

**GUJARAT TECHNOLOGICAL UNIVERSITY****M.E –I<sup>st</sup> SEMESTER–EXAMINATION – JULY- 2012****Subject code: 711205N****Date: 11/07/2012****Subject Name: Hydropower Engineering****Time: 2:30 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 marks.

- Q.1** (a) Discuss (i) Load factor (ii) Base factor (iii) peak factor (iv) Firm capacity **07**  
 (b) Explain sources of Energy ? Compare conventional and Non conventional Energy sources **07**

- Q.2** (a) Give sketch of Hydropower plant , Enlist components of Hydropower plant and explain its function **07**  
 (b) Calculate wall thickness of penstock if internal diameter of 2.5m Supplies at a head equivalent to 19.3 Kg/cm<sup>2</sup> . There is a possibility of 16.5 % increase pressure due to transient condition . The design stress and efficiency of joint may be assumed to 1040 Kg/cm<sup>2</sup> and 76% percent respectively. **07**

**OR**

- (b) From the details of the (i) Unit generated per year = 11.2 x 10<sup>6</sup> Kwh (ii) Station capacity 35 MW (iii) Total hours 2400 hr (iv) Maximum demand 16 MW Calculate (a) Annual load factor (b) Plant use factor (c) Capacity factor **07**

- Q.3** (a) Assuming that the daily flow in a river constant 20 m<sup>3</sup>/s What would be the firm capacity of a runoff river plant to be used as an 8 hour peaking station ? What would be the pondage factor and magnitude of pondage ? Head of the plant 12m and overall efficiency 78 % **07**  
 (b) Explain the Elastic column theory of water hammer **07**

**OR**

- Q.3** (a) Following data is available (i) Available head = 55m (ii) Total catchment = 80 Sq. Km. (iii) Rainfall per annum 150 cm (iii) percentage of rainfall utilized = 70 % (iv) Turbine efficiency = 81 % (v) Generator efficiency=90%(vi ) Penstock efficiency =75% . Calculate suitable capacity of turbo generator **07**  
 (b) Explain low medium and high head power plants **07**

- Q.4** (a) Explain Kaplan turbine **07**  
 (b) Explain surge tank and effect of surge **07**

**OR**

- Q.4** (a) Describe briefly the various controls in hydro power plant **07**  
 (b) Discuss draft tube .Give list of different type of draft tube **07**

- Q.5** (a) Explain (i) Tail race (ii) Trash rack (iii) Penstock (iii) Pond **07**  
 (b) Explain factors affecting selection of turbines **07**

**OR**

- Q.5** (a) Describe the Hydro power generation potential of India **07**  
 (b) Explain Economy in power plant **07**

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