1. Rules and principles imposed by the Hippocratic School.
2. Physiology – definition, branches and sub-branches, existential questions, importance.
3. Describe the organization and hierarchy of the human body from cell to system.
4. Describe the main functional systems of the human body.
5. Describe the extracellular environment and its components.
6. Describe the intracellular environment and its components.
7. Describe the extracellular matrix and explain the importance of the enzymes located here.
10. Macro-elements: list them and give general characteristics. Particularize: fluorine and sulphur.
11. Describe the general characteristics of trace elements and list the essential ones.
12. Trace elements: iron and copper.
13. Trace elements: zinc and cobalt.
15. Toxic trace elements: lead.
16. Describe and exemplify factors that induce variations of the physiological parameters.
17. Explain the concepts of “balance” and “reference level (value)” in biology and physiology.
18. Describe the negative feedback regulation mechanism for a constant of the internal environment: temperature or blood pressure.
19. Describe the antagonistic effectors or antagonistic adjustment systems.
20. Describe the components of a system of maintaining homeostasis.
21. Describe the mechanisms of maintaining homeostasis. Particularize the negative feedback.
22. Describe the mechanisms of maintaining homeostasis. Particularize the positive feedback.
23. Describe the structure and major functions of the cell membrane.
24. Describe the major functions of the cell membrane proteins and carbohydrates.
25. Describe the functional characteristics of the cell membrane: selective permeability and polarity.
26. Describe and explain (using a sketch) simple diffusion. Specify what substances are transported through simple diffusion.
27. Describe the factors that influence the rate of diffusion.
28. Explain ion transport through ion channels.
29. Describe and explain (using a sketch) osmosis.
30. Define osmotic pressure and specify its plasma value and the factors that influence it.
31. Explain what happens to a cell in a solution with an electrolyte concentration equal or different from plasma.
32. Explain what happens to water transport in a person with low plasma protein level.
33. Explain what types of fluids should be used for intravenous rehydration. What type of fluids should be used for stimulating osmosis?
34. Describe the blood osmolality regulation mechanisms.
Explain what happens to plasma osmolality and blood volume after consuming food with high salt concentration or with no salt at all.

Describe transport through facilitated diffusion.

Describe the primary and secondary active transport.

Describe membrane excitability and particularize the resting potential.

Describe membrane excitability and particularize the action potential.

Describe the morphofunctional characteristics of the airways.

Ventilation: definition, mechanisms: resting and forced inspiration.

Ventilation: definition, mechanisms: resting and forced expiration.

Mechanisms of pulmonary ventilation. Forces and resistances of the thoraco-pulmonary system.

The pulmonary surfactant and its role in the mechanisms of ventilation.

The dead space: definition, types, capacity, roles.

Lung volumes: definition, reference values, measuring methods.

Lung capacities: definition, reference values, measuring methods.

Lung flows: definition, reference values, measuring methods.

Pulmonary circulation: morphofunctional characteristics and roles.

Pulmonary compliance and elastance. Definition, normal values, variations.

Diffusion of the respiratory gases. Definition, components of the alveolar-capillary (blood-air) barrier.

Factors that determine gas diffusion through the alveolar-capillary barrier.

O$_2$ transport in blood. Describe the forms of transport.

Draw and explain the oxyhemoglobin dissociation curve and specify the factors that influence the formation and dissociation of oxyhemoglobin.

CO$_2$ transport in blood. Forms of transport, proportions. The Hamburger phenomenon.

Respiration control. Motor respiratory centers (inspiratory and expiratory).

Respiration control. Coordinating respiratory centers (apneustic and pneumotaxic). The connection between the respiratory centers and other centers in the CNS.

Respiration control. The Hering-Breuer reflex.

Receptors involved in controlling respiration.

Describe the dynamics of fluid exchange in the pulmonary capillary.

Describe the morphofunctional characteristics of the digestive tract.

Describe the major functions of the digestive tract.

The secretory function of the digestive system – mechanisms.

Explain the mechanisms of regulation of the digestive secretion function.

Digestive enzymes – classification, characteristics, action requirements, enzymatic effectors.

Salivary glands: localization, morphofunctional characteristics, percentage of the total saliva volume.

Saliva – roles description.

Describe the phases of the salivary secretion.

Describe the mechanisms of controlling the salivary secretion.

Describe the functional parts of the stomach and their functions.

Describe the morphofunctional characteristics and roles of the gastric glands.

Describe the major functions of the stomach.

The secretory function of the stomach: describe the HCl secretion mechanism.

Describe the roles of the HCl in the gastric juice.

Describe the role of protection barrier of the gastric mucosa and the factors that can degrade it.

Secretory function of the stomach: describe enzymatic secretion.

Secretory function of the stomach: role of the Castle intrinsic factor.
78. Describe the cephalic phase of the gastric juice secretion.
79. Describe the gastric phase of the gastric juice secretion.
80. Describe the intestinal phase of the gastric juice secretion.
81. Describe the effects of sympathetic and parasympathetic stimulation on gastric juice secretion.
82. Describe the influence of the vagus nerve on the stomach and pancreas.
83. The endocrine function of the stomach: name the stimulating and inhibitory hormones of the gastric secretion and their roles.
84. Describe the role of histamine in the control of gastric secretion. Inhibitors of histamine receptors and their importance in antiulcer therapy.
85. Describe the roles of gastrin in the control of gastrin secretion. Inhibition of gastrin secretion.
86. Intestinal mucosa: describe the main morphofunctional characteristics and their roles.
87. Intestinal mucosa: describe the main cellular populations in the Lieberkühn crypts.
88. Intestinal juice: describe its physicochemical characteristics and its composition, including the enzymes.
89. Describe the mechanisms of regulation of intestinal secretion.
90. Describe the passive transport mechanism of the substances absorbed through the enterocyte membrane.
91. Describe the active transport mechanism of the substances absorbed through the enterocyte membrane.
92. Describe the digestion and absorption mechanisms of carbohydrates.
93. Describe the digestion and absorption mechanisms of proteins.
94. Describe the digestion and absorption mechanisms of lipids.
95. Describe the absorption mechanism of water and electrolytes.
96. Describe the absorption mechanism of iron and vitamins.
97. Describe the physical properties and the composition of the pancreatic juice.
98. Describe the characteristics of the proteolytic enzymes in the pancreatic juice.
99. Describe the characteristics of the inhibitors of the pancreatic proteolytic activity.
100. Describe the characteristics of the glycolytic and lipolytic enzymes of the pancreatic juice.
101. Describe the inorganic component of the pancreatic juice.
102. Describe the regulation mechanisms of the pancreatic exocrine secretion.
103. Describe the main functions of the large intestine.
104. Describe the characteristics of the fermentation flora of the bowel; roles and consequences of its excessive degradation and destruction.
105. Describe the characteristics of the putrefaction flora of the bowel; roles and consequences of its excessive degradation and destruction.
106. Describe the organization (structure) of the liver.
107. Describe the cellular populations of the liver.
108. Describe the main liver functions.
109. Describe the roles of the bile salts.
111. Describe the composition of the bile secretion.
112. Describe the regulation mechanisms of bile secretion.
113. Describe the evacuation mechanisms of the gallbladder.
114. Describe the factors and substances with choleretic effects.
115. Describe the factors and substances with cholagogue (cholecystokininetic) effects.
116. Describe the consequences of an increased blood level of bile pigments.
117. Describe the morphofunctional characteristics of digestive motility.
118. Describe the mechanisms of mastication.
119. Describe the mechanisms of deglutition.
120. Describe the morphofunctional support of the digestive automatism.
121. Describe the types of motor activity of the stomach.
122. Describe the mechanisms of regulating the motor function of the stomach.
123. Describe the motor function of the small and large intestines.
124. Describe the mechanisms of defecation and indicate the centers of this reflex.
125. Describe the mechanisms of hunger and satiety and indicate the centers of these reflexes.
126. Describe the components of the endocrine system.
127. Describe the mechanisms of regulation of hormone secretion.
128. Describe the structure of the endocrine hypothalamus, the secreted hormones and their roles.
129. ADH – definition, secretion site, effects, regulation mechanisms and secretion alterations.
130. Oxytocin – definition, secretion site, effects, regulation mechanisms.
132. Prolactin - definition, secretion site, effects, regulation mechanisms and secretion alterations.
133. MSH - definition, secretion site, effects, regulation mechanisms.
134. Describe the tropic hormones of the anterior pituitary gland: ACTH, gonadotropins, TSH.
135. Thyroid hormones: names, generalities and effects on the intermediary metabolism.
136. Describe the role in growth of the thyroid hormones and the consequences of thyroid insufficiency in children.
137. Describe the effects of thyroid hormones on systems, organs and other endocrine glands and the alterations of thyroid hormones secretion.
138. Explain the regulation of thyroid hormones secretion (draw the feedback mechanism).
139. Describe the metabolic roles and specific effects on organs and systems of cortisol. Describe its regulation and secretion alterations.
140. Describe the use of corticoids in therapy and the side effects of cortisone therapy.
141. Describe the mineralocorticoid hormones – aldosterone and its roles.
142. Describe the corticosteroid hormones, sexosteroid hormones and their roles.
143. Describe the adrenal medulla hormones and their roles.
144. Insulin – definition, metabolic roles, metabolic consequences of insulin absence or deficiency.
145. Describe the physiological mechanisms affected in insulin deficiency.
146. Describe the mechanisms of regulating insulin secretion.
147. What is glucagon and what are its roles?
149. Female gonad: hormones, roles, regulation.
150. Estrogens – definition, roles.
151. Draw and describe the phases of the ovarian cycle.
152. Progesterone – description, secretion site, the cyclical nature of its secretion and roles.
154. Androgens – definition, names, roles.
155. Describe the structure of actin and myosin myofilaments in skeletal muscle.
156. Describe the coupling of excitation and contraction in the skeletal muscle.
157. Explain the cycle of the myosin heads.
158. Excitation transmission in the motor plate: structure, mediators, receptors.
159. Describe the mechanism of contraction of the striated muscle.
160. Describe the mechanisms of muscle fatigue.