

Theoretical part – thematic circuits and typical questions

ELECTRIC POWER OUTLET AND CONTROL

- Specify a principle of generator phasing to the grid, draw a single line diagram, calculation of initial overcurrent in the case of different voltage magnitude and different voltage phase.
- Active and reactive power control principles (simple diagram, basic formulas).
- Components and basic properties of a generator excitation system.
- De-excitation system of synchronous generator

POWER PLANT AUXILIARY SYSTEM

- Draw single line of auxiliary with:
 - o primary (operating) voltage source
 - o primary (back-up) voltage source
 - o UPS
- Basic requirements on auxiliary voltage drops:
 - o For normal operation
 - o For largest appliance (motor) start-up
 - o For total auxiliary start-up

TERMODYNAMICS + POWER PLANT STEAM AND COOLING CIRCUIT PART

- Draw diagrams and specify main differences between condensing and backpressure turbine
- Draw T-s diagram for Clausius – Rankine cycle and corresponding scheme of a cycle with condensing turbine, mark and explain the most important points of the cycle.
- Basic diagram of Combined Cycle Gas Turbine (CCGT) system

THERMAL POWER PLANT COMBUSTION SYSTEM

- Draw a simple process diagram for feedwater (i.e. water + steam) and combustion (i.e. fuel, air, flue gas) in thermal power plant with major components.
- Main technical properties and schematic diagram of
 - o Pulverized coal-fired boiler
 - o Fluidized bed coal-fired boiler

HYDROELECTRIC POWER PLANTS

- Main technical properties of
 - o Kaplan turbine
 - o Francis turbine
 - o Pelton turbine