomers, A and B. With a catalyst and $KMnO_4$ (which is a strong oxidizing agent), compound A forms another compound, C of formula C_3H_6O, while B forms compound D of formula $C_3H_6O_2$. A simple litmus test reveals that compound D is a weak acid. Give the IUPAC names AND draw the structures of the four compounds. (8 marks)

OR

Explain in detail how to synthesize 1-chloropropanone from 1-chloropropane. Include all structural diagrams and IUPAC names of reactants and products to illustrate your answer. (8 marks)