

Final Exam Questions
Chemistry and Biochemistry, Dentistry, 2023/24

1. Biochemical functions of the cellular organelles/compartments
2. Enzyme classification, the function of coenzymes
3. Enzyme activity regulation
4. Enzyme inhibitors, antimetabolites
5. Biochemical thermodynamics, high-energy compounds
6. Biological oxidations, an overview of the respiratory chain
7. Oxidative phosphorylation
8. NAD / NADP dehydrogenases and their cellular functions
9. FMN and FAD dehydrogenases
10. Biological role of coenzyme Q and the cytochrome system
11. The citric acid cycle, its energy yield and regulation
12. Anaplerotic reactions of the citric acid cycle
13. Major nutritive carbohydrates, their digestion and resorption
14. Glycogen, its synthesis and degradation, regulation
15. Glycolysis and its regulation
16. Pentose phosphate pathway in the glucose oxidation
17. Metabolic reactions of pyruvate
18. Metabolism of lactose, sucrose and fructose
19. Gluconeogenesis and its regulation
20. Lipids, their nutritive value, digestion and resorption
21. Oxidative degradation of fatty acids
22. Biosynthesis of fatty acids and triacylglycerols
23. An integration of carbohydrate and lipid metabolism
24. Formation of ketone bodies and their metabolism
25. Biosynthesis and physiologic role of eicosanoids
26. Metabolism and physiological role of acylglycerols, phospholipids and sphingolipids
27. Lipid transport in the blood plasma, lipoproteins
28. Cholesterol synthesis
29. Distribution and excretion of cholesterol
30. Steroid sex hormones
31. Calcitriol biosynthesis, its biological role
32. Synthesis and the biological role of corticosteroids
33. Metabolism and the biological role of bile acids
34. Nutritive value of proteins, digestion and absorption
35. Blood plasma proteins
36. Essential and nonessential amino acids, their nutritive value
37. Reactions of amino acids, deamination and transamination, detoxification of ammonia
38. Urea cycle
39. Biosynthesis and the biological role of NO
40. One-carbon units, the role of THFA
41. THFA in biosynthesis of nucleotides and methionine
42. Metabolism of glycine and serine
43. Metabolism of cysteine and methionine
44. Structure of glutathione, its biological role
45. Metabolism of glutamic acid and aspartic acid
46. Metabolism of valine, leucine, isoleucine and lysine
47. Metabolism of tryptophan and histidine
48. Metabolism of phenylalanine and tyrosine
49. Synthesis and degradation of catecholamines
50. Biosynthesis of thyroid hormones, their biological role
51. Biosynthesis of purine and pyrimidine nucleotides
52. Uric acid synthesis, gout
53. DNA replication
54. Gene, its structure and organization
55. Chromatin, its structure and function
56. The genetic code, gene expression
57. Mechanisms of mutations
58. Mechanisms of the flow of genetic information
59. Transcription and mRNA processing
60. RNA types and their functions
61. Mechanism of proteosynthesis
62. Posttranslational modifications
63. DNA analysis in medicine, methods and diagnostic value
64. Gene manipulation in medicine
65. Manufacturing of peptides by recombinant DNA technology
66. Viruses: structure, lytic and lysogenic pathway
67. RNA viruses
68. HIV, SARS-CoV-2 and their reproduction
69. Biological membranes, structure and function
70. Regulatory pathways: the action of peptide and steroid hormones
71. Regulatory pathways: second messengers
72. Porphyrin synthesis and function, porphyrias
73. Heme catabolism, biochemistry of bile pigments
74. Reactive oxygen species, toxicity and biological protection
75. Metabolism of xenobiotics
76. Hemoglobin, structure and function, HbA, HbF, BPG
77. Metabolic specificity of RBCs, formation of 2,3-BPG
78. Immunoglobulin structure, synthesis, and function
79. Metabolic functions of hepatocytes
80. Biochemistry of CNS and nervous tissue
81. Biochemical events in muscles
82. Biochemistry of connective tissue
83. Biochemistry of bone and teeth
84. Regulation of calcium metabolism
85. Oral biochemistry, composition of saliva
86. Pathogenesis of caries, dental calculus and parodontosis
87. Biochemistry of nutrition and starvation
88. Biological role of trace elements
89. Water-soluble vitamins
90. Fat-soluble vitamins
91. Biochemical aspects of diabetes mellitus
92. Pathogenesis of phenylketonuria and Parkinson disease
93. Jaundice
94. Enzymes in clinical diagnostics
95. Proteolytic systems, its role in blood clotting and clot dissolution
96. Programmed cell death (apoptosis)
97. Renal functions and their examination, clearance
98. Basic chemical examination of urine
99. Examination of urinary sediment
100. Acid-base balance, its disorders, compensatory mechanisms