Reg. No. : .....

Name : .....

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E – 4760

Fourth Semester B.Tech. Degree Examination, September 2018
(2008 Scheme)
08.404 : FLUID MECHANICS – II (C)

Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **5** marks.

1. Define with reference to open channel flows :
   i) Depth of flow
   ii) Top width
   iii) Wetted perimeter
   iv) Hydraulic radius
   v) Hydraulic depth

2. Differentiate between (i) uniform flow and non uniform flow (ii) steady flow and unsteady flow.

3. Explain the following terms :
   (i) critical depth
   (ii) alternate depths
   (iii) initial depth and sequent depth.

4. Sketch and explain the possible gradually varied flow profiles in steep sloped channel.

5. Explain dynamic similarity between model and prototype.

6. Explain the applications of momentum equation.

7. Differentiate between impulse turbine and reaction turbine.

8. Explain different types of centrifugal pumps. **(8×5=40 Marks)**

P.T.O.

PART – B

Answer **any one full** question from **each** Module. **Each** full question carries **20** marks.

Module – I

9. a) What is meant by most economic section of a channel. Prove that the hydraulic radius is half the depth of flow for the most efficient section of a trapezoidal channel section. **10**

   b) A rectangular channel 4 m wide carries 15 m^3/s of water. The bed slope of the channel is 1 in 250. Determine the normal depth. Assume Manning's n = 0.015. **10**

10. a) Explain specific energy diagram and specific force diagram. **10**

    b) Obtain an expression for the ratio of initial depth and sequent depth in the form of Froude number. **10**

Module – II

11. a) Derive dynamic equation for gradually varied flow mentioning the assumptions. **10**

    b) Explain the direct step method for the computation of gradually varied flow profile. **10**

12. a) By dimensional analysis, show that the torque T on a shaft of diameter d, revolving at a speed N in a fluid of viscosity μ and mass density ρ is given by the expression $T = \left(\rho d^5 N^2\right)\Phi\left(\frac{\nu}{d^2 N}\right)$. **10**

    b) Explain Reynold's Model law and Froude Model law. **10**

Module – III

13. a) Draw the velocity triangles of Francis turbine and Kaplan turbine and explain. **10**

    b) A jet of water 50 mm in diameter having a velocity of 15 m/s strikes a flat plate, the normal of which is inclined at 30° to the axis of the jet. Calculate the normal force, work done and efficiency when the plate is moving with a velocity of 10 m/s in the direction of the jet. **10**

14. Write short notes on (i) draft tube (ii) air vessels (iii) minimum speed of a centrifugal pump (iv) surge tank. **20**