Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Sem-I Remedial Examination January/ February 2011

Subject code: 711205

Subject Name: Hydropower Engineering

Date: 03 /02 /2011 **Time: 02.30 pm – 05.00 pm**

Total Marks: 60

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Explain different Energy sources and explain any one non conventional energy sources in detail	**06**
	(b)	What are the essential features of Hydroelectric power plant ? explain the layout of the plant with sketch	**06**
Q.2	**(a)**	A penstock with an internal diameter 2.0m supplies at a head equivalent to 18 Kg/cm^2 there is possibility of 20% increase in the pressure due to transient condition . The design stress and the efficiency of the joint may be assumed to 1020 Kg/cm^2 and 76 % respectively . calculate the approximate wall thickness of penstock required	**06**
	(b)	Enlist the medium head power plant	**06**
		OR	
	(b)	Explain (i) Head (ii) Load Factor	**06**
Q.3	**(a)**	Determine the firm capacity of a run of river hydro power plan to be used as 10.00 hours peaking plant . assuming daily flow 20 m^3/s also calculate pondage factor and pond age if the head of the plant is 19.00m and overall efficiency 85%	**06**
	(b)	What is the function of draft tube ? explain in detail .	**06**
		OR	
Q.3	**(a)**	Enlist different types of turbines and explain any one in detail	**06**
	(b)	Explain water hammer and mention the equation to find out pipe thickness	**06**
Q.4	**(a)**	What is surge ? Explain surge tank	**06**
	(b)	Explain Anchor block with sketch in penstock	**06**
		OR	
Q.4	**(a)**	Enlist the method of arriving at the rate per unit of the power . also discuss the different factor affecting unit rate of power	**06**
	(b)	A pump storage power plant has a gross head of 230 m. the head race tunnel is 2.50 m dia and 540 m long . The flow velocity is 5 m/s . and friction factor is 0.0016. If the overall efficiency of pumping and generation are 85% and 90% respectively. Determine the plant discharges directly in the lower reservoir	**06**
Q.5	**(a)**	Explain Pelton wheel	**06**
	(b)	Explain Francis Turbine	**06**
		OR	
Q.5	**(a)**	Explain the design parameter of turbine	**06**
	(b)	Enlist different types of Intake and explain any one	**06**

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