

1. What elements have atomic numbers 16 and 56? Write down their names.

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a) What are the physical and the chemical properties of their simple substances? Fill in the table below.

Chemical symbol	Simple substances	Physical state at STP	Type of bonding	Hydrogen compounds	Chemical formula and character of the oxides	Chemical formula and character of the hydroxides

b) Express with a Lewis dot formula the bond formation in the hydrogen compound of the atomic number 16 element. What is the character of its aqueous solution and why (explain with the help of chemical equations)?

Lewis dot formula:

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2. One of the oxides of a period 2 element is a highly toxic gas which blocks the oxygen transport to the cells if breathed in. The hydrogen compound of the same element is the simplest organic compound:

a) What is this chemical element?

b) Express the formulae of the described compounds and name them.

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c) Express the balanced chemical equations of their burning.

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3. Which of the compounds are polar, which are nonpolar and which – ionic?

NH_3 NO N_2O Mg_3N_2 CO CO_2 CH_4 CCl_4 CHCl_3 CaC_2 $\text{H}_2\text{NCH}_2\text{COOH}$ CH_3COOH HCHO

Nonpolar: **Ionic:**

Polar:

4. Which of the following substances does HNO_3 react with? Express all possible reactions with balanced chemical equations and name the products.



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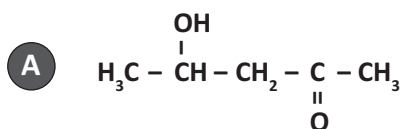
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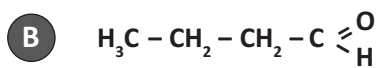
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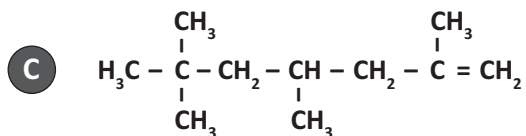
5. Which of the compounds are homologues and which – isomers? Name the compounds.



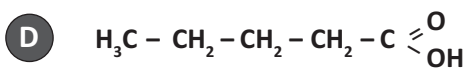
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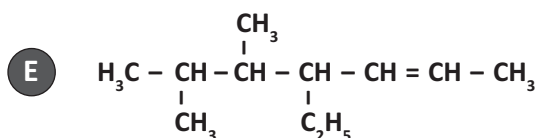
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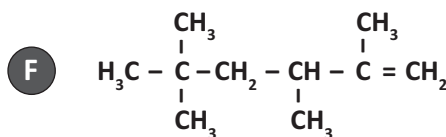
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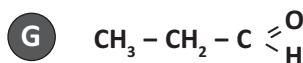
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Homologues:

Isomers:

6. The molecules of cyclohexane and benzene both contain a 6-carbon atoms ring. Which molecule is planar and why?

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7. Express with balanced chemical equations the production of benzene from amorphous carbon:



①.....

②.....

③.....

④.....

⑤.....

⑥.....

⑦.....

8. Is it possible to obtain ethanoic acid from carbon dioxide in the air? Look at the scheme below. Which are the compounds A and B?



Express the transformations with balanced chemical equations and name the processes.

①.....

②.....

③.....

9. The different classes of organic substances can be distinguished from each other with the help of specific reagents. Recall them by filling in the table below.

COMPOUND	REAGENT	OBSERVATIONS
ethene		
ethyne		
ethanol		
ethane-1,2-diol		
propane-1,2,3-triol		
phenol		
ethanal		
propanone		
glucose		
starch		
protein		

10. What are the global ecological issues resulting from the use of fuels and detergents in the everyday life? Explain:

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