*Total No. of Questions : 8]* *[Total No. of Printed Pages : 2*

 **Roll No** .....

# MMTP-104

## M.E./M.Tech. I Semester

Examination, June 2017

## Advanced Fluid Mechanics

***Time : Three Hours***

***Maximum Marks : 70***

***Note:*** i) Attempt any Five questions. All questions carry equal marks.
ii) Assume missing data suitably, if any.
iii) Draw neat and clean sketches/diagrams/figures wherever required.

1. a) Explain the concept of continuum.
   b) Compare:
      i) Streamline and stream tube flow.
      ii) Laminar and turbulent flow.

2. a) State and discuss Reynolds Transport Theorem. State its applications.
   b) Derive Bernoulli's equation for steady flow by integrating Euler's equation of motion.



3. a) As shown in Fig.1, if water flows out of the tank of head 50cm through the throttle, obtain the pressure at the throat.

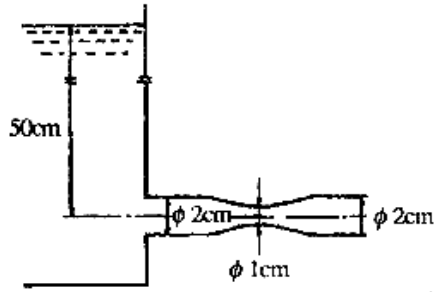


Fig.1







   b) Derive the expression for velocity variation for a laminar incompressible flow in a circular pipe.

4. Glycerine of viscosity 0.88 N/m$^2$ and specific gravity 1.26 is pumped through a horizontal pipe of diameter 30 mm at a flow rate of 50 lit/min. Determine whether the flow is laminar or turbulent. Find also the pressure loss due to the frictional resistance in a length of 10 m and the power required.



5. a) Explain various energy losses in pipes.
   b) Explain with a neat sketch the phenomenon of boundary layer separation on a stationary flat plate.

6. A channel of trapezoidal section has sides sloping at 60° with the horizontal and a bed slope of 1 in 800 conveys a discharge of 12 m$^3$/sec. Find the bottom width and depth of flow for most economical section. Take Chezy's constant, C = 70.

7. a) State the classifications of hydraulic machines.
   b) 1000 kW of power is being developed by a hydraulic turbine under a head of 20 m and gives 85% efficiency. Calculate the specific speed of the turbine.

8. Write short note on following (Any two):
   a) Froude's law of similarity.
   b) Pressure Wave Propagation.
   c) Centrifugal Pumps.
   d) N-S Equations and its Applications.

******