

*Paper (b) : Applied Geology*

The order of the systems of rocks in geological time, and methods of determining the relative ages of strata. The general character and situation of the chief New Zealand formations and the broad conditions under which they were formed. The principle economic products derived from them, such as sands, clays, fuels, and refractories, cements, buildings and road making materials. The work and facilities of the New Zealand Geological Survey.

Water-supply, underground water, surface supplies and catchment areas, the siting of dams and reservoirs. Exploratory surveys at engineering sites ; trial pits and headings ; augering ; boring ; use of magnetic, gravitational, seismic and electrical methods.

Geological considerations in the location of works of engineering construction, including foundations, excavations, tunnels, drainage.

A candidate in this subject will be required to present a certificate from the Principal of the institution attended that he has carried out a course of practical work of at least sixty hours' duration based on the above prescription and that his attendance and work have been satisfactory.

*Theory and Design of Structures I (a)*

Conditions for equilibrium. Classification of structures into statically determinate and indeterminate. Graphical and analytical methods for the determination of reactions, bending moments and shear forces. Construction of bending moment and shear force diagrams. Graphical and analytical methods for the determination of stresses in framed, determinate structures and three-hinged arches. The simple beam ; bending, shear, slope, and deflection. Stability of masonry and brickwork structures. Design and analysis of simple, reinforced-concrete beams and columns.

*Theory and Design of Structures I (b)*

Further consideration of slope and deflection leading to statically indeterminate beams. Columns and standard formula. Influence lines. Analysis and design of reinforced-concrete slabs, beams with single and double reinforcement, tee-beams, columns and foundations. Design of riveted and welded joints, simple beams, plate and other built up girders, struts, simple trusses.

*Theory and Design of Structures II (a)*

Deflection of trusses analytically and graphically. Analysis of redundant structures by methods of strain energy and virtual work. Analysis of rigid frames by moment-distribution. Codes of practice and regulations governing the design of structures. Methods of choosing design loads and working stresses. Design of simple structures in steel, timber and concrete.

Candidates will be expected to show competency in making dimensioned hand sketches in good proportion.

*Theory and Design of Structures II (b)*

Further applications of moment-distribution. Slope-deflection and column analogy methods. Theory of arches. Use of models. Design of more complex structures.

Candidates will be expected to show competency in making dimensioned hand sketches in good proportion.