

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -3 EXAMINATION- Dec 2017

B.Tech VII Semester

COURSE CODE: 10B1W CE732

MAX. MARKS: 35

COURSE NAME: **Hydropower Engineering**

COURSE CREDITS: 3

MAX. TIME: 2Hr

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Assume suitable data if required.

1. The peripheral velocity at inlet of an outward flow reaction turbine is 12 m/s. The internal diameter is 0.8 times the external diameter. The vanes are radial at the entrance and the vane angle at outlet is 20° . The velocity of flow through the runner at inlet is 4m/s. if the final discharge is radial. Determine
 - (a) The guide blade angle
 - (b) The absolute velocity of water leaving the guide vanes
 - (c) The head on the turbine
 - (d) The hydraulic efficiency

[6]
2. Explain the working of reciprocating pump with neat sketch.

[4]
3. Design a Pelton wheel for a head of 60 m when running at 200 rpm. The pelton wheel develops 95.75kW shaft power. The velocity of the buckets = 0.45 times the velocity of the jet, overall efficiency = 0.85 and co-efficient of the velocity is equal to 0.98.

[5]
4. The internal and external diameters of the impeller of a centrifugal pump are 200 mm and 400 mm respectively. The pump is running at 1200 rpm. The vane angle of the impeller at inlet and outlet are 20 and 30 degree respectively. The water enters the impeller radially and the velocity of flow is constant. Determine the work done by the impeller per unit weight of the water

[5]
5. A propeller turbine has a 6 m diameter runner and 1.8 m diameter boss and consumes 220 cumec of water. If the flow ratio is 0.4, the guide blade angle is 51° and the hydraulic efficiency is 90%, calculate the speed of the turbine and the head on the turbine. Assume that the turbine discharge without whirl.

[5]
6. Explain briefly the Cavitation problem in pumps and turbines following

[4]
7. Explain the working of hydraulic accumulator. Derive the expression for its capacity.

[6]