

Seat No.: _____

Enrolment No. _____

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**
