Enrolment No.

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 Instructions:

Total Marks: 70

07

07

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

OR

- (b) The load on hydel plant varies from a minimum of 10,000 kW to a maximum of 07 35000 kW. Two turbo-generators of capacity 21000 kW each have been installed. Calculate :
 - (a) total installed capacity of the plant,
 - (b) plant factor,
 - (c) maximum demand,
 - (d) load factor,
 - (e) utilization factor.
- Differentiate between high head hydro plant and low head hydro plant. **Q.3** (a)
 - **(b)** A run-off river plant installed on a river having a minimum flow of 15 cumecs, If 07 the plant is used as a peak load plant operating only for 8 hours daily. Compute the firm capacity of the plant :
 - (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 bet		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 07 variable load, as under :

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.

		OK OK	
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	07
		cumecs. If the efficiency is 90 % determine :	
		(a) power generated,	
		(b) specific speed of the machine,	
		(c) types of turbine,	
		(d) norformance under head of 25 metres	

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