

Paper Id: 100323

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4. Attempt any *one* part of the following: 1 x 10 = 10

Qno.	Question	Marks	CO
a.	Write examples of viscous flow and explain the characteristics of Laminar flow.	10	2
b.	Find the velocity and acceleration at a point (1,2,3) after 1 sec. for a three dimensional flow given by $u=yz+t$, $v=xz-t$, $w=xy$ m/s	10	2

5. Attempt any *one* part of the following: 1 x 10 = 10

Qno.	Question	Marks	CO
a.	A horizontal pipe of diameter 450 mm is suddenly contracted to a diameter of 200 mm. The pressure intensities in the large and smaller pipe is given as 13.734N/cm^2 and 11.774N/cm^2 respectively. Find the loss of head due to contraction if $C_c=0.62$. Also determine the rate of flow of water.	10	3
b.	Derive an expression for the power transmission through the pipes. Find also the condition of power and corresponding efficiency of transmission	10	3

6. Attempt any *one* part of the following: 1 x 10 = 10

Qno.	Question	Marks	CO
a.	If velocity distribution in laminar boundary layer a flat plate is assumed to be given by second order polynomial $u=a+by+cy^2$. Determine its form using the necessary boundary conditions.	10	4
b.	Prove that in case of force vortex, the rise of liquid level at the ends is equal to the full liquid level at the axis of rotation.	10	4

7. Attempt any *one* part of the following: 1 x 10 = 10

Qno.	Question	Marks	CO
a.	What is meant by geometric, kinematic and dynamic similarities? Are these similarities truly attainable? If is not why?	10	
b.	A 1:40 model of ocean tanker is dragged through fresh water at 2m/s with total measured drag of 117.7 N. The skin (frictional) drag coefficient ' f ' for model and prototype are 0.3 and 0.02 respectively in the equation $R_f=fAV^2$. The water surface area of the model is 25m^2 . Taking the densities for the prototype and the model as 1030kg/m^3 and 1000kg/m^3 respectively, Determine (i) The total drag on the prototype (ii) Power required to drive the prototype. https://www.aktuonline.com	10	