Individual assignment No 7

1. The power plant on saturated steam Rankine cycle. Pressure in steam generator is (10+N/10) MPa, pressure in the condenser is (5+N) kPa. Efficiency of the turbine is (75+N) %, the work of feedwater pump should be neglected. Define efficiency of the cycle and quality of the steam at the outlet of turbine.

2. To reduce the moisture content of steam at the outlet of turbine, the separator was installed into previous task. Separator condensate is introduced into the feedwater line in the mixing point. Choose the pressure of the separation to ensure the same quality of the steam at the outlet of the first and the second part of turbine. Define efficiency of the cycle.

3. To increase the quality of steam in the second part of turbine, the superheater on steam from boiler was introduced in the scheme from task 2. Define efficiency of the cycle if underheating in this superheater is 10 °C and its condensate is introduced into the feedwater line in the mixing point.

4. To increase the quality of steam in the second part of turbine, the intermediate superheater on steam from bleed of the first part of turbine was introduced in the scheme from task 3. Define efficiency of the cycle if underheating in this intermediate superheater is 10 °C and its condensate is introduced into the feedwater line in the mixing point together with the condensate of the first superheater. The temperature difference for the steam after superheaters of the first and second steps should be considered to be the same.

   N here is number of your variant.