FLUID FACILITIES AND MACHINERY

GUIDE TO LABORATORY PRACTICALS

University of the Basque Country (UPV/EHU)

Energy Engineering Department

SELF - ASSESSMENT

THEME 2: PUMPS – ROTATION SPEED

1. Two identical centrifugal pumps rotating at different speeds:
   a. Have similar ***H-Q*** characteristic curves but the maximum efficiency of the faster rotating pump is much higher than the maximum efficiency of the slower rotating pump, according to the corresponding similarity laws.
   b. Have similar ***H-Q*** characteristic curves but the maximum efficiency of the slower rotating pump is much higher than the maximum efficiency of the faster rotating pump, according to the corresponding similarity laws.
   c. Have similar ***H-Q*** characteristic curves with the same efficiency at homologous operating points.
   d. Have completely different ***H-Q*** characteristic curves, with no similarity between them, due to the variation in rotational speed.

2. A centrifugal pump will obtain a hydraulic power for the fluid:
   a. Higher than the mechanical power provided by the shaft for all the points of operation.
   b. Higher than the mechanical power provided by the shaft only for the points of operation near to the optimal operating point.
   c. Lower than the mechanical power provided by the shaft for all the points of operation.
   d. Lower than the mechanical power provided by the shaft only for the points of operation near to the optimal operating point.

3. The overall efficiency of a centrifugal motor pump (centrifugal pump driven by an electric motor) rotating at a given rotational speed:
   a. Has a maximum for zero flow rates.
   b. Has a maximum for zero heads (energies).
   c. Has a maximum for a single operating point.
   d. Has no maximum since it remains constant for any point of operation.

4. The mechanical power of a centrifugal pump:
   a. Has a maximum for zero flow rate.
   b. Has several maximums and minimums over the range of pumped flow rates.
   c. Has a maximum for a single point of operation.
   d. Has no maximum since it remains constant for any point of operation.

5. The $P_{mechanical}$-Q characteristic curve of a centrifugal pump:
   a. Fits reasonably well to an exponential function.
   b. Fits reasonably well to a polynomial of degree 2.
   c. Fits reasonably well to the equation of a line.
   d. Fits reasonably well to a sinusoidal equation.

6. The η-Q characteristic curve of a centrifugal pump:
   a. Fits reasonably well to an exponential function.
   b. Fits reasonably well to a polynomial of degree 2.
   c. Fits reasonably well to the equation of a line.
   d. Fits reasonably well to a sinusoidal equation.

7. By varying the speed of rotation of a centrifugal pump:
   a. The point of operation of the pump is changed.
   b. The point of operation remains unaffected but a different mechanical power is consumed.
   c. The point of operation is unaffected but the performance is changed.
   d. Cavitation occurs.

8. In a centrifugal pump and for a given operating point:
   a. Hydraulic power is greater than mechanical power.
   b. Hydraulic power and mechanical power are the same.
   c. Hydraulic power is greater than or equal to mechanical power (depending on fluid viscosity).
   d. Hydraulic power is less than mechanical power.