

FLUID FACILITIES AND MACHINERY

GUIDE TO LABORATORY PRACTICALS

University of the Basque Country (UPV/EHU)

Energy Engineering Department

SELF - ASSESSMENT

THEME 5: TURBINES – KAPLAN TURBINE

1. A Kaplan 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 existence of a pressure variation between the inlet and outlet of the runner.
 - c. A reaction turbine because part of the energy exchange is produced by the existence of a pressure variation between the inlet and outlet of the runner.
 - d. A reaction turbine because the energy exchange takes place at atmospheric pressure.

2. The main purpose of the injector of a Kaplan turbine is:
 - a. To create a jet with a diameter suitable for the runner blades.
 - b. To profile the streamlines in order to arrange them parallel to each other and thus minimise energy losses.
 - c. Kaplan turbines do not have injectors.
 - d. To direct the fluid towards the runner.

3. Kaplan turbines operating in hydroelectric power plants are characterised by:
 - a. Having fixed guide vanes.
 - b. Having fixed runner blades.
 - c. Having fixed guide vanes and movable impeller blades.
 - d. Having guide-vanes and movable impeller blades.

4. As far as the intake pipe of a turbine is concerned:
 - a. It is used in action turbines.
 - b. It is used in reaction turbines.
 - c. It is used to direct the fluid to the turbine inlet.
 - d. It is always straight in section.

5. At the optimum point of operation:

- a. Mechanical power is at maximum.
 - b. The turbine operates with the runner at maximum angle.
 - c. Hydraulic power is minimum.
 - d. The efficiency is maximum.
6. In the conditions under which the Kaplan turbine described in the practice is operated, concerning the hydraulic power:
- a. It will depend only on the manometric head.
 - b. It will always depend on the degree of opening of the injector.
 - c. At constant head, it will increase as the flow rate decreases.
 - d. At constant head, it will increase as the flow rate increases.
7. In the conditions under which the Kaplan turbine described in the practice is operated, concerning the mechanical power:
- a. At zero flow, its value is zero.
 - b. It depends only on the type of blade installed on the turbine.
 - c. It depends only on the position of the guide vanes.
 - d. Its evolution follows a straight trend line.
8. In the conditions under which the Kaplan turbine described in the practice is operated, concerning the efficiency:
- a. It is the quotient between mechanical power and hydraulic power.
 - b. At zero flow, its value is maximum.
 - c. Its maximum value is achieved with the upper angle vane.
 - d. Its evolution follows a straight trend line.