

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)** Discuss 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/cm². There is possibility of 20% increase in pressure due to transient conditions. The design stress and the efficiency of the joint are 1030 Kg/cm² 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**
