Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – SUMMER • 2014

Subject code: 711205N **Date: 24-06-2014**

Subject Name: Hydro Power 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 mark.**

Q.1	**(a)**	Discuss the relative merits and demerits of hydropower as compared to other power sources.	**07**
	(b)	Discus the forces that are considered for stable analysis of anchor blocks.	**07**
Q.2	**(a)**	Derive an expression for water hammer pressure in case of a rigid pipe.	**07**
	(b)	Explain the working principle of impulse turbine.	**07**
		OR	
	(b)	Mention the different types of draft tube and explain any two in detail.	**07**
Q.3	**(a)**	What is meant by economical diameter of a penstock? A penstock with an internal diameter of 1.2 m, supplies water at a head equivalent to 18 Kg/cm^2. There is possibility of 20% increase in pressure due to transient conditions. The design stress and the efficiency of the joint are 1030 Kg/cm^2 and 90% respectively .Calculate the approximate wall thickness of the penstock.	**07**
	(b)	What are the functions of a surge tank? Discuss the behavior of a surge tank.	**07**
		OR	
Q.3	**(a)**	Explain entrance loss and head gate loss of intake structure.	**07**
	(b)	It is observed that a run off river power plant operates as peak load plant with a weekly load factor of 25% as firm capacity. Determine the minimum flow in river so that the power plant may act as base load plant for the following data: Rated installed capacity of generating plant =15000 KW, operating head =18 m, plant efficiency= 85%	**07**
Q.4	**(a)**	What are the points you will consider for selecting site for tidal power generation. Discuss the limitations of tidal power generation.	**07**
	(b)	Discuss in detail the characteristics curve of turbine with neat sketch.	**07**
		OR	
Q.4	**(a)**	What are the different types of valves used in hydro electric installation? Discuss the suitability of penstock valve under various conditions.	**07**
	(b)	Explain the different method of classifying hydro electric power plant.	**07**
Q.5	**(a)**	Explain the dimension of unit bay (machine hall) of super structure power house.	**07**
	(b)	Explain the basic features and advantages of pump storage plant.	**07**
		OR	
Q.5	**(a)**	What are the advantages and limitations of underground power station.	**07**
	(b)	Discuss design criteria of power canal based on discharge capacity and maximum pressure velocity.	**07**

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