

## Final Exam Questions

### Medical Chemistry and Biochemistry II, General Medicine, 2024/25

1. Water in nature and in organism
2. Osmolality and its disorders
3. Calcium – its role in organism
4. Iron in human organism
5. Proteins – structure and function
6. Enzymes – structure and function
7. Regulation of enzyme activity
8. Enzymes in clinical diagnostics
9. Enzyme inhibitors
10. Antimetabolites
11. Digestion and resorption of main nutrients
12. Bioenergetics
13. Respiratory chain
14. Oxidative phosphorylation in mitochondria
15. Glycolysis and its regulation
16. Glycolysis in RBC and the role of 2,3-BPG
17. Pentose phosphate pathway
18. UDP derivatives of carbohydrates, metabolism of galactose and lactose
19. Metabolism of fructose and sucrose
20. Gluconeogenesis and its regulation
21. Glycogen synthesis and breakdown
22. Citrate cycle
23. Anaplerotic reactions of citrate cycle
24. Metabolism of pyruvate
25. Oxidative decarboxylation of  $\alpha$ -ketoacids
26. Oxidation of fatty acids
27. Biosynthesis of fatty acids
28. Formation of double bonds in fatty acids and its importance
29. Eicosanoids, their formation and significance
30. Formation of ketone bodies and their metabolism
31. Metabolism of triacylglycerols
32. Biosynthesis of lipids containing glycerol and their degradation
33. Biosynthesis of lipids containing sphingosine and their degradation
34. Formation of cholesterol and its distribution
35. Degradation of cholesterol and its excretion
36. Synthesis and degradation of steroid hormones
37. Direct and indirect deamination of amino acids
38. Biosynthesis of urea
39. Uric acid synthesis in human metabolism
40. Metabolism of glutamate and aspartate
41. Metabolism of branch chain amino acids
42. Metabolism of amino acids containing sulphur and selenium
43. Metabolism of aromatic amino acids
44. Metabolism of histidine and tryptophan
45. Metabolism of lysine, threonine and alanine
46. Metabolism of arginine, formation of creatine and NO
47. Transmethylation and carboxylation, their mechanisms
48. THFA and partially oxidised one-carbon fragments
49. Methylation with the involvement of THFA
50. Metabolism of glycine and serine
51. Overview of amino acid degradation
52. Ketogenic and glucogenic metabolites
53. Biosynthesis and degradation of pyrimidine nucleotides
54. Biosynthesis and degradation of purine nucleotides
55. Biosynthesis of porphyrins
56. Hem degradation and metabolism of bile pigments
57. Biochemical aspects of jaundice
58. Structure of nucleic acids and chromatin
59. Biosynthesis and function of DNA
60. DNA repair and DNA recombination
61. Structure and function of individual types of RNA
62. Transcription and its regulation
63. Formation of mRNA (hnRNA, splicing, editation, microRNA)
64. Mechanism of proteosynthesis
65. Protein targeting and posttranslational modifications
66. Genetic code, gene expression, mutations
67. Gene structure and organisation
68. Regulation of gene expression
69. Recombined DNA and gene manipulation, DNA libraries
70. PCR, its methodological and diagnostic importance
71. Recombined DNA in biotechnology
72. DNA and RNA analysis in diagnostics
73. Replication cycles of viruses
74. Retroviruses – their significance
75. Immunoglobulins - structure, formation, function
76. Immunoglobulins - mechanism of gene expression
77. Hemoglobin
78. Blood plasma proteins
79. Blood plasma lipoproteins
80. Acid-base balance, buffer systems
81. Acid-base balance, disorders and their compensation
82. Biochemistry of muscle contraction
83. Biochemistry of connective tissue
84. Biochemistry of nervous tissue
85. Neurotransmitters
86. Structure and function of membranes
87. Biochemistry of liver
88. Biochemistry of nutrition and starvation
89. Water-soluble vitamins
90. Fat-soluble vitamins
91. Biochemical specialisation of cell organelles
92. Cellular and extracellular proteolysis
93. Regulation of biochemical processes
94. Foundations of xenobiochemistry
95. Free radicals, anti-oxidative protection
96. Renal functions and their examination, clearance
97. Basic chemical examination of urine
98. Examination of urinary sediment
99. Biochemical aspects of diabetes mellitus
100. Factor V Leiden