**Questions**

1. Definition of functions.
2. Domain of a function.
3. Range of functions.
4. Monotonous functions.
5. Investigating concavity of a function.
6. The concept of a composite function
7. Sketching the graph.
8. Vectors and their properties.
9. Operations with vectors.
10. Linear vector space
11. Scalar product of vectors.
12. Linear dependence of vectors. Basis and rank of a system of vectors.
13. Decomposition of a vector by a basis.
14. Matrices.
15. Operations on matrices.
16. Multiplication of matrices.
17. Inverse matrices.
18. Identity matrix.
19. Minors of matrices.
20. Definitions of determinants.
21. Operations on determinants. Properties of determinants.
22. Minors of a matrix.
23. Rank of a matrix and a system of vectors.
24. Transpose matrix.
25. General form of a system of linear equations.
26. Matrix form of a system of linear equations.
27. Cramer’s method. Gauss-Jordan Elimination. method.
28. Homogeneous Systems
29. Solving homogeneous systems of linear equations.
30. Fundamental system of solutions.
31. Eugene values and Eugene vectors of linear transformation.
32. Sequences.
33. Limit of sequences.
34. Limit of functions.
35. Wonderful limits.
36. Definition of continuity.
37. Operations on continuous functions.
38. Continuity of elementary functions.
39. Discontinuities of a function.
40. Classification of the points of discontinuity of a function.
41. Derivative of function.
42. Derivatives of higher order.
43. Definition of differential .
44. The geometrical meaning of the differential.
45. Tangent lines.
46. Use of the limit definition to find the derivative of a function
47. Applications of Differentiation.
48. The properties of differentials. The table of differentials.
49. L’Hospital rule.
50. Taylor expansion of the polynomials.
51. Monotonicity of a function: intervals of increase and decrease.
52. Extremum of a function.
53. The greatest and least values of a function.
54. Points of inflexion.
55. Scheme of investigation of a function.
56. Indefinite integral.
57. The table of indefinite integrals.
58. Main properties of indefinite integrals.
59. Main methods of integration.
60. Definite integral.
61. Newton-Leibnitz formula of integral calculus.
62. Properties of definite integral.
63. Definition and domain of function of several variables.
64. Total and partial increment of the function several variables.
65. Limit of function of several variables.
66. Continuity. Partial derivatives.
67. The total differential of the function of several variables.
68. Partial derivatives of higher orders.
69. Derivative of a composite function of several variables.
70. Local extrema.
71. Necessary and sufficient conditions of extremum.
72. Constrained optimisation.
73. Application of calculus methods to optimization problems.
74. Asymptotes of the function.
75. Mean- value theorems for differentiation.