



Questions for oral exam





Topics for oral part of exam - 1

1. Characteristics of scientific field of statics
2. Basic terms of mechanics – coordinate system, rigid body, mass point, force, mass and weight, cinematics, action and reaction, interaction, set of forces



Topics for oral exam - 2

1. Equilibrium conditions for linear set of forces
2. Static moment of force to point in plane
3. Varignon's moment definition
4. Equilibrium conditions for general 2D set of forces
5. Equilibrium conditions for parallel 2D set of forces
6. Static center of 2D set of parallel forces



Topics for oral exam - 3

1. Loading on carrying structures
2. Securing immovability, static indeterminacy, reaction components in external supports
3. Exceptional supports of cinematically determined supported members
4. Securing immovability of planar system with hinges, static indeterminacy, reaction components in external supports and internal interactions.



Questions for oral exam - 4

1. Analysis of beam in axial task (Normal force analysis)
2. Analysis of beam in transverse task (Analysis of shear force and bending moment – vertical principal plane xz)
3. Analysis of beam in transverse task (Analysis of shear force and bending moment – horizontal principal plane xy)
4. Analysis of beam in torsional task
5. Analysis of beam in planar task - horizontal beam with sideways loading
6. Analysis of beam in planar task - horizontal beam with sideways support
7. Analysis of beam in planar task - sideways beam with vertical loading
8. Analysis of beam in 3D task
9. Differential equilibrium conditions of straight beam element, Schwedler's formulas, application



Questions for oral exam - 5

1. 2-D cranked beam in planar task
2. 2-D cranked beam in transverse task
3. Equilibrium check-up of joints in 2-D cranked beam
4. 3-D cranked beam
5. 2-D curved beam in planar task



Questions for oral exam - 6

1. Condition of static determinacy of continuous beam with hinges
2. Layout of inserted hinges in continuous beam
3. Solution of continuous beam with hinges
4. Solution of three-hinged beam and arch
5. Solution of three-hinged frame with string a of bowstring arch



Questions for oral exam - 7

1. Condition of static determinacy for truss girder
2. Exceptional case of planar hinged truss girder
3. Determination of axial forces in members planar hinged truss girder by joint method
4. Determination of axial forces in members of planar hinged truss girder by section method
5. Determination of internal forces in members planar hinged truss girder exposed to out-of-joint loading



Questions for oral exam - 8

1. Influence lines on simple beam without overhang
2. Influence lines on cantilever beam
3. Influence lines on simple beam with overhangs



Topics for oral exam - 9

1. Computation of center of gravity for 2D lines
2. Center of gravity computation of simple 2D elements
3. Center of gravity computation of combined 2D elements



Topics for oral exam - 10

1. Central Quadratic moments of basic elements
2. Central Quadratic moments of combined elements
3. Quadratic moments to rotated axes
4. Polar moments of inertia



Questions for oral exam - 11

1. Equilibrium conditions of 3D set of forces
2. Equilibrium conditions of general 3D set of forces
3. Static center of 3D set of parallel forces