

Entrance Examination for 2019 Master's Course Program
Specialized Engineering Knowledge
(Question Abstract)

[Structural Mechanics]

As for a three members statically determinate frame structure subjected to an applied load, find a sectional force of members and its influence by loading position. By assuming a rigid member or an elastic member, find a displacement of the structure and the reaction force when making statically indeterminate frame structure by adding a supporting point to the original structure.

[Hydraulics]

The following two questions are given. Obtain the pressure distribution in a pipe attached to a tank with different angles and the condition of no cavitation. Obtain the water surface profile equation and critical water depth in the triangular channel. And obtain the relationship between conjugate depth and Froude number when hydraulic jump occurs.

[Soil Mechanics]

Soil mechanics examination comprises two questions dealing with "consolidation" and "shear strength of soil". The first one covered characteristics of ground displacements due to consolidation as well as distributions of pore water pressure and effective stress at an immediate time and after a long time under the two loading patterns of uniformly distributed surcharge and rapid rise of the water level, respectively. The second one confirmed understanding of various soil parameters obtained from a triaxial compression test in which effective stress path and pore water pressure buildup in a specimen until failure is observed under consolidated undrained condition.

[System Analysis for Planning and Management]

As for Non-linear programming problem with a parameter, prove the convexity of the problem, find out the range of parameter which satisfies an optimal solution. As for a regression model about traffic volume estimation, the implementation of the estimation result and the model fitness are asked.