

Code No: RT22012

R13

SET - 1

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° to the horizontal and the depth measured normal to the flow is 0.75 m. A certain flow produces a normal acceleration of 0.4 g 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 m³/sec
(ii) the velocity in model corresponding to Prototype velocity of 3.5 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 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)

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