Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER– I (New course)• REMEDIAL EXAMINATION – SUMMER 2015

Subject Code: 2713305 **Date:16/05/2015**

Subject Name: HYDROPOWER ENGINEERING

Time: 10:30 am to 1:00 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)**	What is turbine? Differentiate between reaction and impulse turbines. Give examples.	**07**
	(b)	Differentiate between inward and outward flow turbines.	**07**
Q.2	**(a)**	What is draft tube? Write the functions of the draft tube.	**07**
	(b)	Write short note on pelton wheel turbine.	**07**
		OR	
	(b)	A pelton wheel is supplied with 75 mm diameter jet having a velocity of 100 m/s. The bucket deflects the jet by 170 ° when stationary. The ratio of the vane speed to the jet speed is 0.47. Speed of the turbine is 650 rpm. Neglecting losses find (a) wheel diameter (b) power developed (c) kinetic energy head of the jet leaving the pelton wheel.	**07**
Q.3	**(a)**	What is surge tank? Explain different types of surge tanks in brief with sketches.	**07**
	(b)	Write hydraulic design criteria of surge tank.	**07**
		OR	
Q.3	**(a)**	Write short note on water hammer.	**07**
	(b)	Briefly discuss the economic aspect of hydro power and thermal power.	**07**
Q.4	**(a)**	What are the various components of the power plant? Explain their functions.	**06**
	(b)	Define the following terms (i) Capacity factor (ii) Load factor (iii) Firm power (iv) Operating head.	**08**
		OR	
Q.4	**(a)**	Classify hydropower plant based on hydraulic characteristics.	**07**
	(b)	How do you assess the water potential of hydroelectric scheme?	**07**
Q.5	**(a)**	Write short note on power house of hydel scheme.	**07**
	(b)	Describe hydropower development in India.	**07**
		OR	
Q.5	**(a)**	A run off stream station with an installed capacity of 1800 kW operates at 15% load factor when it serves as peak load station. What should be the lowest discharge in the stream so that the station may serve as the base load station? It is given that the plant efficiency is 75% when working under a head of 20 m. Also calculate the maximum load factor of the plant when the discharge in the stream rises to 20 cumecs.	**07**
	(b)	A common load is shared by two hydel stations; one being a base load station with 22 MW installed capacity and the other being a standï by station with 27	**07**

MW capacity. The yearly output of the stand-by station is $10*10^6$ kWh and that of the base load plant as $110*10^6$ kWh. The peak load taken by standï by station is 12 MW and this station works for 2500 hours during the year. The base load station takes a peak of 18 MW. Find out ;

(i) Annual load factors for both stations.

(ii) Plant use factors for both stations.

(iii) Capacity factors for both stations.

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