

Code No: R22014

R10**SET - 1**

II B. Tech II Semester Supplementary Examinations, November - 2018
HYDRAULICS AND HYDRAULIC MACHINERY
(Civil Engineering)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks

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1. a) Explain the various types of flows in channels. Also explain the types of channels.  
b) Define specific energy and discuss applications.
2. Explain the various surface profiles of a gradually varied flow with sketches
3. Explain in detail about Buckingham's pi theorem of dimensional analysis. Give one example
4. A jet of water having a velocity of 40m/sec strikes a curved vane, which is moving with a velocity of 20m/sec. The jet makes an angle of  $30^\circ$  with the direction of motion of the vane at inlet and leaves at an angle of  $90^\circ$  to the direction of motion of the vane at outlet. Draw the velocity triangles at inlet and outlet and determine the vane angles at inlet and outlet so that the water enters and leaves the vane without shock.
5. Obtain an expression to the work done per second by water on the runner of a Pelton wheel. Hence derive an expression for maximum efficiency of the Pelton wheel giving the relationship between the jet speed and the bucket speed.
6. a) A hydraulic turbine develops 120 KW under a head of 10 m at a speed of 90 rpm and gives an efficiency of 92%. Find the water consumption and the specific speed. If a model of scale 1: 30 is constructed to operate under a head of 8m what must be its speed, power and water consumption to run under the conditions similar to prototype.  
b) What are the constant head characteristic curves of a turbine? What is the use to develop them?
7. a) Explain the principle behind a centrifugal pump and also explain its working with a neat sketch.  
b) Discuss multi stage pumps and pumps in parallel
8. Explain a hydropower plant with a neat sketch and also the different terms associated with it. Also explain the estimation of hydropower potential