

GUJARAT TECHNOLOGICAL UNIVERSITY**M.E Sem-I Regular Examination January / February 2011****Subject code: 711205N****Subject Name: Hydro Power Engineering****Date: 03 /02 /2011****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 marks.**

- Q.1** (a) List the various source of energy production & discuss merits and demerits of any two briefly. **07**
- (b) Draw a typical layout of low head hydropower development scheme Canal & explain the function of each element. **07**

- Q.2** (a) What is the Hydro electric plant? Classified & discuss any one. **07**
- (b) Draw flow diagram me of the Hydro electric plant showing & discuss the function of each element. **07**

OR

- (b) A power canal having bed width 15m of rectangular shape, with assuming a steady state depth of flow of 3m and having discharge of 30 cum/s to three turbine. Calculate height of surge tank in the canal if the load in the plant is suddenly thrown off, so that two is to be shut down. **07**
- Q.3** (a) How is water turbines classified? Suggest the best suited turbine for (1) High head (2) low head (3) Low head & high flow. **07**
- (b) A hydraulic turbine works under a maximum head of 27.5m. Find out (1) H.P. & Speed under a unit head and unit speed. (2) Speed under a unit head and for unit power. (3) Power & unit head and unit speed. **07**

OR

- Q.3** (a) Differentiate between the poltroon wheel turbine and Reaction turbine. Sketch any one. **07**
- (b) Design wall thickness of the penstock required for 1.20m diameter supplier pipes water at a head equivalent to 17.6 kg/sq cm. & 20% increase in pressure due to transient's conditions. Assuming design stress 1020 kg/sq cm. & 84% efficiency. **07**
- Q.4** (a) Discuss the design criteria for Penstock. **07**
- (b) What are the function of Surge tank? List the types of surge tank. & discuss any one. **07**

OR

- Q.4** (a) Merits & demerits of hydro electric power generations over thermal electric power generations. **07**
- (b) Write short notes on Drafts tube & its types. **07**
- Q.5** (a) List electrical & Mechanical equipments used in the Hydro electric plant. Discuss perform of various functions in the control room. **07**
- (b) A steel penstock carries 12 sq m/s of water under a head of 240m. The penstock diameter is 2.8m. The allowable stress in penstock materials is 1400 kg/sq m. Determine water pressure assuming velocity of pressure wave 1425m/s and thickness of penstock. **07**

OR

- Q.5** (a) Discuss advantage & disadvantage of u/g power plants with solidarity. **07**
- (b) A hydro electric power plant having a discharge of 320 cum and head of 30m. The generator is directly coupled to the turbine. The frequency of generator is 82 Hz.. **07**
The turbine efficiency is 82%. Find the number of turbines required if a Francis turbine with a specific speed of 250 is used.
