FLUID FACILITIES AND MACHINERY

GUIDE TO LABORATORY PRACTICALS

University of the Basque Country (UPV/EHU)

Energy Engineering Department

SELF – ASSESSMENT

THEME 3: TURBINES – PELTON TURBINE

1. A Pelton turbine is:
   a. An action turbine because the energy exchange takes place at atmospheric pressure.
   b. An action turbine because part of the energy exchange is produced by the pressure variation existing between the inlet and outlet of the runner.
   c. A reaction turbine because part of the energy exchange is produced by the pressure variation existing between the inlet and outlet of the runner.
   d. A reaction turbine because the exchanged energy occurs at atmospheric pressure.

2. The main purpose of the injector of a Pelton turbine is:
   a. To direct the fluid towards the runner shaft.
   b. To profile the streamlines in order to arrange them in parallel and thus minimise energy losses.
   c. To create a jet with a diameter slightly higher than the size of the impeller buckets to generate maximum mechanical power.
   d. To transform the pressure energy of the fluid into kinetic energy and regulate the flow rate.

3. At the optimum point of operation:
   a. The mechanical power is maximum.
   b. The efficiency is maximum.
   c. The torque is maximum.
   d. The hydraulic power is maximum.

4. The point of maximum performance:
   a. Matches with the point of maximum mechanical power.
   b. Matches with the maximum torque.
   c. Matches with the maximum hydraulic power.
   d. None of the above.

5. In the conditions that works the Pelton turbine described in the practice, and regarding the hydraulic power:
    a. It will decrease at decreasing speed of rotation, for a specific injector position.
    b. It will increase at increasing flow rate.
    c. It will decrease at increasing head.
    d. It varies only with the position of the injector.

6. In the conditions that works the Pelton turbine described in the practice, and regarding the torque:
    a. For a given position of the injector, it will decrease with the speed of rotation.
    b. For a given position of the injector, it will increase with the speed of rotation.
    c. For a given position of the injector, it will be constant.
    d. For a given position of the injector, its trend is parabolic.

7. In the conditions that works the Pelton turbine described in the practice, and regarding the mechanical power:
    a. At zero flow, its value is zero.
    b. It depends only on the torque.
    c. Its evolution follows a straight trend line.
    d. It depends on the outlet diameter of the injector.

8. In the conditions that works the Pelton turbine described in the practice, and regarding its performance:
    a. At zero flow, its value is maximum.
    b. It is the relation between the hydraulic power and the mechanical power.
    c. It is the relation between the mechanical power and the hydraulic power.
    d. Its evolution follows a straight trend line.