



**State exam questions
Mechanical Engineering BSc
Operation and Maintenance specialization**

Material Handling and Robotics

1. Review the classification of material handling machines, introduce the characteristics of each one of groups. Review the classification of transported materials. Introduce the main features of solid bulk materials and piece-goods.
2. Review the construction, the operation and the calculation methods of capacity and required driving power of belt conveyors.
3. Review the construction, the operation and the calculation methods of capacity and required driving power of bucket elevators.
4. Review the construction, the operation and the calculation methods of capacity and required driving power of screw conveyors and submerged conveyors.
5. Introduce the classification, construction and main application areas of industrial trucks. Review the static stability of forklifts, the capacity chart as well as the dynamic stability of forklifts during movements.
6. The structure of robots with formula and basic configuration with three degrees of freedom, Euler angles, Denavit–Hartenberg method.
7. Descartes (cartesian) systems of robot coordinates and its context.
8. Goal and process of robot mastering.
9. Tool measurement, Payload data, base measurement. Standard motions of the robots, data of motions.
10. Ambiguous status and turn information for determining the Status and Turn parameters. The singularity problem, three different singularity positions.