

PROBLEMS FOR DIPLOMA EXAMINATION OF 1ST CYCLE STUDIES

1.	Cross-section forces in frame structures.
2.	Analysis of strain and stress state at a point.
3.	Buckling of straight bars, buckling modes, methods to calculate critical forces.
4.	Influence lines of static forces in bar structures.
5.	Basic methods to solve statically indeterminate bar structures.
6.	Dynamic influences in civil engineering, dynamic characteristics of structures. Taking into account the dynamic effects on civil engineering structures.
7.	Ultimate limit state design based on strength of materials.
8.	Classification, basic characteristics and test methods for building materials and products.
9.	Basic properties of concrete constituents and general rules of their quality assessment; influence of constituent properties on concrete strength and other properties.
10.	Factors determining the durability of building materials.
11.	Principles of concrete strength and other properties evaluation in the light of requirements of the current national and European standards.
12.	Material, structural and technological solutions of housing, commercial and industrial buildings. ¹
13.	Thermal and moisture aspects of designing buildings envelope and their construction details.
14.	Advantages and disadvantages of traditional and new finishing elements of building. ²
15.	Actions on structures. Traffic loads on road bridges, foot bridges and railway bridges.
16.	Limit states for building structures. Classification, safety requirements and design rules.
17.	Calculation models for building structures.
18.	Conceptual designing of steel structures with respect to the classification of steel cross-sections.
19.	The influence of imperfections on the load-bearing capacity of steel structures.
20.	Joints and connections in the steel structures.
21.	Simplified methods for reinforced concrete / pre-stressed concrete cross-section design in structural elements for different load cases.
22.	Execution of pre-stressed and post tensioned concrete structures – materials, systems of pre-stressing, technology of execution.
23.	Design rules and detailing for simple structural reinforced concrete elements (slabs, beams).

¹ building foundations (direct and indirect, excavations, hydroprotection of foundations and basements of buildings), walls (masonry and prefabricated walls, heat-insulating multilayer walls, timber walls, light curtain walls), chimneys designing (traditional systems and chimney blocks), lintels, floors (timber floors, monolithic and prefabricated floors, rib-and-slab floors, floors with steel beams), communication elements (stairs, lifts, ramps), roofs (types of roofs, timber construction of roofs – roof rafters, flat roofs, large span roof structures).

² windows, doors, flooring, plastering, internal and external linings, roof tiles and steel sheets.

24.	Design rules and detailing for simple structural reinforced concrete elements (frames, foundations).
25.	Design rules for machine foundation.
26.	Rules of design and detailing of simple precast structures – phases of work, support zone of precast elements, connections and joints, pocket type precast foundations.
27.	Modern production technologies of concrete precast products The influence of production method on precast element properties.
28.	Basic structural systems for concrete, steel and composite steel and concrete bridge structures.
29.	Basis of design, sizing, detailing and construction methods for typical beam/deck single and multi-span concrete bridges.
30.	Basic technologies of bridges construction. Methods of tunnels construction.
31.	Design of roads and streets in the horizontal and vertical planes – cross-section, layout and grade line
32.	Rail and road superstructures
33.	Transportation service in urban areas
34.	Earthworks technology
35.	Technology of concrete works and reinforced concrete works
36.	Site assembly of building structures
37.	Works planning and organization
38.	Development of a building site