

QUESTIONS FOR THE ORAL PART OF THE FINAL EXAMINATION IN PHYSIOLOGY
DENTISTRY

General neurophysiology and physiology of the muscle

1. Resting transmembrane potential
2. Receptor potential, coding of the strength of the sensory stimuli
3. Function and classification of the receptors, adaptation of the receptors
4. Action potential and factors determining its generation, the „all or nothing“ law, refractory periods
5. Conduction of the action potential, types of nerve fibers
6. Classification of neurons and synapses, excitatory and inhibitory postsynaptic potentials
7. Neuromuscular transmission – function of the motor end-plate
8. Mechanism of muscle contraction, types of muscle fibers and muscle contractions
9. Motor unit, regulation of the strength of muscle contraction, muscle fatigue
10. Classification, excitation and contraction of the smooth muscle

Physiology of the central and autonomic nervous system

11. Reflex, reflex arc, classification of reflexes
12. Functions of the sensory division of the CNS, sensation and perception of a stimulus
13. Pain – mechanism of its sensation and its types, mechanisms of hypoalgesia
14. Functions of the motor division of the CNS, voluntary and reflex movements
15. Spinal reflexes, alpha-gamma co-activation and function of the muscle spindle
16. Projection and association areas of the brain cortex, their locations and functions
17. Sleep and wakefulness, electroencephalography (EEG)
18. Speech and its disorders, functional specialization of the cerebral hemispheres
19. Learning and memory
20. Physiology of emotions
21. Functions of the autonomic nervous system

Physiology of the endocrine system and reproduction

22. Mechanisms of action of hormones, endocrine control
23. Functions of the hypothalamo-hypophyseal system
24. Functions of the hypophysis and epiphysis
25. Functions of the thyroid and parathyroid glands
26. Functions of the suprarenal (adrenal) glands
27. Endocrine and reproductive functions of the male reproductive organs
28. Endocrine and reproductive functions of the female reproductive organs, menstrual cycle
29. Fertilization, hormonal changes in pregnancy, functions of placenta, birth and breastfeeding
30. Endocrine function of the pancreas
31. Response of the human organism to stress

Physiology of the cardiovascular system

32. Physiological properties of the heart – autorhythmicity and conductivity
33. Physiological properties of the heart – excitability and contractility
34. The cardiac cycle and blood pressures in the cardiac atria and ventricles
35. Heart volumes (end-diastolic, systolic, end-systolic), ejection fraction, cardiac output
36. Heart sounds, arterial pulse
37. Electrocardiography and electrocardiogram
38. Haemodynamics in arteries
39. Haemodynamics in veins

40. Blood pressure and its measurement
41. Haemodynamics in capillaries and transcapillary exchange of water and substances
42. Functions of the lymphatic system and spleen
43. Regulation of the cardiovascular system

Physiology of the senses

44. Smell and taste
45. Somatovisceral sensory system
46. Vision: refraction system of the eye, accommodation, ametropias
47. Vision: function of the retina, colour vision, central and peripheral vision
48. Binocular vision and 3D visual perception, visual field and scotoma, visual pathway
49. Hearing
50. Sense of balance, nystagmus

Body fluids, physiology of the kidneys and urinary tract, acid-base balance

51. Body fluids – classification, functions, composition, osmosis, daily water balance
52. Functions of the renal corpuscle and proximal tubule
53. Functions of the loop of Henle, distal tubule and collecting duct
54. Regulation of the volume and osmolarity of urine
55. Function of the urinary tract (from calyces to urethra), micturition, urine – volume and composition
56. Acid-base balance and its regulation

Physiology of blood

57. Blood plasma – composition, function, osmotic and oncotic pressure
58. Erythrocytes – characteristics and functions, haemoglobin
59. Leukocytes – characteristics and their immune functions, immunization
60. Haemostasis
61. Blood groups – ABO system, Rh factor, compatibility, cross-matching test
62. Haemopoiesis

Physiology of the respiratory system

63. Functions of the respiratory passageways, dead space – classification, function
64. Mechanism of inspiration and expiration, surfactant
65. Lung volumes and capacities, lung ventilation and its changes
66. Exchange of respiratory gasses, their concentrations and partial pressures, alveolo-capillary barrier
67. Transport of O₂ and CO₂ in blood
68. Regulation of respiration
69. Protective reflexes of the respiratory system and ciliary activity
70. Respiration during diving and in high altitudes

Physiology of the gastrointestinal system

71. Mastication, swallowing and function of oesophagus, vomiting
72. Secretion, composition and functions of the saliva
73. Functions of the stomach
74. Exocrine function of the pancreas
75. Functions of the liver and gall bladder, bile and its functions
76. Functions of the small intestine
77. Functions of the large intestine, gastrointestinal microbiota, defaecation, composition of faeces
78. Digestion of proteins, fats and carbohydrates, mechanisms of absorption

79. Regulation of the gastrointestinal system (autoregulation, nervous and humoral regulation)

Metabolism, nutrition and thermoregulation

80. Basal metabolism and factors that influence it

81. Metabolism in physical activity, oxygen debt

82. Total energy expenditure and types of energy balance, energy value of nutrients, respiratory quotient, energy equivalent

83. Main metabolic pathways of carbohydrates, fats and proteins in absorptive and postabsorptive phase

84. Nutrients (proteins, fats, carbohydrates, vitamins, minerals), their functions and food sources

85. Current situation in nutrition and healthy nutrition recommendations

86. Mechanisms of heat production and loss, heat balance in the body

87. Normal body temperature and its biorhythms, thermoregulatory centre, thermoregulatory mechanisms in heat and cold, fever