

Exam questions categories - BIA001 Building materials

1. Structure and basic properties of building materials

- Composition and structure of building materials
- Basic physical properties
- Humidity and diffusion properties
- Mechanical properties
- Thermal properties
- Radiant properties
- Acoustic properties
- Radioactivity of building materials
- Chemical properties
- Bioresistance
- Fire performance
- Electrical and magnetic properties
- Durability of building materials.

2. Building stone, stone products

- Rock classification, mining, processing
- Basic areas of application of selected igneous, sedimentary and metamorphic rocks
- Building stone
 - Quarry and stone products
 - Protection and maintenance of stone products
 - Artificial stone, artificial stone products
 - Piece products from melted basalt
 - Corundum-baddeleyite melt products

3. Aggregates

- Aggregates – definition, basic classification, harmful substances in aggregates
 - Requirements for the properties and method of determining the properties of aggregates
 - Heavy aggregates
 - Dense aggregates
 - Porous aggregate
- Mineral fibres
 - Production of mineral fibres
 - Mineral fibre products
- Asbestos

4. Concrete I, II

- Concrete I
 - Definition and specification of concrete according to ČSN EN 206-1
 - Classification of concrete according to ČSN EN 206-1
 - Concrete categories
 - Components of fresh concrete - features and functions
 - Fresh concrete production technology
 - Properties of fresh concrete
- Concrete II
 - Properties of hardened concretes
 - Classification of hardened concrete
 - Concrete stress-strain diagram
 - Lightweight concretes
 - Special types of concrete – high-performance, high-strength, self-compacting, visible, fibre-reinforced concrete, self-cleaning, polymer concrete
 - Concrete products, types of concrete structures

5. Binders and mortars

- Types of binders and mortars – basic classification and properties
- Production and preparation of fresh binders and mortars.
- Testing of fresh binders and mortars.
- Methodology for performing laboratory tests of hardened mortars.
- Non-hydraulic binders – types, production, composition, use.
- Hydraulic binders – types, production, composition, application
- Cement – production, composition, types, use.

6. Ceramics

- Production of ceramics, the technological process of production
- Ceramic mass, characteristics, raw materials plastic and non-plastic
- Brick products, categories
- Brick products for vertical structures
- Brick products for horizontal structures
- Brick products for roofing
- Brick products for special purposes
- Sanitary ceramics and stoneware
- Refractory products – classification
- Testing of ceramic products

7. Wood

- Wood composition, wood, trunk structure
- Basic wood sections, basic anatomical directions in wood

- Wood structure, macroscopic features of wood, dendrochronology
- Tree species, deciduous trees, coniferous trees
- Physical properties of wood
- Mechanical properties of wood
- Sorting wood according to standards
- Durability of wood, wood-decaying fungi, wood-destroying insects
- Wood-based materials – advantages, disadvantages, basic types and properties
 - Wood-based boards (SWP, plywood, laminated, chipboard, fibrous)
 - Glued laminated timber
 - Densified wood
 - Modified wood
 - Combined materials (cement-bonded particleboards, filled plastics)
- Other cellulose materials

8. Polymers

- Definition of polymers, explanation of the term
- History of polymer production
- Basic classification of polymers, typical properties
- Preparation of synthetic polymers – types of monomer chaining
- Advantages and disadvantages of polymers
- Processing of pure polymers into technical products
- Overview of common thermoplastics
- Overview of common thermosets
- Basic types and properties of elastomers
- Mechanical properties of polymers

9. Metals

- Metals, manufacturing in general, iron and steel production
- Properties of steel, compressive and tensile strength, stress-strain diagrams
- Heat treatment of steel – methods
- Marking of steels in the past (according to ČSN 42 0002)
- Marking of steels today (according to ČSN EN 10 027)
- Types of steel in construction – concrete reinforcement (wires and bars, prestressing, dispersed, solid), other steel products.
- Reinforcement corrosion
- Cast iron – types of cast iron
- Non-ferrous metals and their alloys

10. Bitumen and road-building materials

- Composition and production of asphalt and asphalt mixtures

- Properties of bitumen and asphalt mixtures and their determination
- Use of bitumen in construction
- Construction layers of pavements; Asphalt mixture - specifications
- Concrete road pavements