

FIRST NAME, LAST NAME:

DATE OF BIRTH:

PROGRAM:

DATE:

In the tests more than one answer may be correct.
Please, fill in all of the correct answers properly!!

Proper way ● NOT proper way ⊗ ⊙

No.	BIOLOGY	No.	CHEMISTRY	No.	PHYSICS
1	(A) (B) (C) (D)	1	(A) (B) (C) (D)	1	(A) (B) (C) (D)
2	(A) (B) (C) (D)	2	(A) (B) (C) (D)	2	(A) (B) (C) (D)
3	(A) (B) (C) (D)	3	(A) (B) (C) (D)	3	(A) (B) (C) (D)
4	(A) (B) (C) (D)	4	(A) (B) (C) (D)	4	(A) (B) (C) (D)
5	(A) (B) (C) (D)	5	(A) (B) (C) (D)	5	(A) (B) (C) (D)
6	(A) (B) (C) (D)	6	(A) (B) (C) (D)	6	(A) (B) (C) (D)
7	(A) (B) (C) (D)	7	(A) (B) (C) (D)	7	(A) (B) (C) (D)
8	(A) (B) (C) (D)	8	(A) (B) (C) (D)	8	(A) (B) (C) (D)
9	(A) (B) (C) (D)	9	(A) (B) (C) (D)	9	(A) (B) (C) (D)
10	(A) (B) (C) (D)	10	(A) (B) (C) (D)	10	(A) (B) (C) (D)

This test contains 10 model question for each discipline. The questions are retired ones from the previous years. This test serves for the purposes of self-evaluation of your readiness for the entrance exams to the First Faculty of Medicine in 2018.

You should use NO MORE than 1 hour for this test. We suggest that you print out this document. The only allowed aid is the Periodic Table of Elements. No calculator should be use (or is allowed for the real exam). First, we suggest you circle the answers you consider correct in the printouts of the questions. Use the back side for any calculations or drawings. Then, when you reviewed your answers, mark them into the table provided above as indicated.

DO NOT LOOK at the LAST page, as it contains the solutions, unless you completed the test.

We wish you good luck. Evaluation of your score is provided at the last page, too.

1. **Mother has blood group AB, her child B. Men with following blood groups can be fathers of this child:**
 - a) **A**
 - b) **B**
 - c) **0**
 - d) **AB**

2. **Crosses between dominant homozygotes and heterozygotes (AAxAa) under condition of complete dominance exhibit in the progeny:**
 - a) **uniform phenotype**
 - b) **genotypic ratio 1:1**
 - c) **phenotype segregation 3:1**
 - d) **phenotype segregation 1:1**

3. **Prophase I of the meiotic division includes:**
 - a) **leptotene**
 - b) **zygotene**
 - c) **recombination events**
 - d) **cytokinesis**

4. **Substances which can stimulate cell division are called:**
 - a) **mutagens**
 - b) **cytostatics**
 - c) **antibiotics**
 - d) **mitogens**

5. **mRNA serves:**
 - a) **for transfer of amino acids to ribosomes**
 - b) **as a template for tRNA production**
 - c) **for rRNA transfer from nucleus to ribosomes**
 - d) **as a template for protein production**

6. **Prokaryotic cells:**
 - a) **contain many ribosomes for polypeptide synthesis**
 - b) **have their DNA in the form of a single long chromosome**
 - c) **could contain small circular plasmids**
 - d) **possess a nucleus that is separated from cytoplasm by nuclear membrane**

7. **Photosynthesis:**
 - a) **occurs in two stages – light and dark**
 - b) **is a process by which light energy is trapped and used to manufacture carbohydrate by fixation of CO₂**
 - c) **in its light stage produces ATP**
 - d) **in its dark stage reduces CO₂ to carbohydrate**

8. **Catabolism:**
 - a) **is the phase of metabolism that consists of breaking down complex compounds into simpler ones**
 - b) **involves mostly exergonic reactions**
 - c) **does not exist in the muscle cells**
 - d) **is the typical reaction for growing organisms**

9. **Fat-soluble vitamins are:**
 - a) **A**
 - b) **B2 (Riboflavin)**
 - c) **C**
 - d) **Folic acid**

10. **Placenta:**
 - a) **develops from the fetal membranes, the chorion and allantois**
 - b) **produces chorionic gonadotropin**
 - c) **is ejected first before delivery**
 - d) **enables mixing of fetal and maternal blood**

1. Nitrites are the salts of:

- a) nitrous acid
- b) nitric acid
- c) nitrate acid
- d) nitrite acid

2. The oxidation number of P in H_3PO_4 is:

- a) -5
- b) +5
- c) +3
- d) -3

3. One mole of a gas at standard temperature and pressure occupies a volume of:

- a) 22.4 ml
- b) 22.4 l
- c) 22.4 dm³
- d) 22.4 m³

4. Primary or secondary alcohols can be oxidized by strong oxidizing agent to:

- a) aldehydes
- b) ethers
- c) esters
- d) amines

5. Acylglycerols are:

- a) fats
- b) esters
- c) ethers
- d) salts

6. $\text{HOOC}\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{COOH}$ is:

- a) succinic acid
- b) butyric acid
- c) malonic acid
- d) oxalic acid

7. According to the reaction represented by the unbalanced equation $\dots \text{SO}_2 (g) + \dots \text{O}_2 (g) \Rightarrow \dots \text{SO}_3 (g)$, how many moles of $\text{SO}_2 (g)$ are required to react completely with 1 mole of $\text{O}_2 (g)$?

- a. 0.5 mol
- b. 1 mol
- c. 2 mol
- d. 3 mol

8. Formaldehyde is an oxidation product of:

- a. methanol
- b. formic acid
- c. ethanol
- d. acetaldehyde

9. Most human enzymes

- a) are absorbed from the food
- b) work best at temperatures between 35 and 42 °C
- c) resist strongly acidic environment
- d) have no homology in the nature

10. Zinc:

- a) is an element dangerous to human even in very small quantities
- b) is a microbiogenic element
- c) as a noble metal, it practically does not form ions in the nature
- d) is a co-factor of some enzymes

1. The momentum of a body that has the mass 1 ton equals 10^4 kg.m.s^{-1} . Its velocity is
 - a) 100 m.s^{-1}
 - b) 10 m.s^{-1}
 - c) 3.6 km.hr^{-1}
 - d) 36 km.hr^{-1}

2. The unit of pressure in the SI system of units is
 - a) atmosphere
 - b) pascal
 - c) newton.meter^{-1}
 - d) joule.meter^{-2}

3. A homogeneous body of the density 10.2 g.cm^{-3} floats in a mercury bath. The density of mercury is 13.6 g.cm^{-3} . The part of the total body volume immersed in mercury amounts
 - a) 55 %
 - b) 65 %
 - c) 75 %
 - d) 85 %

4. Charge of $5 \mu\text{C}$ was transported between two places with potential difference 1 kV. The work done by the electric force equals
 - a) $5 \times 10^{-3} \text{ J}$
 - b) $5 \times 10^{-2} \text{ J}$
 - c) 0.5 J
 - d) 5 J

5. Electric force between two charges is inversely proportional to
 - a) product of the charges
 - b) sum of the charges
 - c) permittivity of the medium
 - d) distance between the charges

6. How much water of the temperature $75 \text{ }^\circ\text{C}$ must be added into 6 kg of water of the temperature $20 \text{ }^\circ\text{C}$ to get the mixture of the temperature $42 \text{ }^\circ\text{C}$?
 - a) 4 kg
 - b) 3.6 kg
 - c) 3.2 kg
 - d) 2.8 kg

7. The molar gas constant R_m is expressed in
 - a) J
 - b) J.K^{-1}
 - c) J.mol^{-1}
 - d) $\text{J.K}^{-1}.\text{mol}^{-1}$

8. The permittivity can be expressed in units
 - a) F.m
 - b) F.m^{-1}
 - c) C.m
 - d) $\text{C}^2.\text{N}^{-1}.\text{m}^{-2}$

9. Consider the velocity of sound in water equal to 1440 m.s^{-1} . The ultrasound signal emitted by a sonar returned to the ship after 3 s. The depth of the sea is
 - a) 540 m
 - b) 1080 m
 - c) 2160 m
 - d) 3240 m

10. A decisive role in mutual interactions of nucleons in atomic nuclei has
 - a) electromagnetic interaction
 - b) strong interaction
 - c) weak interaction
 - d) gravitational interaction

Solutions

Question No.	Biology	Chemistry	Physics
1	A, B, C, D	A	B, D
2	A, B	B	B
3	A, B, C	B, C	C
4	D	A	A
5	D	A, B	C
6	A, B, C	A	A
7	A, B, C, D	C	D
8	A, B	A	B
9	A	B	C
10	A, B	B, D	B

Count one point for each CORRECTLY CHECKED option.

Count one point for each CORRECTLY UNCHECKED question.

The maximum total is $3 \times 10 \times 4 = 120$ points

To stand a reasonable chance of success at the real exam, you should achieve at least 85% of the maximum, i.e., 102 points. If you scored less than 80% in a particular subject, you should review the basics.