Printed Pages : 4

EEV061

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : **197854**

Roll No.

B. Tech.

(SEM. VIII) THEORY EXAMINATION, 2014-15

WATER POWER ENGINEERING

Time : **3** Hours] [Total Marks : **100**

Note : Attempt **all** questions. **Each** carries equal marks. Assume data not given.

1 Attempt any **four** parts of the following : **4×5=20**

(a) Discuss the Indian Scenario of Hydro-power.

(b) Explain how to forecast the load.

(c) A canal carries a discharge of 110 m^3/s at a section where a hydel scheme is installed. The effective head available for running the turbine is 5.0 m. Estimate power generation capacity of the power house in MW for 80% overall efficiency of power plant.

(d) Define hydro-power potential and list various sources of energy available in nature.

(e) When a run-of-river plant operates as a peak load station with a weekly load factor of 20%, all its capacity is firm capacity. What will be the minimum flow in the river so that the station may serve as the base load station? It is given that-

Rated installed capacity of generator =10,000 kW

Operating head =15 m

Plant efficiency = 80%

Estimate the daily load factor of the plant if the stream flow is 15 cumecs.

(f) Define and discuss Utilization factor, Diversity factor.

2 Attempt any **four** parts of the following : **4×5=20**

(a) With neat sketch discuss diversion canal plants.

(b) A hydel plant operates for 8 hours for 6 days in a week, every day. Compute the pondage factor.

(c) Define and explain power duration curve and load factor.

(d) How are Pumped Storage Plants advantageous?

(e) Compare flow-duration curve and power-duration curve. How would you construct such curves?

(f) Highlight reservoir capacity, pondage capacity, pondage factor and plant capacity.

3 Attempt any **two** parts of the following : **10×2=20**

(a) Define the phenomenon of water hammer and explain its demerits.

(b) Explain the stability considerations in the surge tanks. Also explain how to determine the `economical diameter of penstock'.

(c) With the help of neat sketches explain the Intake and its various types. What are the various losses in intakes in water power generation?

4 Attempt any **two** parts of the following : **10×2=20**

(a) Name various types of turbines and their importance in hydroelectric generation.

(b) Describe the Propeller and Kaplan turbine and its all features with neat sketches.

(c) For a hydroelectric plant, its Kaplan turbine has the following data :

Operation head	= 22.5 m
Output power at this head	=126 MW
Discharge at this head	= 615 m^3/s
Speed	= 68.2 rpm
Runner tip to tip diameter	D = 9.3 m
Hub diameter	D_h = 4.3 m
Number of blades	= 6

Calculate : the speed ratio, the flow ratio, the overall efficiency and the max^m suction draft head.

5 Attempt any **two** parts of the following : **10×2=20**

(a) Describe the various methods of tidal power generation with neat sketches along with their limitations.

(b) Briefly discuss power house planning. Also write the advantages of underground hydroelectric power stations.

(c) Enlist various components surface power house. Also discuss various lay outs for surface power house.