Seat No.: _____ Enrolment No._____

UJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – WINTER 2012

Subject code: 711205N **Date: 16-01-2013**

Subject Name: Hydro Power Engineering (Elective)

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)**	Give classification of hydropower plant as per the head of the water	**07**
	(b)	Enlist the different types of the turbines and explain Francis turbine	**07**
Q.2	**(a)**	Enlist different sources of energy and explain hydrpower as source of energy	**07**
	(b)	A reaction turbine is supplied with 160 cu.m. of water per second and work under a maximum head of 108 m . Assuming overall efficiency of the plant 80 % and specific weight of water 1000 m^3/s , calculate the horse power developed in KW	**07**
		OR	
	(b)	Explain hydropower development of India	**07**
Q.3	**(a)**	Explain different types of penstock	**07**
	(b)	Explain behaviors of surge tank	**07**
		OR	
Q.3	**(a)**	Explain (i) Load factor (ii) Capacity factor (iii)Firm power	**07**
	(b)	Considering daily flow in a river constant 10 m^3/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 the magnitude of the pondage ? Head of the plant 20 m . Overall efficiency η=85 %	**07**
Q.4	**(a)**	Explain different methods of support of penstock	**07**
	(b)	Explain design criterias of surge tank	**07**
		OR	
Q.4	**(a)**	A penstock with internal diameter of 1.0 m supplies water at head equivalent to 19.4 Kg/cm^2 . There is a possibility of 19 % increase in the pressure due to transient conditions. The design stress and the efficiency of the joint may be assumed to be 1000 Kg/cm^2 and 84 % respectively . calculate the approximate thickness of the penstock required	**07**
Q.4	**(b)**	Explain rigid water column theory	**07**
Q.5	**(a)**	Enlist different types of intake and explain dam intake	**07**
	(b)	Explain Draft tube	**07**
		OR	
Q.5	**(a)**	The following data of a turbine is given (i) Frequency : 50 Hz (ii) Pairs of poles : 10 (iii) Gross Head : 60 m (iv)Power generation : 128000 HP, (v) Efficiency of head race tunnel and penstock : 95 % (vi)Overall efficiency : 90 % (vii) Numbers of unit : 3 Calculate (i) Synchronous speed of generator (ii) Net Head of turbine (iii) Discharge (iv) Specific speed	**07**
	(b)	Explain (i) Tail race (ii) Trash rack	**07**

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