

Questions for diploma exam

Energy Technologies

1. Generation structure of the national energy system,
2. Basic definitions concerning power and energy,
3. What is the principle of sustainable development?
4. List the most important pollutants emitted into the atmosphere by burning fossil fuels.
5. Give some examples of techniques used in the clean-burning boilers.
6. What is a trading system for CO₂ emissions?
7. Long term risks and risk management.
8. Innovation in company.
9. Give the characteristics of metals and metal alloys
10. What is the hardening of steel ?
11. Give the definitions of basic copper alloys.
12. Mathematical formula/expression of 1st Law of Thermodynamics for open and closed systems.
13. Thermal equation of state.
14. Calorific equation of state.
15. Mathematical and verbal formula/expression of second Law of Thermodynamics.
16. Thermodynamic processes of ideal gases.
17. Engine thermodynamic cycles. Clausius-Rankine cycle.
18. Open and short-circuit test of transformers.
19. Equivalent circuit of induction motor
20. Generator volt-ampere characteristic
21. Characteristics of semiconductor devices as power electronics switches
22. Construction and operation principle of diode rectifiers
23. Structure and operating principle of the selected pulsed DC-DC converter
24. Construction and operation of the voltage inverter
25. The impact of power electronic converters on the power grid
26. Improving the quality of electricity through the use of a power electronic converter
27. Causes of error: systematic, random.
28. Ways to reduce these errors.
29. How to estimate the uncertainty of measurement?
30. Derive the scheme and the way of balancing the Wheatstone bridge.
31. What is a two-channel phase measurement of an oscilloscope by comparison?
32. Active and reactive power measurement systems in a three-phase four-wire system.
33. Physical properties of renewable sources
34. OTEC system
35. Classification of hydro power plants and their advantages
36. Types of geothermal sources and scheme of the binary power plant
37. Features of wind/electricity generating systems
38. Solar constant
39. The term of cogeneration and trigeneration.
40. Distributed energy system.
41. Design and use of the combined power and heat energy systems.
42. The construction of combustion engines and compressors.
43. The use of renewable fuels in distributed energy systems.
44. How does the vacuum between the two walls reduce conduction?
45. How does the vacuum between the two walls reduce convection?
46. What is radiation?