

GUJARAT TECHNOLOGICAL UNIVERSITY**BE SEM-VI Regular Examination May 2011****Subject code: 160602****Subject Name: Applied Fluid Mechanics****Date: 17/05/2011****Time: 10.30 am – 01.00 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) Oil of specific gravity 0.82 is pumped through a horizontal pipe line 15 cm in diameter & 3 km long at the rate of 900 liters per minute. The pump has an efficiency of 68% & requires 7.35 kw to pump the oil. Determine the dynamic viscosity of oil & verify whether the flow is laminar? **07**
- (b) Explain hydro-dynamically smooth & rough pipes. **07**

- Q.2** (a) Derive the expressions for Displacement thickness. **07**
- (b) Discuss drag on a circular cylinder with all possible flow conditions with sketch. **07**

OR

- (b) Discuss the phenomenon of boundary layer separation. **07**

- Q.3** (a) Derive the differential equation of gradually varied flow with assumptions made in it. **07**
- (b) Derive the geometrical conditions for the most economical section of a trapezoidal channel. **07**

OR

- Q.3** (a) Explain normal depth, critical depth, alternate depths and conjugate depths. **07**
- (b) A 12m wide rectangular channel carries a discharge of 30 m³/s with a bed slope of 1:5000, the depth of flow at a section is 1.5 m. Find the type of water surface profile. **07**

- Q.4** (a) Differentiate between pump and turbine. **07**
- (b) What is priming? Why it is necessary? **07**

OR

- Q.4** (a) What is draft tube? Why it is required in case of a reaction turbine? **07**
- (b) Differentiate between a single stage and multi stage pump. **07**

- Q.5** (a) What do you mean by fundamental units and derived units. **07**
- (b) What is meant by dimensionless number? Enlist and explain any two of them. **07**

OR

- Q.5** (a) What is undistorted and distorted model. What are the advantages of using distorted model? **07**
- (b) State Buckingham's π theorem. Why it is considered superior over Rayleigh method for dimension analysis? **07**
