

**BIOTECHNOLOGY
EXAM TOPICS FOR
MASTER'S DIPLOMA EXAM
VALID FROM 2022/2023**

1. Chemical composition and types of contaminants found in raw materials and food products.
2. What are the most commonly used food additives and what is their role?
3. What are the main types and selection criteria for separation methods used in biotechnological processes?
4. What factors have an impact on the performance of the membrane filtration process? Present the types of membrane separation methods for bioproducts.
5. Applying UV-VIS and IR spectroscopy for identifying and studying compounds with biological properties.
6. Applying mass spectrometry and magnetic resonance for identifying and studying compounds with biological properties.
7. What are the stages of designing scientific experiments in biotechnology and what are their key elements?
8. Discuss the quality assurance and control system used in biotechnology laboratories.
9. Justify using analysis of variance and regression models in order to analyse experimental data?
10. Applying survival analysis in biological research, what are the methods for estimating survival functions and what are the key aspects of this analysis?
11. Discuss the methods of selecting statistical methods in evaluating diagnostic test results.
12. Present the structure and properties of biological membranes.
13. Present the biophysical methods used for studying the biomolecule structure, dynamics, and functions.
14. Present the main risks posed by immunotherapy techniques.
15. Discuss the reasons behind the ineffectiveness of antibiotic therapy.
16. Discuss the basics of prevention used to reduce bacterial and viral infections.
17. Present the methodology for viral multiplication in *in vitro* cultures.
18. Present the most important molecular biology methods that are used for diagnosing genetic diseases.
19. Discuss the most important factors having an impact on microbiological contamination of food.
20. Characterise selected pathogenic bacteria causing food contamination.
21. Present the impact of environmental factors on the human genome.
22. Present selected genetic diseases caused by gene and chromosome mutations.
23. Present what you know about the possibilities of using restriction enzymes in genetic engineering.

24. Propose a mode of operation in which you carry out genetic modification of a selected organism.
25. Present the molecular phenomena that lead to developing autoimmune diseases.
26. Describe the immune reactions that take place at the level of the human mucous membranes and skin.
27. Describe the possibilities for using the achievements of metabolomics in biotechnology.
28. Present what properties bacterial polysaccharides should have in order to constitute a target for protective vaccines.
29. Discuss the difference between polymers and biopolymers in relation to their physical and chemical properties.
30. Discuss the types of bioreactors, the processes involved in bioreactors and the conditions for their optimisation.