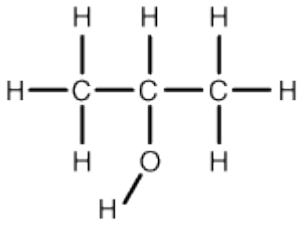
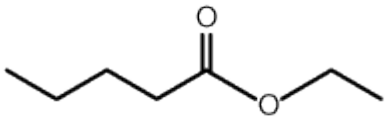
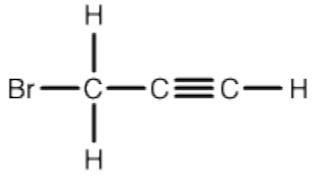
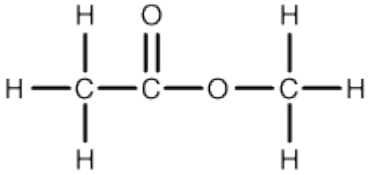
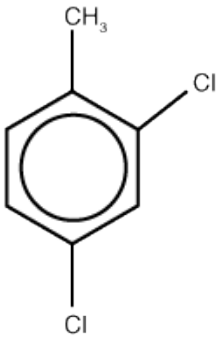
Module 2 Summative Assessment

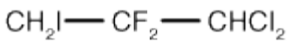
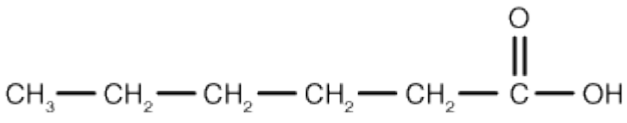
Marks		
Maximum Possible	***Earned***	***%***
57		

Lesson 1

1. Using IUPAC guidelines, name the following organic compounds.
Answer (9 Marks)

	IUPAC Name
A.	
B.	

C.	**C_3H_7COOH**
D.	
E.	
F.	
G.	$CH(OH)_2—CH_2—CH_2—CHOH—CH_3$

H.	
I.	

2. Consider the following pairs of compounds. For each pair, predict which compound has greater solubility in water and explain why. Refer to the compound's ability to from hydrogen bonds. *You may wish to review pages 111-112 in your textbook.*

A. hexane and hexanol

Answer (2 Marks)

B. pentan-3-ol and pentane-1,2,3-triol

Answer (2 Marks)

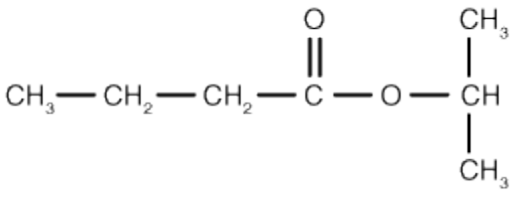
3. Write the **molecular formula** for each of the following compounds.

Answer (4 Marks)

Organic Compound	**Molecular Formula**
A. 1,3-dichloro-3-fluorocyclohexane	
B. pentanoic acid	
C. propylmethanoate	
D. butane-1,3,3-triol	

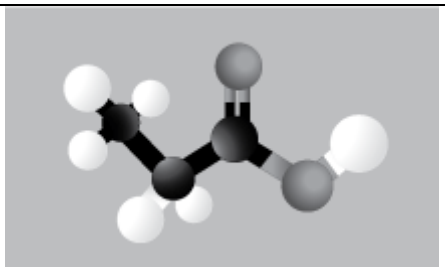
4. Identify the IUPAC name of the alcohol and the IUPAC name of the acid that were used to synthesize each of the following esters.

Answer (4 Marks)

	Reactants	**Ester**
A.	Alcohol IUPAC Name: Carboxylic Acid IUPAC Name:	ethyl heptanoate
B.	Alcohol IUPAC Name: Carboxylic Acid IUPAC Name:	

Use the following information to answer Question 5.

Organic Compound



Legend

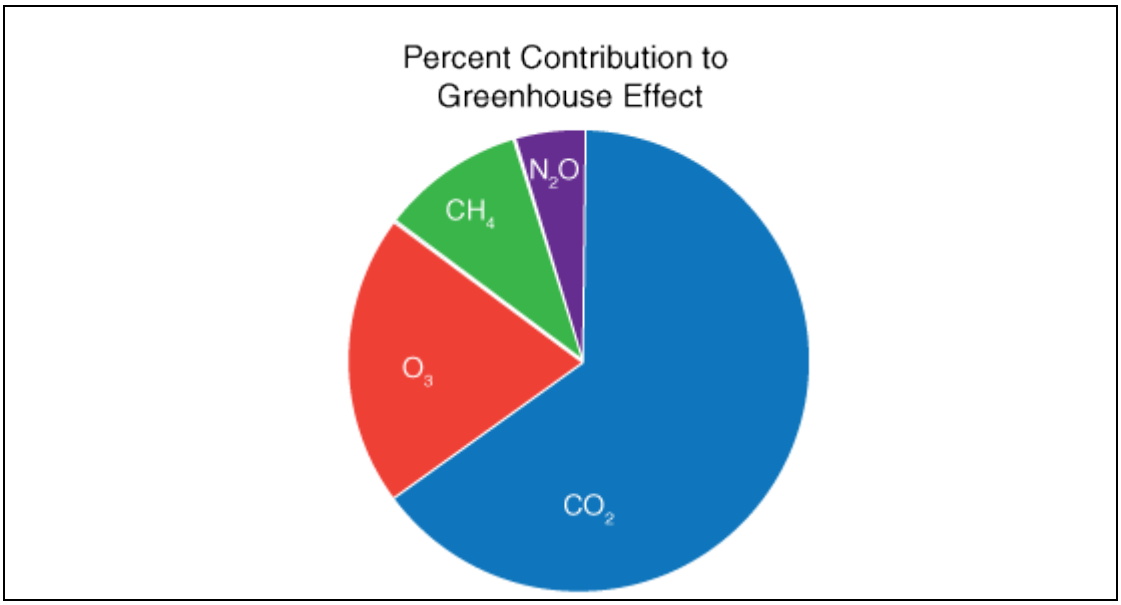
White – hydrogen atom
Black – carbon atom
Grey – oxygen atom

5. Draw the structure and identify the IUPAC name for one isomer of the above compound. Recall from Module 1 that an isomer is a compound with the same molecular formula, but a different structure.

Answer (**2 Marks**)

Lesson 2

Use the following information to answer Questions 6 and 7.



6. The combustion of fossil fuels will **mainly** cause an increase in the amount of which of the above greenhouse gases?

Answer (1 Mark)

7. Which of the above greenhouse gas contributors is an organic compound?

Answer (1 Mark)

8. Write a balanced reaction equation, using molecular formulas, for the complete combustion of 2,2,4-trimethylpentane - a component of gasoline that has an octane rating of 100.

Answer (2 Marks)

9. Identify two additional products that may be produced if fossil fuels undergo **incomplete** combustion.

Answer (1 Mark)

Use the following information to answer Question 10.

Some individuals are proponents of using propane fueled vehicles. The following two reactions are complete combustion reactions for propane and 2, 2, 4 – trimethylpentane (a component of gasoline)

Combustion Reactions

1. $C_3H_8(g) + 5\ O_2(g) \rightarrow 3\ CO_2(g) + 4\ H_2O(g)$

2. $2\ C_8H_{18}(l) + 25\ O_2(g) \rightarrow 16\ CO_2(g) + 18\ H_2O(g)$

10. Consider the two reactions shown above. From an environmental perspective, which reaction could be considered more environmentally friendly? Explain your answer.

Answer (2 Marks)

11. Identify and describe **one** major environmental concern for **Alberta** associated with the production of $CO_2(g)$ from combustion reactions.

Answer (2 Marks)

View the Virtual Investigation "Double Bonds" in Module 2 Lesson 2.2 and use the information provided to answer Questions 12 – 15.

12. Identify the manipulated and responding in the Virtual Investigation. In addition, identify two variables that should be controlled.

Answer (4 Marks)

Manipulated	
Responding	
Controlled	

13. Use the data table below to record observations from the Virtual Investigation "Double Bonds".

Answer (4 Marks)

Substance	**Initial colour of substance**	**Colour of bromine**	**Colour when mixed with bromine**

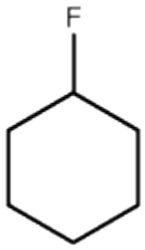
14. Indicate whether corn oil is a saturated or unsaturated compound.
Answer (1 Mark)

15. Using line diagrams represent the reaction of cyclohexene with bromine. Using IUPAC rules, name the product. Finally, identify the reaction type.

Answers (3 Marks)

Reaction of Cyclohexene with Bromine	
Equation	
Product (IUPAC Name)	
Reaction Type	

16. Show how you would synthesize fluorocyclohexane using cyclohexane as a starting material.



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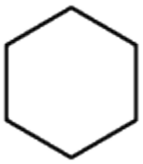


Include in your response:

- the name of the process
- a chemical equation (using line structural diagrams for organic compounds)
- IUPAC names for all reactants and products

Answer (4 Marks)

View the Virtual Investigation "Synthesizing an Ester" in Module 2 Lesson 2.5 and use the information provided to answer Questions 17 and 18.

17. Identify the two **types** of organic compounds that react to form an ester.

Answer (1 Mark)

18. Write the reaction equations for the synthesis of the two esters in this Virtual Investigation. Use structural diagrams and name all reactants and products.

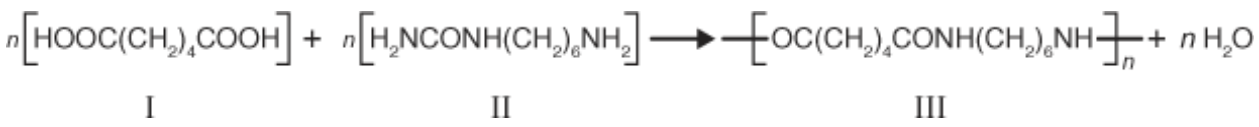
Answer (4 Marks)

Lesson 3

View the Virtual Investigation "Polymerization" in Module 2 Lesson 3.3. Then use the information below to answer Questions 19 and 20.

Use the following additional information to answer Questions 19 and 20.

The reaction between adipic acid and hexamethylenediamine produces nylon.



I II III

19. The reactants and products shown above can be classified as follows. Please classify using the Roman Numerals underneath.

Answer (3 Marks)

Monomer 1	
Monomer 2	
polymer	

20. What type of polymerization reaction is being illustrated in the information box?

Answer (1 Mark)