

**II B. Tech II Semester Supplementary Examinations, Nov/Dec-2016**  
**HYDRAULICS AND HYDRAULIC MACHINERY**  
 (Civil Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
 2. Answer **ALL** the questions in **Part-A**  
 3. Answer any **THREE** Questions from **Part-B**

~~~~~  
**PART-A**

1. a) What do you know about specific energy.
- b) Explain the statement of Buckingham pi theorem .
- c) What are different applications of radial flow turbines?
- d) Differentiate between Francis turbine and Kaplan turbine.
- e) Explain about different characteristic curves of turbine.
- f) Write about cavitation in the pump.
- g) What are various components of reciprocating pump.

(3M+4M+4M+3M+3M+3M+2M)

**PART-B**

2. a) Distinguish between Prismatic and Non-prismatic channels.
  - b) Write a short note on velocity distribution in open channel flow.
  - c) A rectangular channel has a convex curvature in a vertical plane on its bed. At a section the bed has an inclination of  $30^\circ$  to the horizontal and the depth measured normal to the flow is 0.75 m. A certain flow produces a normal acceleration of  $0.4g$  which can be assumed to be Constant throughout depth. Determine the pressure distribution and compare with hydrostatic distribution. Also determine the pressure distribution if the boundary has a concave curvature to the flow and rest of the data remain same?
- (4M+4M+8M)
3. a) A spillway model is constructed on a scale of 1:25. Calculate
    - (i) the prototype discharge Corresponding to model discharge of  $0.12 \text{ m}^3/\text{sec}$
    - (ii) the velocity in model corresponding to Prototype velocity of  $3.5 \text{ m/s}$ .
  - b) What is dimensional homogeneity? Explain Geometric, kinematic and Dynamic similarity.
- (8M+8M)
4. a) What is the importance of inclined and curved two values and write clear note on moving feat.
  - b) What are the applications of radial flow turbines and explain.
- (8M+8M)



5. a) Explain in detail the various characteristic curves present in the case of turbines.  
b) A turbine develops 7460 kW under a head of 24.7m at 135 rpm. What is the specific speed? What would be its normal speed and output under a head of 20.5m? (8M+8M)
6. a) With a neat sketch, explain the principle and working of a centrifugal pump.  
b) A centrifugal pump rotating at 1000 rpm delivers 160 liters/s of water against a head of 30 m. The pump is installed at a place where atmospheric pressure is  $1 \times 10^5 \text{ Pa (abs.)}$  and vapour pressure of water is  $2 \text{ kPa (abs.)}$ . The head loss in suction pipe is equivalent to 0.2 m of water. Calculate minimum NPSH. (8M+8M)
7. a) Briefly explain the classification of power plants based on the storage characteristics.  
b) Write clear note on the importance of load factor? (8M+8M)

\*\*\*\*\*

