



**State exam questions  
Mechanical Engineering MSc  
Production Engineering specialization**

**Maintenance and Repairing Technologies;  
and Diagnostics and Condition Monitoring**

1. Please describe and classify the parameter differences!
2. Please describe and classify the malfunctions!
3. What type of wear do you know? Please classify them and the Stribeck diagram!
4. Please describe the EBM technology and PVD, CVD technologies!
5. Please describe the EDM and WJM technologies! Afterwards please compare the EBM and laser beam technologies!
6. Please describe the role of the digital signal processing in diagnostics. What is Shannon law, aliasing phenomena, quantization, and window functions?
7. Please describe the measurement sensors, DAQs, their typical parameters. What type of noise signals do you know?
8. Please describe the analogue and digital filters. What is the FIR, IIR filter, their transfer function?
9. Please describe the wavelet transform. What is the purpose of the wavelet transform? What wavelet functions do you know? Please show the steps of the parameter optimization focusing on genetic algorithm!
10. Please describe the machine learning methods: Artificial Neural Networks (ANN), Support Vector Machines (SVM) and Fuzzy logic in machine fault classification!