

GUJARAT TECHNOLOGICAL UNIVERSITY
M. E. - SEMESTER – I • EXAMINATION – WINTER • 2014

Subject code: 2713305**Date: 12-01-2015****Subject Name: Hydropower Engineering****Time: 02:30 pm - 05:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Classify hydropower plant on the basis of hydraulic characteristics and explain each in brief. **07**
- (b) Compare hydropower plant with thermal power plant with reference to Indian condition. **07**
- Q.2** (a) Explain hydropower potential in India. **07**
- (b) What are the principal components of hydropower plant? Discuss the utility of each components. **07**

OR

- (b) The load on hydel plant varies from a minimum of 10,000 kW to a maximum of 35000 kW. Two turbo-generators of capacity 21000 kW each have been installed. Calculate : **07**
- (a) total installed capacity of the plant ,
- (b) plant factor ,
- (c) maximum demand ,
- (d) load factor ,
- (e) utilization factor.
- Q.3** (a) Differentiate between high head hydro plant and low head hydro plant. **07**
- (b) A run-off river plant installed on a river having a minimum flow of 15 cumecs, If the plant is used as a peak load plant operating only for 8 hours daily. Compute the firm capacity of the plant : **07**
- (a) without pondage,
- (b) with pondage but allowing 10 % water to be lost in evaporation and other losses, Head at the plant is 16 m. and the plant efficiency may be assumed as 80 %

OR

- Q.3** (a) Differentiate between impulse turbine and reaction turbine. **07**
- (b) Classify the turbines according to specific speed. **07**
- Q.4** (a) Write design criteria of power canals. **07**

- (b) A medium hydro electric plant working at 35 m head at 85 % efficiency has variable load , as under : 07

Time in hours	Load in MW
0 - 3	15
3 - 6	20
6 - 9	90
9 - 12	50
12 - 15	60
15 - 18	70
18 - 21	63
21 - 24	12

Determine :

- (a) minimum average daily discharge required to supply load ,
 (b) storage required to produce peak load.

OR

- Q.4** (a) Describe penstock and write design steps of it. 07
 (b) Explain rigid and elastic water column theories. 07

- Q.5** (a) Define surge tank. Describe various types of surge tanks. 07
 (b) Write short note on governing of turbine. 07

OR

- Q.5** (a) Explain characteristic curves of the turbine. 07
 (b) A turbine is to operate under a head of 30 metres at 200 rpm. The discharge is 9 cumecs. If the efficiency is 90 % determine : 07
 (a) power generated,
 (b) specific speed of the machine,
 (c) types of turbine,
 (d) performance under head of 25 metres.
