Clinical Biochemistry Exam Items
(summer session, 2022-2023)

1. What kind of investigations are included in the spectrum of clinical laboratory diagnosis?
2. Select the mistakes in patient preparation for laboratory investigation:
3. Select the typical mistakes in the blood sampling procedure:
4. Select the factors that can influence the quality of the collected biological material:
5. Select the errors specific to the pre-analytical stage:
6. What activities are specific to the analytical stage of laboratory diagnosis?
7. For which reasons would the laboratory have the right to reject the biological sample?
8. What are the actions that can be taken by the laboratory in case of insufficient amount of biological material?
9. Why does hemolysis have a negative impact on the results of blood laboratory analyses?
10. What are the causes of the most frequent errors associated with performing the analysis?
11. What is the purpose of laboratory tests?
12. What are the causes of the most frequent errors associated with performing the analysis?
13. Which mistakes are associated with the analytical stage of laboratory diagnosis?
14. Which factors DO NOT influence the quality of reagents prepared "in house" (in the laboratory that performs the analysis)?
15. Which activities is the laboratory obliged to undertake in the field of standardization of laboratory equipment?
16. Sensitivity and specificity of laboratory tests – select the correct answers:
17. Reference values/intervals – select the true statements:
18. What factors will determine errors in the clinician's decision at the post-analytical stage of the laboratory diagnosis?
19. What physiological factors should be taken into account when evaluating the results of laboratory tests?
20. What can be determined when using laboratory methods for diagnostic purposes?
21. What are the benefits of biochemical laboratory methods for monitoring treatment?
22. Select the non-modifiable factors associated with the patient that may influence the results of laboratory analyses:
23. Select the responsibilities of the attending physician at the pre-analytical stage of the biochemical laboratory diagnosis that ensures the quality of the analysis results:
24. Which data should be included in the request form of the biochemical laboratory analysis?
25. What activities must be carried out by the laboratory medicine specialist at the pre-analytical stage of the laboratory diagnosis?
26. What activities must be carried out by the laboratory doctor at the pre-analytical stage of the laboratory diagnosis?
27. Select the correct statements regarding α-amylase:
28. Select the positive acute-phase proteins:
29. Which of the following proteins is NOT an acute phase protein?
30. Select the pathology accompanied by a low level of plasma ceruloplasmin:
31. Which of the following plasma proteins are synthesized by the liver?
32. What is the function of α1-antitrypsin?

33. A patient admitted with bone pain, is later diagnosed with multiple myeloma. Select the protein fraction that will be the most elevated on serum protein electrophoresis:
34. Select the pathologies accompanied by a low level of ceruloplasmin:
35. Select pathologies accompanied by low level of α1-antitrypsin:
36. Select the correct statements regarding hepcidin:
37. Select the characteristic protein pattern for liver cirrhosis:
38. Select the correct statement regarding ceruloplasmin:
39. Which of the following is the function of haptoglobin?
40. Select the correct statements regarding α2-macroglobulin:
41. Select the negative acute phase proteins:
42. On plasma protein electrophoresis, the band for transferrin is found in the area:
43. Select the role of C-reactive protein:
44. Select the correct statements regarding the absorption of iron:
45. Select the enzyme whose serum activity increases 4-8 hours after acute myocardial infarction
46. Select creatine kinase (CK) isozymes specific for both myocardium and striated muscle:
47. Select the correct statements about LDH (lactate dehydrogenase):
48. Select the plasma marker that returns to baseline more than 24 hours after acute myocardial infarction:
49. Select the functions of ceruloplasmin:
50. Select the indicatory enzymes:
51. The highest activity of ALT (alanine aminotransferase) is detected in the cells of the:
52. Select the conditions accompanied by an increase in the activity of ɣ-glutamyl transferase (ɣ-GT):
53. Select the enzyme whose serum activity increases in cardiomyocyte injury:
54. Select blood secretory enzymes:
55. Select blood excretory enzymes:
56. Which enzyme is a marker of renal tubular epithelium pathology?
57. The serum activity of which of the listed enzymes is decreased in chronic hepatitis?
58. The measurement of the activity of which enzymes is useful in the differential diagnosis of jaundice?
59. Select enzymes indicators of cellular damage:
60. Select non-protein nitrogenous compounds:
61. An increase in the activity of the following serum enzymes was detected in a patient with retrosternal pain and in the upper part of the abdomen: CK (creatine kinase) > ASAT (aspartate aminotransferase) > ALAT (alanine aminotransferase). What is the presumptive diagnosis?
62. An increase in the activity of the following serum enzymes was detected in a patient with retrosternal pain and in the upper part of the abdomen: lipase > amylase. What is the presumptive diagnosis?
63. An increase in the activity of the following serum enzymes was detected in a patient with an episode of abdominal pain: ALAT (alanine aminotransferase) > ɣ-GT (ɣ-glutamyl transferase) > ASAT (aspartate aminotransferase). What is the presumptive diagnosis?
64. Select the enzyme whose activity determination is appropriate in the diagnosis of posthepatic jaundice:

65. Select the enzyme whose activity determination is appropriate in the case of suspected alcoholic liver damage:
66. In what cases does ASAT (aspartate aminotransferase) activity increase in the serum?
67. Select the enzyme whose activity increases 4-8 hours after acute myocardial infarction?
68. Enzyme that indicates the damage of liver mitochondria:
69. LDH (lactate dehydrogenase) activity is increased in the following conditions:
70. Select the causes of relative hyperproteinemia:
71. Select the causes of absolute hyperproteinemia:
72. Which of the following plasma proteins binds the iron and transports it to the tissues?
73. The following plasma components are bound and transported by albumins, except the following:
74. Select the isoenzymes of alkaline phosphatase:
75. Choose the drug that irreversibly inhibits cyclooxygenase-1 (COX-1)
76. Select which coagulation factor is deficient if the prothrombin time is prolonged, but the Activated partial thromboplastin time (aPPT) is within the normal range:
77. Select the factor with anticoagulant role:
78. Which of the listed laboratory tests is useful in monitoring heparin therapy:
79. Select the stages of primary hemostasis:
80. Select coagulation factors assessed by Activated partial thromboplastin time (aPPT):
81. Select which of the following types of cells are involved in hemostasis:
82. Select the factors which have anticoagulant role:
83. Select the phenomena by which the intrinsic pathway of coagulation is initiated:
84. Select the factors of the intrinsic pathway of coagulation
85. Select the process by which tissue thromboplastin activates factor VII
86. Select the factors that activate the extrinsic pathway of coagulation:
87. Select the products of fibrinolysis:
88. Select the situations in which D-dimers will be elevated
89. Select the situations when serum fibrinogen is elevated:
90. Select the coagulation factors, the activity of which changes when warfarin is administered:
91. Select the coagulation factors that require vitamin K for synthesis:
92. Select the disorders in which the bleeding time is increased:
93. Select the drugs that increase the bleeding time:
94. Select the factor which has anticoagulant role
95. Select the coagulation factors that influence prothrombin time:
96. Select stages of the platelet phase:
97. Select the substances that are physiological inhibitors of primary hemostasis:
98. Choose the process by which clot formation is activated following contact with the glass
99. Select the time required for the intrinsic pathway
100. Select the time required for the extrinsic pathway
101. Select the fibrinolysis product
102. Select the essential substance in fibrinolysis
103. Which of the following laboratory tests gives us information similar to "Coagulation time (Lee-White)"
104. Select the kidney morphofunctional unit
105. Renal mechanisms for concentrating and diluting urine depend on the following factors:

106. Which biologically active substances are synthesized in the kidney tissue?
107. Which hormones can be catabolized in the kidney tissue?
108. Select the metabolic pathways active in kidney tissue:
109. What can be the metabolic consequences in case of gradual decrease in kidney function and progression to chronic kidney disease:
110. Select the impact of chronic renal failure on other systems and processes in the body:
111. Select laboratory investigations used to explore tubular function:
112. Select tests used to explore glomerular function:
113. Select the correct statements regarding the density of urine:
114. What does the increase in diuresis volume above 2.5 L/24 h indicate:
115. Select kidney functions:
116. Damage to which portion of the nephron will cause altered erythrocytes to appear in the urine?
117. Select the possible cause of the pyuria:
118. What are the causes of transient glucosuria?
119. Select causes of ketonuria:
120. In which pathological states can proteinuria of 0.3-1.0g/24 hours be detected?
121. Select the proteins that can be detected in the urine in selective proteinuria:
122. Proteinuria > 3g/24 hours has extensive metabolic consequences. Select the consequences of non-selective macroproteinuria:
123. Select the pathologies that can cause nephrotic syndrome:
124. What are the indicators that stratify the risk and onset of acute renal failure according to the RIFLE criteria (Risk, Injury, Failure, Loss of kidney function, and End-stage kidney disease):
125. Which biochemical parameters are used to define and stratify the risk of chronic kidney disease according to KDIGO 2012 Kidney Disease Improving Global Outcomes)
126. Which processes justify the high consumption of O2 by the renal tissue:
127. What are the factors that determine the dynamics of glomerular filtration in the norm (125mL/min)?
128. Select the correct statement regarding the functions of the nephron:
129. Select the correct statements regarding the metabolic processes in kidney tissue cells:
130. Select the correct statements regarding urinary pH:
131. Select the correct statements with reference to isosthenuria:
132. Select the mechanisms of renal blood flow regulation:
133. Select the mechanisms of urine formation:
134. Select the amount of substances that can be used to calculate glomerular filtration rate:
135. Select the range for the renal glucose clearance threshold:
136. Which hormones are directly involved in regulating kidney functions:
137. Select the correct statement about countercurrent multiplication:
138. Analyze the following serum profile and choose the most possible imbalance:
139. Hemoglobin affinity to O_2 depends on:
140. Select the functions of the following plasma proteins:
141. Name the type of the following plasma components:
142. Metabolic acidosis is present in the following pathological states:
143. Metabolic acidosis is caused by:
144. Respiratory acidosis is caused by:

145. Select the correct statements concerning the plasma albumins:
146. Metabolic alkalosis is caused by:
147. Respiratory alkalosis is caused by:
148. What amino acid determines the buffering capacity of hemoglobin?
149. What amino acids determine the buffering capacity of plasma proteins?
150. Select the classes of the plasma enzymes (functional classification):
151. Select the organic components of blood:
152. Select the formed elements of blood:
153. Select what is characteristic of excretory pancreatic enzymes:
154. Select what is characteristic of indicatory enzymes:
155. Select what is characteristic of secretory liver enzymes:
156. Select the factors involved in blood clotting via both the intrinsic and extrinsic pathways:
157. Select the correct statements concerning fibrinogen:
158. Select the blood functions:
159. Name the gamma-globulins:
160. Select the correct statements concerning the plasma globulins:
161. Select the correct statements concerning the hyperproteinemia:
162. Select the correct statements concerning the hypoproteinemia:
163. In the blood clotting participate (additional to the plasma factors):
164. Select the systems that participate in the maintenance of the physiological pH of blood:
165. Polymerization and stabilization of fibrin (clot formation):
166. Select the proteins of the inflammatory acute phase:
167. Select the functions of plasma proteins:
168. Select the correct statements concerning protrombin:
169. The role of vitamin K in blood clotting:
170. Select the excretory pancreatic enzymes:
171. Select the cardio specific indicatory enzymes:
172. Select the hepatospecific indicatory enzymes
173. Select the organospecific skeletal muscle enzyme:
174. Select the secretory liver enzymes:
175. Select the factors involved in blood clotting via the extrinsic pathway only:
176. Select the factors involved in blood clotting via the intrinsic pathway only:
177. Select the platelet coagulation factors:
178. Select the blood coagulation factor initiating extrinsic pathway:
179. Select the blood coagulation factor initiating intrinsic pathway:
180. Select only erythrocytes buffer system:
181. Select only plasma buffer system:
182. Select buffer system prsents both in plasma and in erythrocytes:
183. Conversion of fibrinogen to fibrin:
184. Select the corect statemens regarding trombin
185. Select the regulatory effects of cholesterol delivered to cells via LDL-receptors:
186. Select the correct statements about lipoprotein(a):
187. Select the most common causes of familial hyperchylomicronemia (HLP type I):
188. Select the changes of lipid profile characteristic of familial hyperchylomicronemia (HLP type I):

189. Select the hereditary defects associated with familial hypercholesterolemia:
190. Select the lipid profile changes characteristic of familial hypercholesterolemia:
191. Select the correct statements regarding sitosterolemia:
192. Regarding the deficiency of LCAT (lecithincholesterol acyl transferase) enzyme, the statements are correct:
193. Select the correct answers regarding familial a-beta-lipoproteinemia:
194. Select the correct answers regarding familial an-alpha-lipoproteinemia (Tangier disease):
195. Select the correct answers regarding combined hyperlipidemia:
196. Select atherogenic lipoproteins:
197. Select the diseases associated with hypercholesterolemia:
198. Regarding isolated hypertriglyceridemia, the statements are correct:
199. Select the biochemical mechanisms involved in the development of diabetic dyslipidemia (from type II diabetes):
200. Select the lipid profile changes that constitute the "diabetic triad":
201. Select the lipid changes that fall within the defining criteria of the metabolic syndrome (according to IDF – International Diabetes Federations, 2005):
202. Select the clinical conditions and laboratory changes that fall within the IDF (International Diabetes Federations. 2005) criteria for defining the metabolic syndrome:
203. Select the correct statement regarding dyslipidemia from hypothyroidism:
204. Select the changes that are part of the "atherogenic lipid profile":
205. Oxidized LDL is involved in atherogenesis through the following effects, with <u>one exception</u>:
206. HDL have an antiatherogenic role through the following effects, with <u>one exception</u>:
207. Select the <u>screening tests</u> used to determine whether or not a patient has a disorder of lipid metabolism:
208. Select the <u>special tests</u> used to confirm and/or establish the type of primary dyslipidemia:
209. Calculation of the concentration of LDL-cholesterol is carried out according to the Friedewald formula. Select the situations when the Friedewald formula is not valid for calculating LDL-cholesterol:
210. Although apoB indirectly reflects the concentration of LDL, there are situations when the concentration of apoB is increased and LDL-Chol values are normal. What information does the disproportionate increase in apoB concentration provide?
211. Select the main mechanism of action of statins:
212. Select the main mechanism of action of resins (bile acid sequestrants):
213. Select the factors that can contribute to the increase in plasma cholesterol concentration:
214. Select the factors that can contribute to the increase in the plasma concentration of triglycerides:
215. Select the site of chylomicron synthesis:
216. Select the site of VLDL synthesis:
217. Select the main function of LDL:
218. Select the main function of HDL:
219. Select the enzyme that cleaves the main triglyceride part of chylomicrons and VLDL:
220. Select the enzyme associated with HDL that contributes to the retrotransport function of cholesterol by these lipoproteins:
221. Select the enzyme that ensures the storage of excess cholesterol in tissues:

222. Select the main function of apolipoprotein A-I:
223. Select the main function of apolipoprotein B-100:
224. Select the main function of apolipoprotein C-II:
225. Select the main cause of the formation of pathological lipoproteins X:
226. Select the dyslipidemia accompanied by the formation of pathological β-VLDL lipoproteins:
227. Interpret the following thyroid function test:
228. Which of the following antibodies is usually used to confirm the diagnosis of diffuse toxic goiter (Graves' disease)?
229. Which of the following substances competes with iodine in the thyroid gland's uptake mechanism?
230. What cofactor is used by TPO (thyreoperoxidase) to produce hydrogen peroxide (H_2O_2)?
231. Which radical is iodinated in thyroglobulin in the process of thyroid hormone biosynthesis?
232. Select the clinical manifestations of hypothyroidism:
233. Select the coenzyme/cofactor of the TPO (thyreoperoxidase) enzyme:
234. Select the metabolic change that may be present in a person with untreated hypothyroidism:
235. TSH (thyroid-stimulating hormone) is characterized by all of the following, <u>with one exception</u>:
236. The production of T_3 and T_4 is normally influenced by all of the following except:
237. Which of the following changes are characteristic in the use of estrogen therapy and contraceptives?
238. Which of the following plasma proteins predominantly binds circulating T_3 and T_4?
239. High serum level of which parameters can be associated with hypothyroidism?
240. What changes are associated with hyperthyroidism?
241. High iodine uptake by the thyroid gland can be caused by the following conditions, <u>with one exception</u>:
242. Which of the following transporters is responsible for the transport of iodine across the apical membrane into colloid?
243. Which of the following plasma proteins transport thyroid hormones in circulation?
244. Select the factors responsible for changing the blood T4/T3 ratio (an index that reflects thyroid function and the action of thyroid hormones on tissues):
245. Select the categories of people for whom the T_4/T_3 blood ratio of 20:1 is characteristic:
246. Select the correct statements regarding reverse triiodothyronine (rT_3):
247. Select the effects of thyroid hormones:
248. Select the correct statements regarding the effects of thyroid hormones on protein metabolism:
249. Select the correct statements regarding the effects of thyroid hormones on protein metabolism:
250. Select metabolic changes that may be present in hypothyroidism:
251. Select the categories of people in whom we can assume an iodine deficiency?
252. Which of the following situations are most likely in people with iodine deficiency?
253. Select the non-thyroid diseases/conditions in which a disturbance of thyroid hormones can be attested:
254. Select glucosteroid hormone:

255. Select pituitary hormones that regulate the peripheral synthesis of corticosteroid hormones:
256. Select precursor for steroid hormone synthesis:
257. Identify the regulatory mechanisms of corticosteroid secretion:
258. Select the time of day when the level of cortisol secretion is maximum:
259. Select the correct statements regarding the regulation of adrenocortical androgen synthesis and secretion (CSR):
260. Which blood transport proteins do androgens bind and transport?
261. Select steroid hormones that can be transported by transcortin (CBG):
262. Select conditions and pathologies associated with increased transcortin levels (CBG):
263. Select metabolic effects of corticosteroids:
264. Deficiency or absence of which enzymes causes congenital adrenal hyperplasia?
265. Select the correct statements characteristic of 21-hydroxylase deficiency
266. Select the correct statements specific for Cushing's disease:
267. Select the correct statements characteristic of ectopic ACTH syndrome:
268. Select the correct statements characteristic for independent ACTH syndrome:
269. Select dynamic tests used in the differential diagnosis between ACTH-dependent and ACTH-independent syndromes:
270. Select changes characteristic for chronic secretory deficiency of adrenocortical hormones:
271. Select changes in suggestive blood markers in chronic deficiency of adrenocortical hormone secretion:
272. Dosing which paraclinical markers are suggestive in the diagnosis of Addison's disease - select the correct statements:
273. Select dynamic tests used in the diagnosis of primary adrenal insufficiency (Addison's disease):
274. Select the correct statements characteristic of hyperaldosteronism:
275. Select the clinical manifestations characteristic of primary hyperaldosteronism (Conn's syndrome):
276. Select laboratory markers changes specific to primary hyperaldosteronism:
277. Select the steroid hormones that cause the appearance of secondary male sexual characteristics:
278. Select the hormones that regulate ovarian secretion during the fertile period in women:
279. Indicate the phases of the menstrual cycle in which we can identify estrogens increasing to the maximum possible level:
280. Select the correct statements regarding the effects of estradiol in the follicular phase of the ovarian cycle:
281. Select the periods when elevated progesterone levels are attested:
282. Select the correct statements characteristic for the luteal phase of the ovarian cycle:
283. Select the hormones secreted by the placenta:
284. Select the conditions and pathologies that inhibit the synthesis of sex hormone transport protein (SHBG):
285. Select the substrate used by aromatase to synthesize estradiol:
286. Select the substrate used by aromatase for estrone synthesis
287. Select the main source of estrogen in the postmenopausal period:
288. Select the correct statements characteristic of female hypogonadism:

289. Select the organs and cells that can synthesize testosterone:
290. Select pituitary hormones that stimulate testosterone synthesis in peripheral tissues:
291. Select the of coenzyme 5-alpha-reductase, the enzyme that converts testosterone to DHT (dihydrotestosterone) in peripheral tissues:
292. Select the most active form of endogenous androgens:
293. Select the correct statements characteristic of male hypogonadism:
294. Select the liver functions:
295. What are liver functions in the carbohydrate metabolism?
296. What are liver functions in the lipid metabolism?
297. What are liver functions in the lipid metabolism?
298. Select the correct statement regarding hyperproteinemia:
299. Select the correct statement regarding hypoproteinemia:
300. Select the correct statements regarding dysproteinemia in hepatobiliary diseases:
301. Select secretory liver enzymes:
302. Select excretory liver enzymes:
303. Select the correct statements regarding alanine aminotransferase (ALAT):
304. Select the correct statements regarding spartate aminotransferase (ASAT):
305. Select the correct statements regarding pseudocholinesterase:
306. Select the correct statements regarding alkaline phosphatase:
307. Select the correct statements regarding gamma-glutamyl transferase:
308. Select the enzymes that are markers of hepatocyte membrane permeability:
309. Select the enzymes that are markers of hepatocyte synthetic function:
310. Select the enzymes that are markers of cholestasis:
311. Select the compounds that are present in the bile:
312. What is specific for liver steatorrhea?
313. Select the types of gallstones:
314. What factor *DOES NOT* contribute to the formation of gallstones?
315. What are the stages of gallstone formation?
316. Select the main pathological consequence of the dysregulation of shemoglobin catabolism:
317. Select types of hyperbilirubinemia:
318. Select the correct statements regarding the determination of blood bilirubin:
319. Select the correct statements regarding serum bilirubin:
320. Select the correct statement regarding unconjugated bilirubin:
321. Select the correct statements regarding conjugated bilirubin:
322. What can cause jaundice?
323. What are the causes of unconjugated hyperbilirubinemia?
324. What are the causes of conjugated hyperbilirubinemia?
325. Select the stages of detoxification in the liver:
326. Select the alkaline phosphatase isoenzymes:
327. What is the origin of tartrate-resistant acid phosphatase:
328. Select the conditions in which hypercalcemia occurs:
329. Select the conditions in which hypocalcemia occurs:
330. The increase of which enzyme activity in the blood serum denotes the bone resorption?
331. The increase of which enzyme activity in the blood serum denotes the intensification of bone formation?

332. Serum alkaline phosphatase activity increases in all diseases, EXCEPT:
333. Select the diseases in which the acid phosphatase activity in the blood serum increases:
334. Select the cells that secrete the bone isoenzyme of alkaline phosphatase:
335. What factors determine the decrease of calcium absorption in the intestine?
336. What factors stimulate the absorption of calcium in the intestine?
337. What factor influences the level of ionized (free) calcium in plasma?
338. What factor increases the amount of the ionized (free) calcium?
339. Select the biological function of calcium in the human body?
340. The biological role of phosphates:
341. Select the main organs which regulate the level of phosphate in the blood:
342. What investigations are recommended to be carried out to detect the causes of calcium and phosphate metabolism disorders?
343. Select factors to consider when interpreting serum calcium concentration results:
344. Select what blood changes are characteristic for osteoporosis:
345. Select the target-organs for parathyroid hormone (PTH):
346. Select the disorders found in hyperparathyroidism:
347. Select the correct statements regarding calcitonin:
348. Select the correct statements regarding calcitriol –$1,25(OH)_2D_3$:
349. Select changes in laboratory parameters of blood serum that are characteristic of osteoporosis:
350. Select the changes of serum laboratory parameters that are specific for osteomalacia:
351. Select the changes of laboratory indices in blood serum specific for bone metastases:
352. Select the laboratory indices, which represent biochemical markers of bone formation:
353. Select the laboratory indices, which represent biochemical markers of bone resorption:
354. Select the correct statements regarding collagen cross-links compounds - (pyridinoline (PID) and deoxypyridinoline (DPID):
355. Select the correct statements regarding hydroxyproline:
356. Select the diseases in which osteoporosis is attested:
357. Select the drugs that induce osteoporosis:
358. Select risk factors for osteoporosis:
359. Select the purinergic compound involved in nerve transmission:
360. Select monoaminergic neuromodulators:
361. Select the peptides with a role in neurotransmission:
362. Select the neurotransmitter derived from amino acids:
363. Select the cholinergic neurotransmitter:
364. Select inhibitory neurotransmitters:
365. Select the compounds involved in neurotransmission with excitatory action:
366. Select the correct statements regarding GABA (gamma-aminobutyric acid):
367. Select the correct statements about acetylcholine:
368. Select the correct statements regarding NMDA (N-methyl-D-aspartate) receptors:
369. Select the correct statements regarding MAO enzymes (monoamine oxidases):
370. Select the correct statements regarding myasthenia gravis: