CONSTRUCTIVE GEOMETRY
EXAMINATION TOPICS

Analytic geometry
Point: coordinates in E_2, E_3; distance between two points. Vector: given by two points, coordinates in E_2, E_3. Dot product, cross product, mixed product and applications of these products. Straight line: parametric, slope, intercept and general equation; mutual position between point and straight line, two straight lines. Plane: parametric, intercept and general equation; mutual position between point and plane, straight line and plane, two planes. Conic sections: definition, formula, sketching, construction of ellipse by means of osculation circles. Quadratic surfaces: formula, characteristics, sketching in technical isometry.
Monge projection
Definition of Monge projection. True length of straight line segment; basic geometric planar shape (circle, triangle, square, …) in projecting plane; basic geometric solid (sphere, cylinder of revolution, cone of revolution, torus) in special position.
Technical isometry
Definition of isometry and technical isometry. Construction of the solid given by technical drawing in technical isometry.
Kinematic geometry
Motion given by trajectories or envelopes: construction of new position of moving point, line or circle; construction of tangent line to the trajectory of moving point or point of contact between moving line or circle and its envelope; trajectory of moving point and envelope of moving line or circle sketching; construction of instantaneous centre of rotation; fixed centrode sketching.
Cyclic motion: definition of cyclic motion; construction of new position of moving point, line or circle; construction of tangent line to the trajectory of moving point or point of contact between moving line or circle and its envelope; trajectory of moving point and envelope of moving line or circle sketching. General position of moving figure with respect to the moving system.
Surfaces of revolution and their intersection
Surfaces of revolution: definition; construction of missing view of point; construction of tangent plane and normal line at the point on surface of revolution; construction of intersection between surface of revolution and projecting plane; principal meridian construction. Intersection: theoretical principle and procedure of construction of intersection between two surfaces of revolution with parallel and intersecting axes; condition for decomposition of the intersection between two quadrics of revolution and intersection curve construction.
Helix, helicoidal surfaces
Definition of the helix and helicoidal surface. Construction of the helix in Monge projection. Construction of principal meridian and normal section of helicoidal surface, construction of tangent plane at point on helicoidal surface.
Developable surfaces
Definition of the developable surface and conditions for developing of the surface. Construction of developing: of the cylinder and cone of revolution, of two quadrics (cylinders or cones) of revolution with degenerated (decomposed) intersection.