

FLUID FACILITIES AND MACHINERY

GUIDE TO LABORATORY PRACTICALS

University of the Basque Country (UPV/EHU)

Energy Engineering Department

SELF - ASSESSMENT

THEME 6: TURBINES – PROPELLER TURBINE

1. A propeller turbine is:
 - a. An action turbine because the energy exchange takes place at atmospheric pressure.
 - b. 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.
 - c. 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.
 - d. A reaction turbine because the energy exchange takes place at atmospheric pressure.

2. The main purpose of the injector of a propeller 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. Propeller type turbines do not have injectors.
 - d. To direct the fluid towards the runner.

3. The main purpose of the deflector of a propeller turbine is to:
 - 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. Propeller turbines do not have deflectors.
 - d. Direct the fluid towards the runner.

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

5. The point of maximum performance:
 - a. Coincides with the point of maximum mechanical power.
 - b. Coincides with the maximum torque.
 - c. Coincides with maximum hydraulic power.
 - d. None of the above.

6. In the conditions under which the propeller turbine described in the practice is operated, regarding the hydraulic power:
 - a. It remains constant for a given flow rate.
 - b. It remains constant for a given flow rate and gauge head.
 - c. Will always depend on the degree of opening of the injector.
 - d. Remains constant for a given gauge head.

7. In the conditions under which the propeller turbine described in the practice is operated, regarding mechanical power:
 - a. At maximum flow rate, its value is the maximum.
 - b. It depends only on the type of blade installed.
 - c. Depends only on the position of the guide vanes.
 - d. Its evolution follows a curve corresponding to a polynomial of degree two.

8. Under the conditions under which the propeller turbine described in the practice is operated, regarding the efficiency:
 - a. Since the hydraulic power remains constant for a given distributor opening, the larger the distributor opening, the higher the hydraulic power will be.
 - b. Since the hydraulic power varies for a given distributor opening, the larger the distributor opening, the greater the hydraulic power will be.
 - c. Since the hydraulic power remains constant for a given manifold opening, it will be smaller the larger the manifold opening.
 - d. Since the hydraulic power remains constant for a given spool valve opening, the smaller the spool valve opening, the greater the hydraulic power will be.