

EXAMINATION QUESTIONS
FOR CIV. ENG. 1st YEAR STUDENTS

A. GENERAL

- A1, Stress-strain diagrams, toughness, brittleness, Young's modulus [E] of the typical building materials.
- A2, Chemical reactions, types and applications of lime.
- A3, Chemical reactions, physical properties, set and hardening, strength range of gypsum.
- A4, Normal aggregate of concrete, cleanness, grading, fineness modulus, MSA, and shape.
- A5, Grading of aggregate, fineness modulus, mix design for required grading and or fineness modulus [m].
- A6, Porosity, gap ratio, apparent porosity, total porosity, and specific surface of bulks.
- A7, The manufacture of cement, types, set and influencing factors of setting + hardening.
- A8, The composition of ordinary Portland cement and clinker minerals. Sulphate resistance. Blended cements. Hydraulic additives.
- A9, Corrosion risks of reinforcing bars, carbonation etc.
- A10, Testing of hardened concrete for compressive strength. Size effect. Grading of concretes. Exposure classes.
- A11, Water tightness and permeability of porous materials. Vapour diffusivity.
- A12, Thermal conductivity in solids. Thermal insulating glass structures. Frost resistance of porous materials.
- A13, Hydration of cement. The effect of W/C ratio on the strength. Curing of cementitious materials.
- A14, Timber. The anatomy of wood. The main physical properties of timber.
- A15, Timber. Moisture content and influence on the mechanical properties. Moisture content and influence on shrinkage. Grain direction and influence on the mechanical properties.
- A16, Decay resistance of wood. Thermal properties. Main mechanical properties of timber. Preservation of timber. Fire resistance of timber.
- A17, Plastics. Production of plastics. Different processing technologies of plastics. Difference between thermosetting and thermoplastics. Thermomechanical curve of polymers.
- A18, Advantages and disadvantages of polymers. Applications of polymers in building industry. Possibility of recycling. Behaviour in fire of polymers.
- A19, Raw materials of glass production. Production methods of glass: blown, drawn, rolled, casted, float. Wire mesh glass. Glass fibres.
- A20, Special glass types: safety glasses, ESG, TVG, fire resistant glass, bulletproof glass.
- A21, Water insulation materials, black binders, Test methods of bitumen.

B. STRUCTURAL MATERIALS

- B1, Principles of mathematical statistics (frequency, distribution, standard deviation and corresponding graphs, variance, median, modus, characteristic values, Student factor).
- B2, The grade (strength classes) of concrete. Characteristic strength (also Study Aid 3.)
- B3, Mix design of concrete, target mean strength, constituents. (also Study Aid 3.)
- B4, Effect of the cement content and D_{\max} (MSA) on the compressive strength of concrete. Effect of consistency. Effect of steam curing.
- B5, Admixtures for concrete (plasticizer, retarder, air entraining agent and their benefits).
- B6, Effect of curing methods on concrete.
- B7, Short term deformations of concrete, different modulies.
- B8, Long term deformations of concrete & influencing factors, creep factor.
- B9, Shrinkage of concrete and influencing factors.
- B10, Production, forming, hot and cold working of steel. Effect of carbon content to steel properties. Steel joints.
- B11, Raw materials and production of ceramics.
- B12, Different type of ceramic products.
- B13, Faults due to the raw materials of ceramic products.
- B14, Faults due to the firing process of ceramic products.
- B15, Glass as structural material, slabs, floors, roofing, point grip glass structures

P. PRACTICALS

P1, Measurement of stress – strain diagram of a mild steel, steel properties, contraction, A_{5d} , grading, etc..

P2, Binders, testing of setting time of cement. Grading of cement, hydraulic additives, blended cements.

P3, Binders, testing of setting time of gypsum. Testing of slaking time of lime.

P4, Aggregates, grading of aggregates. 1st and 2nd class of aggregates. modulus of fineness, MSA. Mixing of aggregates.

P5, Aggregates, clay and sludge content. Cleanness. Flow out value testing. Particle shape tests.

P6, Density, body density, bulk density tests. Material density test of porous materials. Solidity, porosity, bulk solidity, gap ratio, total porosity, total solidity.

P7, Testing fresh concrete properties (body density, air content, consistency).

P8, Testing hardened concrete properties (compressive strength, Young's modulus, flexural tensile strength, etc.)

P9, Testing hardened concrete properties. Static – dynamic strength. Creep factor. Size effect. Fatigue strength.

P10, Hydrotechnical properties, water absorption capacity, testing water content, apparent porosity, capillarity. Body density test of non-uniform specimen.

P11, Testing of timber – compressive strength, flexural tensile strength.

P12, Characterising of timber – effect of grain direction to strength parameters, moisture content, air dry and cell saturated condition, material decays.