YEAR 11 CHEMISTRY **Organic Chemistry Test**

ANSWER BOOKLET
Total Marks: 50

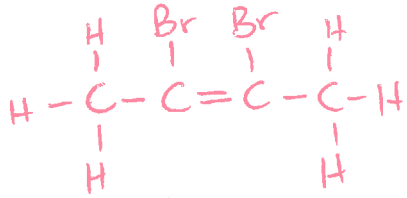
NAME : SOLUTION **DATE :** _____

Part A: Multiple Choice Answer Sheet

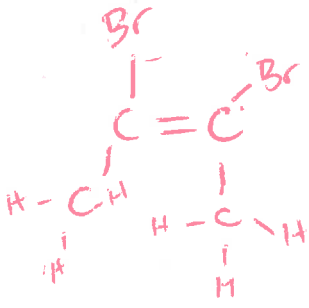
1. [A] [B] [C] [D]
2. [A] [B] [C] [D]
3. [A] [B] [C] [D]
4. [A] [B] [C] [D]
5. [A] [B] [C] [D]
6. [A] [B] [C] [D]
7. [A] [B] [C] [D]
8. [A] [B] [C] [D]
9. [A] [B] [C] [D]
10. [A] [B] [C] [D]

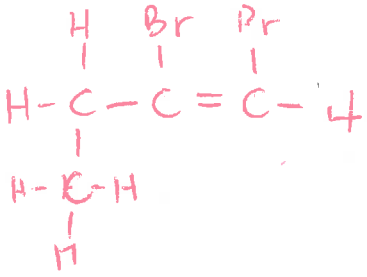
Part B: Short Answer Questions

1. a. Draw *cis* 2,3 dibromobut-2-ene (2 marks)



b. Draw two other isomers of *cis* 2,3 dibromobut-2-ene (2 marks)

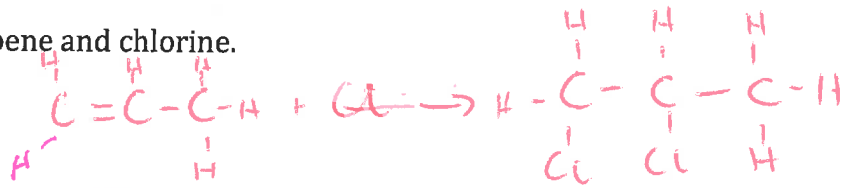




2. Write balanced equations for the reactions between the following substances:
(You may like to use some of the space to start with a word equation but will only earn marks for the final balanced chemical equation)

(8 marks)

a) Propene and chlorine.



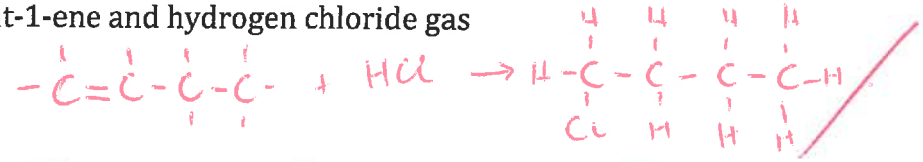
$C_3H_6 + Cl_2 \rightarrow C_3H_6Cl_2$

b) Methane and bromine gas in UV light (first step only)

$CH_4 + Br_2 \xrightarrow{\text{UV light}} CH_3Br + HBr$

alkanes should use semi structural formulae.

c) but-1-ene and hydrogen chloride gas



$C_4H_8 + HCl \rightarrow C_4H_9Cl$

d) The combustion of propane gas in a plentiful supply of oxygen:

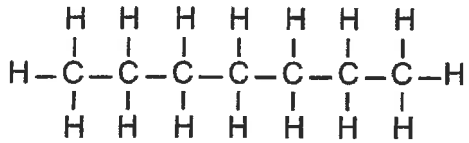
$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$

3. Provide the full correct IUPAC name for each of the following structures:

(7 Marks)

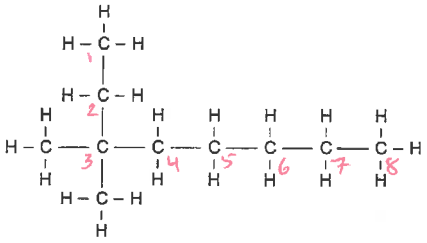
Name

a)



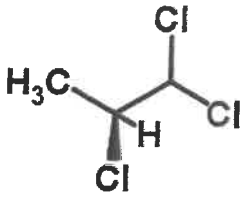
heptane

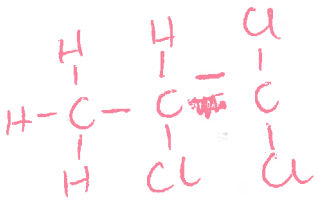
b)

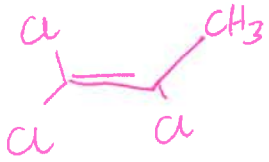


3,3, dimethyl octane

c)

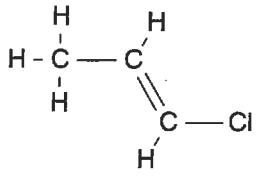






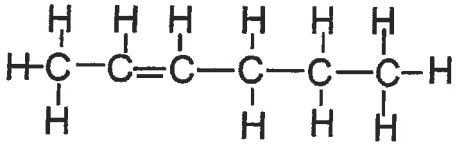
1,1,2 trichloro propene

d)



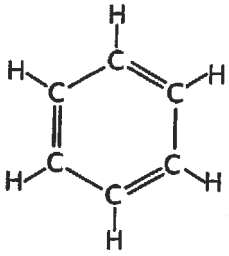
trans 1 chloro prop-1-ene

e)



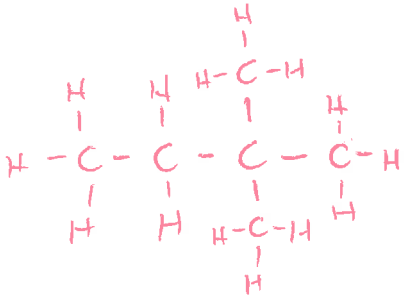
cis hex-2-ene

f)



benzene

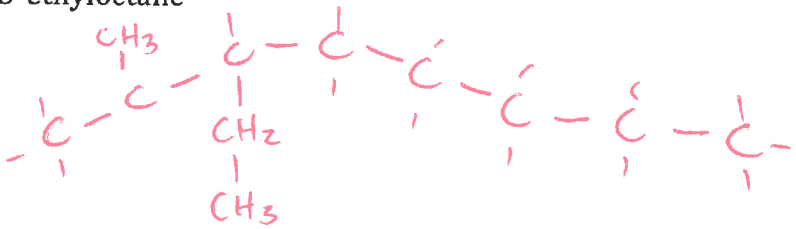
i) $CH_3CH_2C(CH_3)_3$



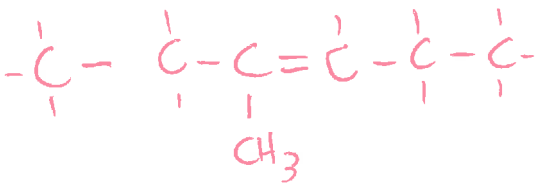
2,2 dimethyl butane

4. Draw the structure of the following compounds: **(7 marks)**

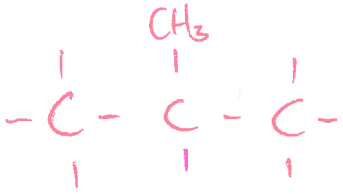
a) 2-methyl-3-ethyloctane



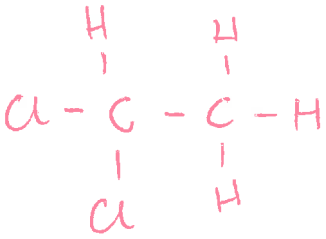
b) *trans*-3-methylhex-3-ene



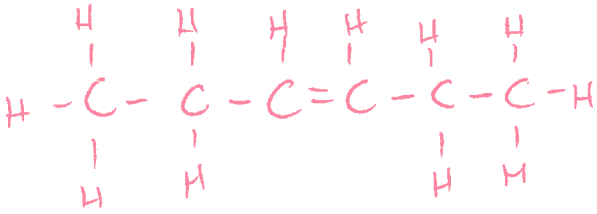
c) Methylpropane



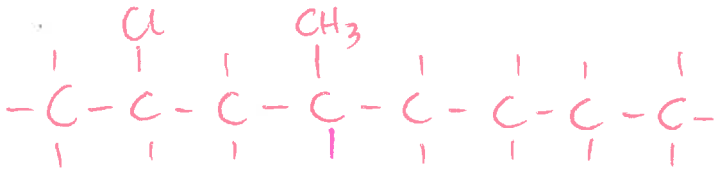
d) 1,1-dichloroethane



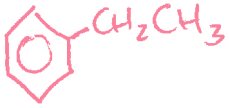
e) *cis*-hex-3-ene



f) 2-chloro-4-methyloctane



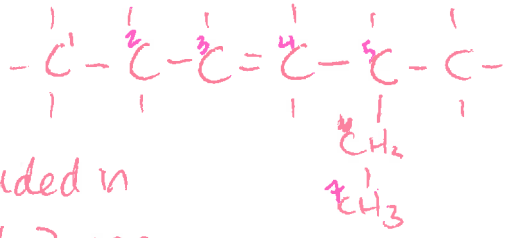
g) ethylbenzene



7. Each of the following compounds has been **named incorrectly** according to IUPAC. In each case **describe** the error(s) in naming, and write the correct name.
(Hint: You will probably need to draw them)

(6 Marks)

a) 1,3-diethylpent-1-ene



Description of error(s):

ethyl group on C1 is included in parent chain to give hept-3-ene

Correct IUPAC name:

5-ethyl hept-3-ene

b) 1,1-dichloro-2-bromobut-4-ene

Description of error(s):

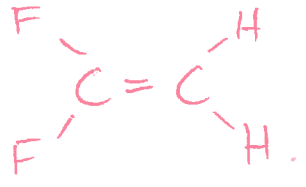
numbering starts from end nearest double bond. ie. but-1-ene

constituent groups listed alphabetically

Correct IUPAC name:

3 bromo, 4,4-dichloro but-1-ene

c) *trans*-1,1-difluoroethene



Description of error(s):

two fluorines, same C

∴ no geometric isomerism

Correct IUPAC name:

1,1, difluoroethene

Extended Answer Calculations question **(8 Marks)**

8. A portable gas stove that has become popular of late runs on aerosol-like cans of **butane.** These stoves use a combustion reaction between the butane and oxygen gas drawn from the surrounding air.

a. Construct a balanced chemical equation for the complete combustion of butane. (2 marks)

$2C_4H_{10} + 13O_2 \longrightarrow 8CO_2 + 10H_2O$

b. If, while boiling a kettle, 1.00 moles of butane were consumed, how many moles of Oxygen gas were required to be drawn from the air? (1 mark)

6.5 mol

c. What is the Molar mass of butane? (1 mark)

$M(C_4H_{10}) = [M(C) \times 4] + [M(H) \times 10]$
$= 12.01 \times 4 + 1.008 \times 10$
$= 48.04 + 10.08$
$= 58.12\ g\,mol^{-1}$

d. During another cooking event, 150.0g of butane was burnt completely.

i. How many moles of butane is this? (1 mark)

$n = \frac{m}{M} = \frac{150}{58.12} = 2.58\ mol$

ii. What mass of oxygen is required to complete this reaction? (3 marks)

$n(C_4H_{10}) : n(O_2) = 2 : 13$

$n(O_2) = \frac{13}{2} n(C_4H_{10})$

$= \frac{13}{2} \times 2.58$

$= 16.77\ mol\ O_2$ required.

$m(O_2) = n M$
$= 16.77 \times 32$
$= 536.64$