GUJARAT TECHNOLOGICAL UNIVERSITY ME – SEMESTER-1 (NEW) EXAMINATION – WINTER 2016

Subject Code: 2713305 Date:06/01/2017 Subject Name: HYDROPOWER ENGINEERING Time: 2:30 pm to 5:00 pm **Total Marks: 70 Instructions:** 1. Attempt all questions. 2. Make suitable assumptions wherever necessary. 3. Figures to the right indicate full marks. (a) Classify the turbines and explain each in brief. 07 0.1 (b) What are the main parts of the Pelton turbine. Explain each part of Pelton 07 turbine with sketch. What are the main components of hydroelectric scheme? Explain all in brief. 07 0.2 **(a)** (b) Classify the hydel plants on the basis of hydraulic characteristics. Explain all in 07 brief. OR (b) The load on a hydel plant varies from a minimum of 10000 KW to a maximum 07 of 36000 KW. Two turbo generators of capacities 22000 KW each have been installed. Calculate : (i)Total installed capacity of the plant (ii)Plant factor (iii)Maximum demand (iv)Load factor (v)Utilization factor 07 0.3 (a) Define the following terms (i)Total installed capacity of the plant (ii)Plant factor (iii)Maximum demand (iv)Load factor (v)Utilization factor (vi)Plant use factor (vii)Capacity factor (b) What is draft tube? Explain different types of draft tubes in brief with sketches. 07 Derive an equation of efficiency of draft tube. OR Write short note on characteristic curves of the hydraulic turbines. 07 0.3 (a) A Kaplan turbine runner is to be designed to develop 7357.5 KW shaft power. 07 **(b)** The net available head is 5.5m. Assume that the speed ratio is 2.1 and flow ratio is 0.7 and the overall efficiency is 60 % . The diameter of the boss is 1/3 rd of the diameter of the runner. Find the diameter of the runner, its speed and its specific speed. (a) Classify the hydroelectric scheme on the basis of head of water. Explain each 07 **Q.4** scheme in detail. (b) Explain governing of the turbines 07 OR Q.4 (a) Write short note on water hammer. 07 (b) A pelton turbine develop 3000 KW under a head of 290m. The overall

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efficiency of the turbine is 83 % . If speed ratio is 0.46, Cv is 0.98 and specific speed is 16.5, then find the diameter of the turbine and the jet.

Q.5	(a)	Write short note on power house of a hydel scheme.	07
	(b)	What are the different types of surge tanks? Explain each type in brief.	07
		OR	
Q.5	(a)	Classify penstocks and describe each type in brief.	07
	(b)	Write design criteria of penstocks.	07
