

Code No: RT22034

R13**SET - 1****II B. Tech II Semester Supplementary Examinations, November - 2018****FLUID MECHANICS AND HYDRAULIC MACHINERY**

(Com. to ME, AME)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)

2. Answer **ALL** the question in **Part-A**3. Answer any **THREE** Questions from **Part-B**

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**PART -A**

1. a) Write about Atmospheric gauge and vacuum pressure
- b) Define Stream line, path line
- c) Explain about Bluff body and its applications
- d) Define hydrodynamic force
- e) Define cavitation
- f) Explain about water hammer

**PART -B**

2. a) A rectangular plane surface is 2m wide and 3m deep. It lies in vertical plane in water. Determine the total pressure and position of centre of pressure on the plane surface when its upper edge is horizontal and coincides with water surface
- b) Explain about viscosity and its significance
3. Write short notes on:
  - i. , flow net
  - ii. Euler's equation
  - iii. Vertex Flow.
4. a) If  $\phi = 3xy$ , find x and y components of velocity at (1,3) and (3,3). Determine the discharge empassing between streamlines passing through these points.
- b) Explain about the basic concepts of velocity profiles
5. A jet of water having a velocity of 60m/sec is deflected by a vane moving at 25m/sec in a direction at  $30^\circ$  to the direction of jet. The water leaves the vane normally to the motion of the vane. Draw the inlet and outlet velocity triangles and find out the vane angles for no shock at entry and exit. Take the relative velocity at the exit as 0.8 times the relative velocity at the entrance.
6. a) What do you mean by manometric efficiency, mechanical efficiency and overall efficiency of a centrifugal pump.
- b) The diameters of an impeller of a centrifugal pump at inlet and outlet are 20 cm and 40 cm respectively. Determine the minimum speed for starting the pump if it works against head of 25 m.

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7. a) A Pelton wheel is to be designed for the following specifications: Shaft Power= $11,772\text{ kW}$ , Head= $380\text{ m}$ , speed= $750\text{ r.p.m}$  overall efficiency= $86\%$ . Jet diameter is not to exceed one-sixth of the wheel diameter. Find the wheel diameter the number of jets required and diameter of the jet. Take  $k_v = 0.985$  and  $k_u = 0.45$ .
- b) Differentiate between firm power and secondary power.

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