

## **BIOLOGY - topics for written part**

### I. Systematic Biology

Protozoa, their subtyping and impact. Flagellata. Rhizopoda. Sporozoa. Ciliata. Porifera. Cnidaria and Acnidaria. Plathelminthes. Nematelminthes. Molluscs, Annelids, Arthropods, their characteristic and subtyping. Deuterostoma. Chordata, Vertebrata. Cyclostoma and Chondroichthyes. Fish. Amphibians. Reptiles. Mammals. Primates. Viruses. Bacteria.

### II. General Biology and Genetics

The cell and its structure. The cell cycle. The cell division. The cell metabolism. The cell organelles, their structure and function. Chromosomes and their structure, number of chromosomes. Intra- and extranuclear DNA, their structure and function. RNA and its types, structure and function. The protein synthesis. The genetic code, Mendel's hybridization experiments and the rules of inheritance. Heritability of sex and sex-linked inheritance. The gene linkage. Polygenic inheritance. Human hereditary diseases. Spontaneous and induced mutations and mutagenic factors. The genetics of populations. The origin of the life on Earth and its evolution. The theory of Evolution, Ch. Darwin and his impact. The origin and evolution of the man, the main periods and human races. Sexual and asexual reproduction. Ontogenesis. Heterotrophy, autotrophy and mixotrophy. Photosynthesis. Ecology and basic ecological terms. The circulation of substances in the nature and the food-chain. Biotic and abiotic compounds of the environment. Characteristic of the ecosystem and possible ways of its evolution.

### III. Biology of the Man

The bones, their structure and conjunction. The skeleton of the man. Voluntary and smooth muscles. The internal environment and the subtyping of body fluids. The blood, its composition, amount and function. The red blood cells, their shape, composition, function and lifetime. Leucocytes, their subtyping, quantity and function. Non-specific and specific immunity, immunization and vaccination. The blood groups and transfusion. The Rhesus-factor. The coagulation of blood. The human heart, its structure and function. The circulation of blood. The capillaries and the production of the tissue fluid. The control of blood circulation. The lymph and its circulation. The respiratory system of the man. The exchange of gases in the lungs and tissues. The breathing control. The digestive system of the man and the function of its particular parts. The digestion and digestive enzymes. Conversion of particular nutrients and the role of saccharides, lipids and proteins. The liver and its function. The optimal composition of the food according to quality and quantity. Vitamins soluble in lipids and their impact. The B group vitamins, their function and avitaminosis manifestation. Vitamin C and its function, avitaminosis. The body temperature and its regulation. The kidneys and their function. The skin and its working. The endocrine glands. Insulin and its role. The adrenals and their hormones. The thyroid gland and its function. The parathyroid glands. The anterior and posterior lobe of the pituitary gland, their hormones and function. The neuron and its structure. The nervous impulse and its conduction. Conditioned and unconditioned reflexes. The involuntary nervous system and its function. The human brain, its structure and function of the particular parts. The olfaction. The taste. The skin perception. The sight, the eye, its structure and function. The vestibular apparatus. The man's hearing. The function of the ovaries and female sex hormones. The menstrual cycle. The pregnancy, the intrauterine development, placenta and its function, the labour. The function of the testes, male sex hormone and its effects. The periods of man's lifetime and their characteristic.