UNIT 11 EXERCISES
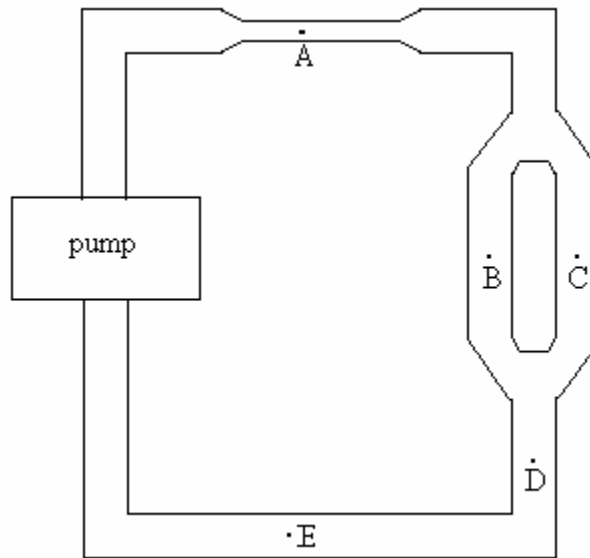
1) Consider the waterflow system in the diagram below. The cross-sectional area of the narrower pipe is ½ the cross-sectional area of the wider pipe.

a) Rank the flow rate at points A-E. Explain. If you cannot rank the flow rates at some of the points explain why you cannot rank them.

b) Rank the pressure at points A-E. Explain. If you cannot rank the pressure at some of the points explain why you cannot rank them.

c) Rank the velocity at point A-E. Explain. If you cannot rank the velocity at some of the points explain why you cannot rank them.

2) A dentist chair is moved up and down by a hydraulic system. The large circular piston supports the dentist's chair. When the dentist wants to lift the patient he has to step on a pedal directly on top of the small circular piston. Calculate the force the dentist must exert if the patient plus chair have a mass of 120kg and the small piston has a diameter of 1.0cm, while the large piston has a diameter of 5.0cm. Show your work.

3) A physiologist measures the weight (reading of a spring scale) of a person in air to be 784N and his weight (reading of a spring scale, as in Unit 11 Section 11.7) when submerged in water to be 19.6N. Calculate the volume and density of the person.

4) What is the density of a piece of wood that floats on water with 70% of its volume submerged? Show your work.