

MASTER'S DEGREE EXAMINATION

Study major: Quantitative Methods in Economics and Information Systems

1. Give the definition of a convex set. Give examples of convex sets and discuss their basic properties.
2. Give the definition of a convex function of one variable and many variables. Give examples, discuss the properties of the graph of a convex function.
3. Give the definition and basic properties of the convex cone. Define the dual cone. Give examples.
4. Give the definition and an example of a convex polyhedral set. Define the extreme point of such set. Discuss the technique for determining vertices, edges, and walls.
5. Define the ordinary differential equation. Give a few examples and selected classification of such equations. Discuss the Cauchy problem. Present the concept of integral curve.
6. Discuss the differential equations with separable variables and the method of solving them.
7. Discuss the system of linear differential equations (homogeneous and heterogeneous). Present the technique for solving a system of homogeneous linear differential equations with constant coefficients.
8. Discuss stability of the solution of the differential equation and the system of differential equations.
9. Define the non-homogenous linear differential equation. Show how to solve homogenous equation and present the method for the variation of constant.
10. Define the contraction map and discuss the Banach contraction mapping theorem.
11. Reasons for the ineffectiveness of small and shallow markets.
12. Institutional factors conditioning development.
13. The impact of social capital on the conditions and effectiveness of management.
14. The impact of cultural factors on the dynamics of development.
15. Institutional change mechanisms responsible for the inflexibility of institutions.
16. To what extent do income inequalities contribute to development?
17. Path-dependence, i.e. the explanatory role of history in economy.
18. Low level of social development. The Human Development Index (HDI).
19. Solow economic growth model.
20. Harrod-Domar economic growth model.
21. The unconditional convergence hypothesis vs the conditional convergence hypothesis.
22. The impact of globalisation on the chances and conditions for development in underdeveloped areas.
23. Economic protectionism. Protecting infant industries. Why are the weak reluctant to open their economies?
24. Natural resources and the Dutch disease.
25. Which theory discusses the inverse correlation between inflation and unemployment? Discuss and present the results of analysis in short and long time period.
26. Software testing – goals, types, techniques, phases.
27. What is the natural rate of unemployment? Can it be reduced and if yes – how can it be reduced?
28. How do unemployment benefits affect the labour market?
29. Factors that influence the demand for labour and supply of labour in the economy.

30. The impact of taxes and social insurance contributions on the labour market.
31. Can minimum wage increase cause drop of employment in one country and growth of employment in another? Justify your answer.
32. Wage flexibility and balance on the labour market.
33. Discuss the impact (positive and negative) of supply shock and, respectively, demand shock on the labour market.
34. Software implementation – what is it about, what problems it involves and what are the system conversion methods?
35. What is the marginal product of labour and how does it affect the demand for labour?
36. Substitution and income effect of wage growth.
37. How do demographic phenomena affect labour markets?
38. Information asymmetry as the source of ineffectiveness on the labour market.
39. Hysteresis in the labour market.
40. Discuss the main assumptions of the New Institutional Economics. Explain the differences between institutional economics – the New Institutional Economics and the Traditional Institutionalism.
41. Explain the concept and idea of transaction costs. Name all the possible transaction costs that may appear when a company is granted a bank loan for the first time.
42. Poland has achieved better results in terms of the advancement of institutional transformations and macroeconomic performance compared to other post-socialist countries. However, future good performance cannot be taken for granted. In what way do the range, scale and order of institutional transformations matter for successful passage to market economy?
43. Why don't developing countries imitate the institutions of developed countries? What is the relationship between institutions and economic growth?
44. Discuss the phenomenon of vertical integration and the causes that are responsible for its appearance.
45. Discuss the phenomenon of horizontal integration and the causes that are responsible for its appearance.
46. Define the concept of corporate governance. How did it develop in the period of transformations in Poland? Name the most important problems of corporate governance in Poland in the period of system transformation.
47. Software measures (metrics). What can be measured in the course of software production? Measures of software process and product.
48. Compare the share capital and debt capital financing agency costs.
49. Explain the concept of institutional transformations and describe the factors that they depend on.
50. The role of human behaviours in the process of institutional transformations.
51. Financial system based on the capital market or banking sector? Which solution stimulates system transformation processes? Analyse this on the example of a country from the Central and Eastern Europe region.
52. What lessons may future reformists learn from the experiences of EEC countries while shifting from planned economy to market economy? When discussing the lessons, use the concept of the past events dependency paths.
53. Characterise taxonomy methods: explain their purposes and practical applications.
54. Discuss the substantive, formal and statistical criteria for the selection of variables in multidimensional comparative analysis.

55. Characterise linear subordination methods and the basic groups of those methods.
56. Discuss the goals and conditions to be met by object grouping methods.
57. Characterise object grouping methods and the basic groups of those methods.
58. Discuss object similarity measures. Discuss the differences between object remoteness and proximity measures.
59. Explain when and why it is reasonable to apply the classical factor analysis. Give examples of at least two research issues.
60. Discuss the theoretical differences between the classical factor analysis and the main component analysis. Give examples of the application of both analyses.
61. Explain when and why it is reasonable to apply the correspondence analysis (give examples of at least two research issues).
62. Discuss the concept of inertia in the classical correspondence analysis model. What is the interpretation of inertia for the respective variables and for objects?
63. Present the basic differences between objective and subjective evaluation of poverty.
64. Name and characterise the basic sources of information for labour market statistics.
65. Discuss the Laeken Indicators of the effectiveness of social policy: definition, advantages, disadvantages, and methods for their limitation.
66. Present the basic differences between absolute and relative poverty measurements.
67. Name and characterise the basic representative household surveys that are the sources of data for social statistics.
68. Discuss two types of errors in the distribution of social benefits. How are the values of those errors affected by changes in the poverty threshold?
69. Compare the advantages and disadvantages of inequality indicators in the form of: the product of extreme quantiles, the product of the average income of 20% of the wealthiest and 20% of the poorest, the Gini index.
70. Present the directions of outflow from employment and characterise their causes.
71. Explain the possible causes for individuals who are not unemployed registering in labour offices and identify what groups of persons they are.
72. Name and synthetically characterise the basic components of the European Union Social Statistical System.
73. Reasons to resign from IT systems used.
74. Discuss the microeconomic and macroeconomic goals of the population time-budget studies.
75. Discuss the basic assumptions and goals of harmonised time-budget studies.
76. Explain the causes for differences between economic unemployment rates and registered unemployment rates in Poland. What are the causes of this?
77. Characterise the main assumptions of the PISA student assessment. What are the possible uses of analyses based on data collected in this assessment?
78. Characterise the main differences between the classical and the multidimensional poverty measurements.
79. Present the procedure for setting the poverty threshold by means of the constant part of the median or mean and present its basic advantages and disadvantages.
80. Explain how to use the Lorenz curve as a tool to describe and measure inequalities.
81. Discuss the importance of equivalence scales in measuring the wealth of households.
82. Name and characterise some of the important administrative registers used as statistical data sources.

83. Discuss the basic advantages and disadvantages of the categories of disposable income and total consumer expenditure of households as a measure of their wealth.
84. Present the basic differences between the categories of poverty and social exclusion.
85. Discuss the concept of life quality measurements within the European Statistical System.
86. Characterise the Human Development Index: the purpose of calculating the social development dimensions, method of construction.
87. How can enterprises come into possession of an IT system (or get access to its functionalities)? The advantages and disadvantages of those solutions.
88. Present the basic problems associated with software development.
89. Discuss basic causes for success and failure in the implementation of IT projects. Can failure be full prevented?
90. What is the difference between software development and production of other engineering products?
91. Present the manufacturing models used in the production of software and describe one such model in detail.
92. Compare the traditional and agile software development.
93. Analyse when to use agile methodologies and when to use traditional methodologies in the development of IT systems.
94. Reasons for undertaking the construction/implementation of new IT systems.
95. Characterise software construction cost estimation techniques.
96. Characterise the phases/activities associated with software requirements analysis.
97. Software prototyping – give a definition, discuss the types and explain when to use it.
98. Software designing. What is it about and what are its levels?
99. Implementation. Typical implementation environments. Choosing the programming language. The most popular languages.
100. Software quality – software process and product quality models and software usefulness models.

Literature:

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