Sample report osbourne reynolds essay

However, for large enough floodwater, the dye streak almost immediately become blurred and spreads across the entire pipe an a random fashion. These three characteristics, denoted as laminar, transitional and turbulent flow. (F. Young, 2012) 1. 2 OBJECTIVE One of the objective is to compute Reynolds number (R) by applying the formula. R= LUVS Another objective is to observed the laminar, transitional and turbulent flow. This flow can be easily observed by applying the dye flowing through the flowing water. Speed of dye flow must be control by adjusting the valve.

Other than that, to determine the upper and lower critical velocities at transitional flow. Speed of transition flow is actually in between laminar and turbulent flow, so he critical velocities of upper and lower must be determine. This can be easily determine by controlling the valve of dye flowing to through the flowing water. 1. 3 Theory The Osborne Reynolds demonstration apparatus is equipped with visualization tube to observe the flow condition. The rock inside the stilling tank are to calm the inflow water so that there will not be any turbulence to interfere with the experiment.

The water inlet and outlet valve and dye injector are utilized to generate the required flow. (Raff, 2010) Reynolds number formula: R= Luvs R = Reynolds number U = fluid velocity (m/s) L = characteristic of length or diameter (m) V = cinematic viscosity (mm/s) Reynolds number, R is independent of pressure Pipe Flow Condition: For water flowing in pipe or circular conduits, L is a diameter of the pipe. For Reynolds numberless than 2100, the pipe flow will be laminar. For Reynolds number from 2100 to 4000, the pipe flow will be consider as a transition flow.

Turbulent occur when Reynolds number is above 4000. The viscosity of the fluid also determines the characteristic of the flow becoming laminar or turbulent. Fluid with lower viscosity is easier to achieve a turbulent flow condition. The viscosity of fluid is also dependent on the temperature. Laminar Flow: Laminar flow denoted a steady flow condition, where all streamlines flow parallel paths, there being no interaction(mixing) between shear planes. Under this condition, the dye observed as a solid, straight and easily identifiable component of flow. Raff, 2010) Transition Flow: Transition flow is a mixing of laminar and turbulent flow with turbulent in the center of the pipe, and laminar flow near the edge. Each of this flows behaves in different manners in terms of their fractional energy loss while flowing, and have efferent equations that predict their behavior. (Raff, 2010) Turbulent Flow: Turbulent flow denoted as unsteady flow condition where streamlines interact causing shear plane collapse and mixing of the fluid. In this condition, the dye observed will become disperse in the water and mix with the water.

The observed dye will not be identifiable at this point. (Raff, 2010) The Osborne Reynolds Demonstration is one of the equipment that use for student to study or observe the flow condition. It contains a several parts; dye reservoir, dye control valve, dye injector, head tank, observation tube, overflow valve, eater inlet valve, bell mouth, and water outlet valve. Inside the tank, it contains the rocks that help to calm the inflow water so there will not be any turbulence to interfere with the experiment.

The water inlet/ outlet valve and dye injector are utilized to generate the required flow. Figure 1: The diagram of Osborne Reynolds Apparatus Dye

reservoir: Dye filler Dye control valve: Controller the amount of dye enter the tube Dye injector: Needle for the dye enter the tube Head tank: Water filler Bell mouth: Water outlet from head tank Observation tube: Placed that show the form of the flow 1. 5 PROCEDURE . 5. 1 Installation and commissioning 1) Before start the experiment prepare the Osborne Reynolds as shown in the picture. 2) The Osborne Reynolds apparatus was placed on the level ground.) The hose was connected to apparatus outflow, inflow, and overflow. 4) The dye reservoir was filled up with the provided blue ink. 5) Establish water supply by connecting the inlet hose to a water source and open the inlet valve. 6) The outflow valve was opened to test the unit. 7) The unit was ready to use. 1. 5. 2 Experiment A 1) The dye injector was lowered until it see in the glass tube. 2) The inlet valve as opened and the water was allowed to enter stilling tank. 3) The water was allowed to settle for a few minute. 4) The water was allowed to flow through the visualizing tube.) The dye control valve was slowly adjusted until a slow flow with dye injection was achieved. 6) The water inlet valve and outlet valve was regulated until a straight identified dye line is achieved. The flow is laminar. 7) The flow rate at the outlet valve was measured by using volumetric method. 8) The experiment was repeated by regulating inlet valve and outlet valve to produce transitional and turbulent flows. 1. 5. Experiment B 1) Step 1 to 5 from experiment A was repeated. 2) Same as procedure to create the laminar flow, the flow rate was slowly increase until the laminar flow produce small disturbance or eddies.