

Science - Grade 11

Competency - 2.0 Investigate matter, properties of matter and their interaction to enhance the quality of life.

Competency level - 2.9, 2.10

Lesson - Hydrocarbons and their Derivatives.

Content: Hydrocarbons, Polymers

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Competency 2.9 Investigates the nature and uses of hydrocarbons and their derivatives

Exercises.

1. (a). What is the main characteristic of compounds of hydrocarbons, when the composition is considered?

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- (b). Write 5 fuels that belong to the group hydrocarbons.

I.....

II.....

III.....

IV.....

V.....

2. Hydrocarbon compounds can be further classified as Alkanes, Alkenes and Alkynes.

- (a). Write the two types of bonds found in alkanes.

I.....

II.....

- (b). Write the common molecular formula of alkanes.

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3. Complete the following table based on Alkanes containing carbon atoms from 1 to 5.

No of C atoms	Alkane	Molecular formula	Structural formula
1	Methane		
2	Ethane		
3	Propane		
4	Butane		
5	Pentane		

1. (a) Mention the two types of bonds essentially found in alkenes which is a type of hydrocarbon.

I.....

II.

- (b). Write the other type of bond that can be found in an alkene except the above mentioned two types of bonds.

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- (c). Ethene is the simplest alkene and its molecular formula is C_2H_4 . Draw the molecular structure of it.

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5. Derivatives of Alkenes are formed by displacing one or more hydrogen atoms of an ethane molecule by atoms such as chlorine and fluorine which are of group VII elements.

- (a). Complete the following table based on two derivatives of ethene molecule.

Derivative of ethane	Structural formula
Chloroethene C_2H_3Cl	
Tetrafluoroethene. C_2F_4	

- (b). Write the main uses of ethene and derivatives of it.

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Past paper Questions:

- The LP gas cylinders used for domestic cooking mainly contain propane and butane, both belonging to the hydrocarbon group.
 - What is meant by “hydrocarbons”?
 - A. To which series of hydrocarbons do propane and butane belong?

B. What is the common formula related to the hydrocarbon series you stated above?

(iii). The balanced chemical equation relevant to the complete combustion of butane is as follows.



Write the values relevant to 'x' and 'y' in the above equation.

(2018)

Competency level 2.10: Explores the diversity of polymers

Exercises.

1. Explain the following terms.

a. Polymers

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b. Monomers

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c. Repeating unit

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2. Complete the following table based on polymers.

Polymer		Monomer	Repeating unit	Representation of the polymer
I	Polyethene(Polythene)			
II	Polychloroethene (PVC)			
III	Polytetrafluoroethene (TEFLON)			
IV	Polyisoprene(Rubber)			

3. Write the special properties and the uses in the given table.

	Polymer	Special properties	Uses
I	Polyethene(Polythene)		
II	Polychloroethene (PVC)		
III	Polytetrafluoroethene (TEFLON)		
IV	Polyisoprene (Rubber)		

4. Polymers can be classified as natural polymers and artificial polymers.

a. Name 6 natural polymers.

I.....II.III.
IV.V.VI.

b. Name 8 artificial polymers.

I.....II.III.
IV.V.VI.
VII.VIII.

1. Complete the following table based on the three types of polymers depending on the structure.

	Type of polymer	Linear representation.	Examples
I	Linear polymers		
II	polymers with side chains		
III	Polymers with cross links.		

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2. Artificial polymers are manufactured abundantly. Write 5 specific properties of these polymers.

I.

II.

III.

IV.

V.

Past paper Questions

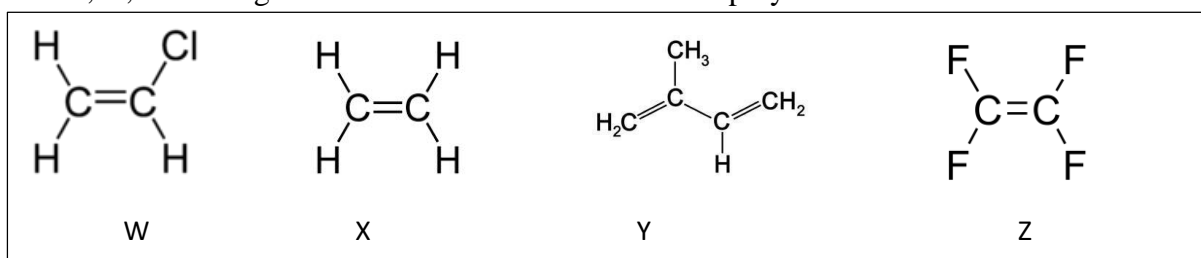
1. (a). What is meant by vulcanization of rubber?

(b). Write down a main characteristic difference between vulcanized rubber and rubber that is not vulcanized. (2001)

2. Polythene is an artificial substitutional substance that is made use in large scale Name the building unit (monomer) of polyethene. (2002)

3. Rubber is vulcanized to increase its utility value. Name the main substance used in vulcanizing of rubber? (2003)

4. W, X, Y and Z given are some monomers of certain polymers.



I. Mention a derivative of ethene out of the monomers W, X, Y and Z.

II. Name the polymers formed by the monomers W, X and Y in order

III. What is the natural polymer out of the polymers you mentioned in the above (II)? (2017)

5. Natural rubber is a polymer.

(i). Name the monomer which natural rubber is made up of.

(ii). Natural rubber is vulcanized by heating rubber with Sulphur to a certain temperature,

- a. Mention the structural change that occurs in natural rubber during vulcanization.
- b. State two changes in the properties of natural rubber brought about by the structural change you stated in part (a) above.
- c. Name one pollutant causing global warming and one pollutant causing acid rain which are added to air when vulcanized tyres are burnt in air (The pollutants causing respective effects should be written clearly and separately). (2018)