

The test consists of three parts. In part A, you should choose the correct answer (please note that only one answer is expected). In part B, you should answer all questions as detailed as possible.

Also, there is a special bonus task (C1). Try to solve this only once you have completed all, or the most of the tasks of parts A and B. This task will not influence the usual test score, but, once solved, it will be considered by us. Good luck!

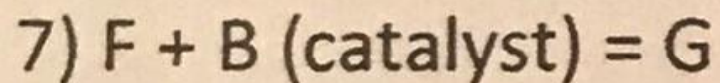
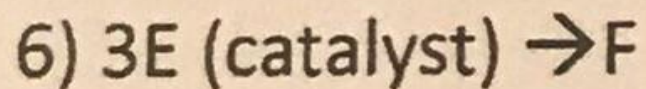
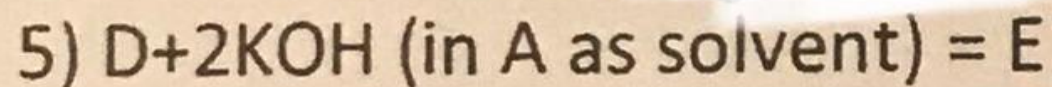
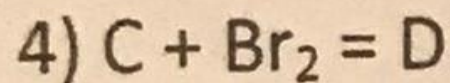
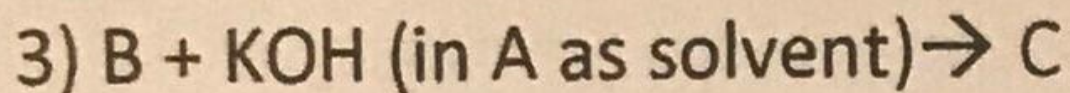
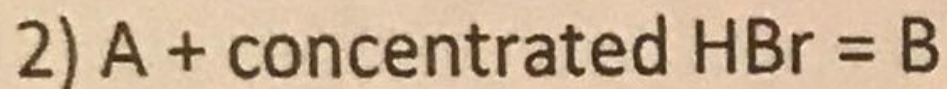
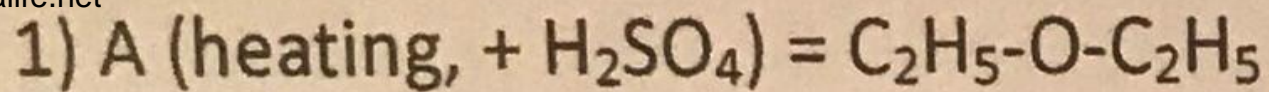
### Intro Test-I

#### Part A

No.	Question
	Which full electronic configuration corresponds to the ion $P^{3-}$ ? a) $1s^2 2s^2 2p^6 3s^2$ b) $1s^2 2s^2 2p^6 3s^2 3p^3 3d^3$ c) $1s^2 2s^2 2p^6 3s^2 3p^3$ d) $1s^2 2s^2 2p^6 3s^2 3p^6$
	Which type of chemical bond is present in $NH_3$ molecule? a) ionic b) polar covalent c) non-polar covalent d) metallic
	If some $NaNO_3$ is put into water, it: a) does not dissolve b) dissolves, but does not dissociate c) dissociates into $Na^+$ and $NO_3^-$ d) reacts with water, resulting in $NaOH$ and $NO_3^-$
	Iron (III) oxide, $Fe_2O_3$ does not react with: a) aqueous solution of $HCl$ b) concentrated solution of $NaBr$ c) solution of $H_2SO_4$ d) Aluminum powder (Al), heating
	In reaction $2KMnO_4 + 16HCl \rightarrow 5Cl_2 + 2KCl + 2MnCl_2 + 8H_2O$ $KMnO_4$ acts as: a) reductant b) oxidant c) solvent d) acid
	Propionic acid ( $CH_3CH_2COOH$ ) does not react with: a) ethanol b) ammonia c) acetic acid d) sodium hydroxide
	Benzyl acetate can be obtained by reaction of: a) benzyl alcohol and acetic acid b) benzyl alcohol and ethanol

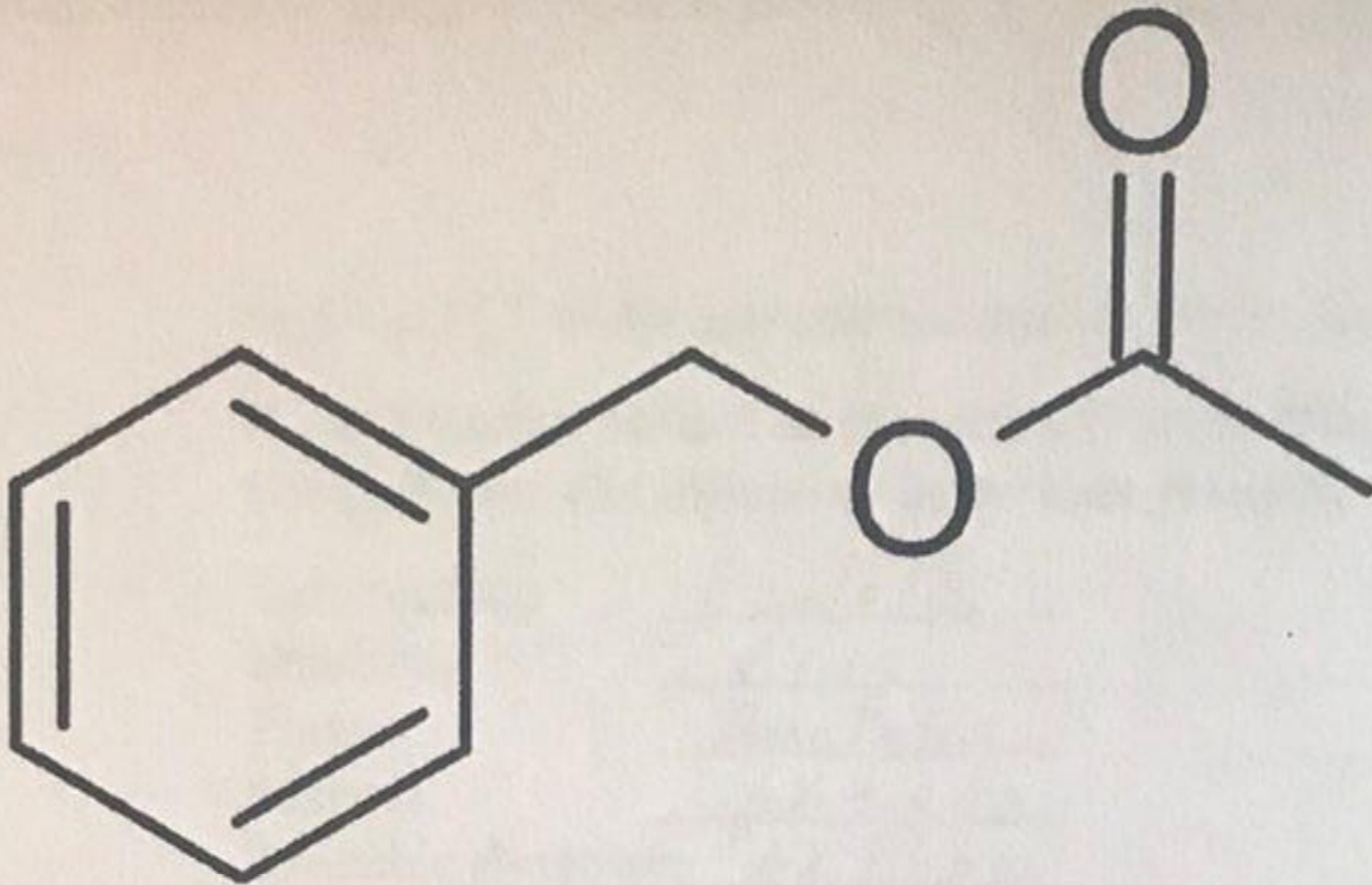
ance the reaction:

ere forms a greenish-yellow gas. Find its mass if the mass



Complete and balance all reactions

From **only** carbon-containing starting compound, propose the synthesis.



Name \_\_\_\_\_  
 Surname \_\_\_\_\_  
 Date of birth \_\_\_\_\_

In the tasks 1 - 7 select one or several correct answers.

1. Which term of mitosis describes chromosomes beginning to move apart in animal cells?

- A. prophase;
- B. prometaphase;
- C. metaphase;
- D. anaphase;
- E. telophase.

2. If there are 24 chromosomes in a somatic cell, how many chromosomes are in a gamete?

- A. 12;
- B. 24;
- C. 36;
- D. 48;
- E. 72.

3. Blood returning to the mammalian heart in a pulmonary vein drains first into the:

- A. Vena cava;
- B. Left atrium;
- C. Right atrium;
- D. Left ventricle;
- E. Right ventricle.

4. Identify the membranous organelles from the following list:

- A. Ribosome;
- B. Nucleus;
- C. Endoplasmic reticulum;
- D. Cytoskeleton;
- E. Cell wall.

5. Which of the following lists of organisms is ranked in correct order from highest to lowest percent in production efficiency?

- A. Mammals, insects, fish;
- B. Mammals, fish, insects;
- C. Insects, mammals, fish;
- D. Insects, fish, mammals;
- E. Fish, insects, mammals.

6. What is a key difference in gene expression between eukaryotic and prokaryotic cells?

- A. In eukaryotic cells, transcribed RNA sequences function as termination signals;
- B. In prokaryotes, proteins are assembled directly from DNA;
- C. In prokaryotic cells, the RNA transcript is immediately available as mRNA without processing;
- D. Prokaryotes do not contain ribosomes;
- E. RNA polymerases are involved only in initiation of transcription in eukaryotes.

7. Interactions that occur when a species cannot live without its mutualistic partner:

- A. Symbiosis;
- B. Obligate mutualism;
- C. Neutralism;
- D. Facultative mutualism;
- E. Commensalism.

In the task 8 select one correct answer for each disease.

8. Define the nature of the cause (Virus, Bacteria or Protista) for the following infectious diseases.

- Tuberculosis
- Smallpox
- Plague
- Malaria
- Amoebic dysentery

In the task 9 range terms with numbers according to the task.

9. Put the levels of hierarchical organization of life from least to most inclusive:

- A. Class \_\_\_\_\_
- B. Family \_\_\_\_\_
- C. Genus \_\_\_\_\_
- D. Kingdom \_\_\_\_\_
- E. Order \_\_\_\_\_
- F. Phylum \_\_\_\_\_
- G. Species \_\_\_\_\_

In the tasks 10 - 13 write the answer in a single or several words.

10. How many type of gametes does the individual with the following genotype produce?  $Rh^+Rh^-I^A I^B X^h Y$

11. In cats, the gene for black fur is dominant and the gene short fur is recessive, and the gene is linked to the X chromosome. What are the possible genotypes and phenotypes in the offspring of two short-furred heterozygous cats?

12. Write down the following definition. The synthesis of RNA using a DNA template.

13. Write down the following definition. A form of acquired immunity in which the body produces its own antibodies against disease-causing antigens.

In the task 14 put a number of definition after each term.

14. Match terms with their definitions.

- A. Androgens \_\_\_\_\_
  - B. Calcitonin \_\_\_\_\_
  - C. Progesterin \_\_\_\_\_
  - D. Corticosteroids \_\_\_\_\_
  - E. Prolactin \_\_\_\_\_
1. Female hormones generated in the ovaries
  2. Hormone responsible for milk production
  3. Support sperm formation; development and maintenance of male secondary sex characteristics
  4. Thyroid hormone that tends to lower the level of calcium in the blood plasma and inhibit resorption of bone
  5. Used medically as an anti-inflammatory agent

In the tasks 15 - 19 write down the full answer in a box. If there is not enough space on this side of the paper use the other side (but write the label "check on the other side").

15. Use the genetic code table to find out the mRNA and the polypeptide sequence from the following DNA sequence: TAGGCATCATTG.

		Second Letter							
		U		C		A		G	
1st letter	U	UUU   Phe	UCU   Ser	UAU   Tyr	UGU   Cys	U			
	UUC			UAC		C			
	UUA	Leu	UCA	UAA   Stop	UGA   Stop	A			
	UUG		UCG	UAG   Stop	UGG   Trp	G			
1st letter	C	CUU   Leu	CCU   Pro	CAU   His	CGU   Arg	U			
	CUC		CCC	CAC	CGC	C			
	CUA		CCA	CAA   Gln	CGA	A			
	CUG		CCG	CAG	CGG	G			
1st letter	A	AUU   Ile	ACU   Thr	AAU   Asn	AGU   Ser	U			
	AUC		ACC	AAC	AGC	C			
	AUA		ACA	AAA   Lys	AGA   Arg	A			
	AUG	Met	ACG	AAG	AGG	G			
1st letter	G	GUU   Val	GCU   Ala	GAU   Asp	GGU   Gly	U			
	GUC		GCC	GAC	GGC	C			
	GUA		GCA	GAA   Glu	GGA	A			
	GUG		GCG	GAG	GGG	G			

DNA: TAGGCATCATTG

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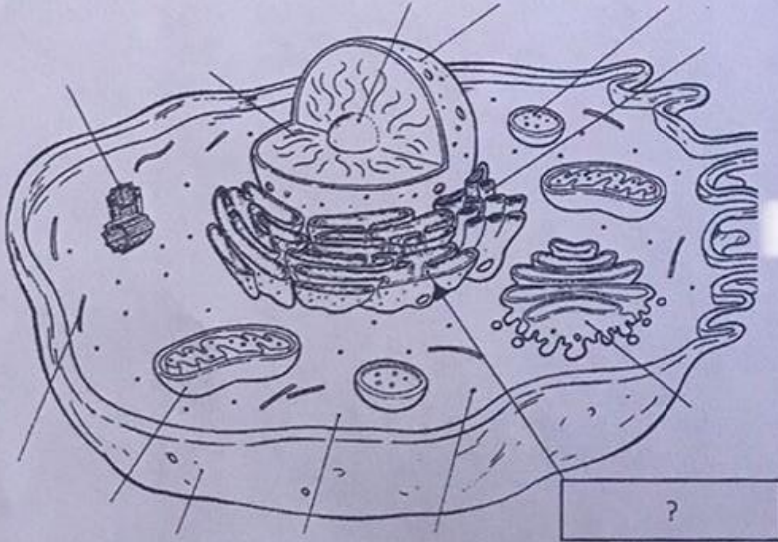


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16. Write down the name of the signed organelle and list the organelle's functions.




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17. Describe the process of urine formation in kidneys (three stages).

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18. Give three examples of infectious parasitic diseases transmitted by Protists. Describe main symptoms of these three infections. Who is the definite host and the secondary host?

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19. Why vitamins are so essential for a human? Give three examples of fat-soluble vitamins along with symptoms of overdosing and deficiency.

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