THESES OF PRACTICAL EXERCISES

1. White blood cells.
Introduction. Leucocytes: function and regulation. Sampling blood for testing. Determining the number of leucocytes. Differential WBC count. Normal values and changes in different physiological states.

2. Red blood cells. Hemoglobin. Hematocrit
Red Blood Cell Counting. Determination of the Hematocrit. Hematological indices. Determination of the Osmotic Resistance of the RBC.

3. Erythrocyte Sedimentation Rate (ESR). Clotting Time. Blood Typing
Determination of erythrocyte sedimentation rate. Normal values and physiological variations Bleeding and clotting time determination. Blood typing with test-sera. Principle of blood transfusions.

4. Colloquium: Blood.

5. Skeletal muscle.

Contraction of skeletal muscle**.** Excitation of skeletal muscle. Neuromuscular transmission. Excitation – contraction coupling. Registration of a single muscle twitch; registration of tetanic contractions; muscle fatigue. Ergography.

6. Colloquium: Cellular physiology. Muscles.

7. Structure of the heart in relation to function. Effect of temperature on the sinus venosus. Stanius ligatures
Registration and analysis of cardiomechanogram of the frog heart. Effect of temperature on the sinus venosus. Stannius ligatures**.**

8. **Extrasystoles. Cardiac Control.**

Action potential of the myocardium. Extrasystoles. Regulation of the heart (intrinsic and extrinsic). Recording of Ventricular Extrasystoles. Nervous control of heart rate (effect of the n. vagus stimulation). Humoral control (effect of adrenalin, effect of hypercalcemia, effect of hyperkalemia).

9. **ECG recording.**
Physiological bases of ECG. Bipolar limb leads. Augmented unipolar limb leads. Unipolar chest leads**.** Preparation of the electrocardiograph for registration. Connecting of the patient with patient cable. ECG registration**.**

10. ECG Analysis
Measurement of the ECG elements**.** Determination of the duration of cardiac cycle. Determination of the heart rate. Electrical axis of the heart. Determination of the mean electrical axis of the heart.

11. Heart sounds. Pulse. Arterial pressure.
Auscultation of the heart sounds. Auscultatory sites. Pulse investigation. Measuring of the arterial pressure. Simultaneous record of ECG, PCG, SPHG. Analysis.

12. Colloquium: Cardiovascular system.

13. Respiration. Lung volumes and capacities. Pulmonary ventilation.
Mechanics of pulmonary ventilation. Pulmonary volumes and capacities. Minute respiratory volume. Alveolar ventilation. Measuring of pulmonary volumes, capacities, minute respiratory volume and alveolar ventilation. Normal values and physiological variations.

14. Gas exchange. Control of breathing.
Physical principle of gas exchange. diffusion of oxygen and carbon dioxide through the respiratory membrane. transport of o_2 and co_2 in the blood and body fluids. Regulation of respiration. Registration of the spirogram. Control of respiration. Effect of n. Vagus stimulation. Effects of ph changes .investigation of the gas exchange.

15. Seminar: Respiratory system.

16. Metabolic Rate. Basal metabolic rate.
Determination of Metabolic Rate according to data of "Spirolyt" and according to composition of expired air. Determination of Basal Metabolic Rate - Actual and standard.

17. Colloquium: Digestive system.

18. Clearance.
Physiological anatomy of the Kidneys. Glomerular filtration, Tubular reabsorption, Tubular secretion. Clearance method to quantify kidney function: GFR, Tubular reabsorbtion, Tubular secretion, RBF, filtration fraction.

19. Acid-base balance.
Buffering of H^+ in the body fluids. Respiratory regulation of acid - base balance. Renal control of acid - base balance. Clinical measurements and analysis of acid - base disorders. Treatment of acidosis and alkalosis.

20. Colloquium: Body fluids and Kidneys.

21. Endocrine System.
Mechanisms of hormonal action. The pituitary gland and its relationship to the hypothalamus. Physiologic functions of the pituitary hormones. Water load test. Thyroid hormones – functions. Hypothyroid state in white rats after thyroid removal. Insulin. Insulin effect on blood sugar level - hypoglycemic shock. Hormonal factors in pregnancy.Early pregnancy tests (Galli-Mainini test).

22. Colloquium: Endocrine system.

23. Reflex Function of the Nervous system.
General design of the nervous system. The spinal cord reflexes.
Unconditioned reflexes in a spinal frog. Analysis of the reflex arc. Determination of the

reaction time. Clinically important reflexes - superficial and deep reflexes.

24. Somatic sensations. Auditory system. Chemical sense of taste.
Hearing tests. Audiometry. Rinne and Weber tests. Determination of threshold of taste sensation. Two point discrimination test.

25. The visual system.
Optics of vision and function of the retina. Neurophysiology of vision. Visual acuity testing. Pupil's reaction. Eye movements. Visual field examination. Color Vision Testing.

26. Colloquium: The special senses.

27. Autonomic Nervous System. EEG.
General Organization of the ANS. Basic characteristics of sympathetic and parasympathetic function. Effects of Sympathetic and Parasympathetic Stimulation on Specific Organs.
Demography. Pupillary reflexes. Aschner - Dagnini reflex. Orthostatic test Registration and analysis of the EEG.

28. Seminar: Nervous system.

29. Changes in the organism during exercises.
Changes in CVS: pulse rate, systolic and diastolic pressure. Changes in respiratory system: MRV, Tidal volume, vital capacity. Changes in blood: White blood cells, Hemoglobin, Hematocrit, clotting time.

30. Revision.
Revision of the practical tasks involved in the synopsis for the practical examination.