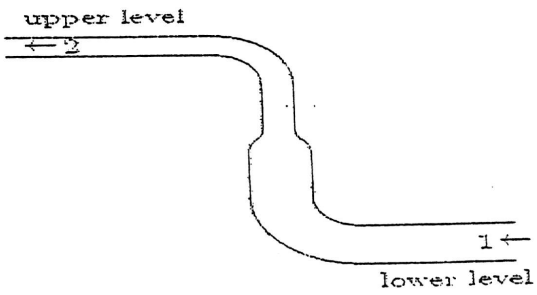
Q12. If the water is pumped at a speed of 0.50 m/s through pipe within a circulating system in the basement at pressure of 3.0 atm. If the flow speed of the water in the second flour 5.0 m above the basement is v=1.183m/s. The pressure in the second floor will be:

a) 2.5×10^5Pa b) 3.3×10^3Pa c) 5.8×10^5Pa d) 1.9×10^4Pa e) 6.1×10^6Pa

Q13. The flow rate of blood through human aorta is about 90 cm^3/s. If the aortahas a radius of 1.0 cm, the velocity of the blood flow is:

a) 14.17 cms^{-1} b) 32.23 cms^{-1} c) 37.51 cms^{-1} d) 28.65 cms^{-1} e) 45.15 cms^{-1}

Q14. Water is pumped through the hose shown below, from a lower level to an upper level. Compared to the water at point 1, the water at point 2:



a) has greater speed and greater pressure
b) has greater speed and less pressure
c) has less speed and less pressure
d) has less speed and greater pressure
e) has greater speed and the same pressure

Q5. A big closed water tank has a constant pressure of 2 atm. at its top. A small hole is made at a distance of 4 m below the water tank level. The velocity of the water is

a) 6.8 ms^{-1} b) 11.3 ms^{-1} c) 9.6 ms^{-1} d) 16.7 ms^{-1} e) 12 ms^{-1}

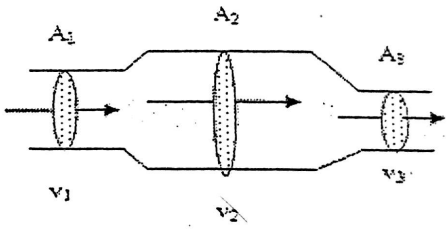
Q6 A horizontal pipe contains water at pressure of 10^5Pa flowing with speed of 1.4 m/s. When the pipe narrows to one-half its original radius, the speed is :

a) 5.6 ms^{-1} b) 10.6 ms^{-1} c) 13 ms^{-1} d) 16.7 ms^{-1} e) 0.7 ms^{-1}

Q7. The equation of continuity is;

a) Valid only for stream line flow of fluids.
b) Valid only for turbulent flow of fluids.
c) Valid for both turbulent and stream line flow of fluids.
d) NOT valid for both turbulent and stream line flow of fluids.
e) NOT depending on the fluid flow.

Q11. Which of the following is true of the pressures in each section of the pipe?

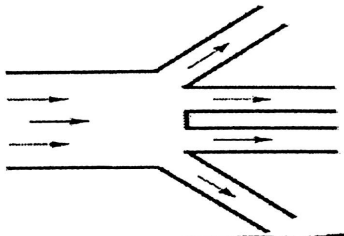


a) $p_1 > p_2 > p_3$
b) $p_2 > p_1 > p_3$
c) $p_3 > p_2 > p_1$
d) $p_2 > p_3 > p_1$

Q12. Water (density = 1.0×10^3 kg/m^3) flows through a horizontal tapered pipe. At the wide end its speed is 4.0m/s. The difference in pressure between the two ends is 4.5×10^3 Pa. The speed of the water at the narrow end is

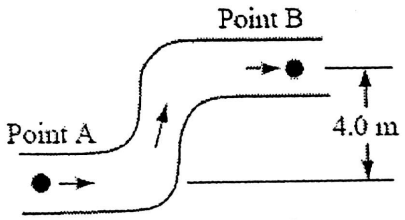
a) 6.0 m/s
b) 3.4 m/s
c) 4.0 m/s
d) 2.6 m/s
e) 6.35 m/s

Q3. Water is flowing through a channel with cross-sectional area of 12 m^2 and speed of 0.75 m/s. The water then flows into four identical channels that have a width of 4.0 m. The depth of the water does not change as it flows into the four channels. The speed of the water in one of the smaller channels is :



a) 0.25 m/s b) 0.75 m/s c) 2.3 m/s d) 0.12 m/s **d) 0.56 m/s**

Q4. Oil (ρ = 925 kg/m3) is flowing through a pipeline at a constant speed when it encounters a vertical bend in the pipe raising it 4.0 m. The cross sectional area of the pipe does not change. The difference in pressure ($P_B - P_A$) in the portions of the pipe before and after the rise is :



a) -3.6×10^4 Pa b) -7.2×10^5 Pa c) $+2.4 \times 10^4$ Pa d) -1.8×10^3 Pa e) $+5.1 \times 10^5$ Pa

Q9 Approximately $6x10^4$kg of water falls down each minute from a height of 100m. If one half of the gravitational energy of water were converted to electrical energy, the power generated is:

a) $98x10^3$w b) $4.52x10^4$ w c) $1x10^4$w d)$3.9x10^3$ w e) $4.9x10^5$w

Q10 A horizontal pipe 10.0 cm in diameter has a smooth reduction to a pipe 5.00 cm in diameter. If the pressure of the water in the larger pipe is 8.00×10^4 Pa and the pressure in the smaller pipe is 6.00×10^4 Pa, then the velocity of the water inside the larger pipe is :

a) 1.63 m/s b) 1.82 m/s c) 2.21 m/s d) 3.26 m/s e) 5.0 m/s

Q11 Water runs in a pipe with 20 mm diameter at a velocity of 5m/s. The diameter of the hose so that water flows at 15 m/s should be:

a) 6.67mm b) 11.5mm c) 44.4mm d) 60mm e) 133.3mm

Q11. Water flows through a horizontal pipe. The diameter of the pipe at point B is larger than at point A. The greatest water pressure is at :

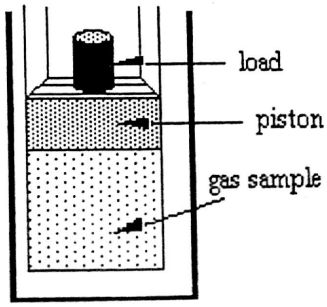
a) point A **b) point B** c) same at both A and B d) somewhere between A and B
e) cannot be determined from the information given

Q12. Water flows at 12 m/s in a horizontal pipe with a pressure of 3.0×10^4 N/m^2. If the pipe diameter is doubled, the pressure in the wider section in N/m^2 is:
Assume the density of the water is equal to 1000 kg/m^3 .

a) 3.0×10^3 b) 4.9×10^3 c) 7.4×10^4 **d) 9.8×10^4** e) 6.0×10^5

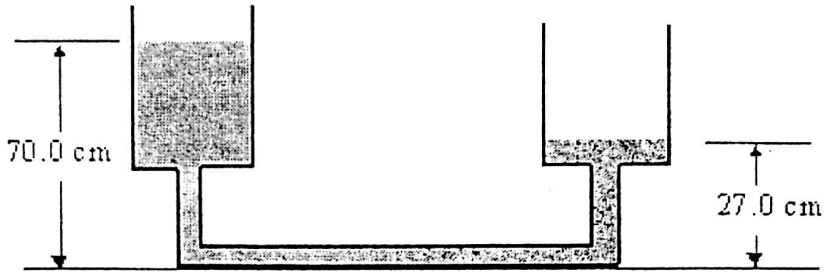
Q13. A gas sample is confined to a chamber with a movable piston. A small load is placed on the piston and the system is allowed to reach equilibrium. If the weight of the piston and the load is 70.0 N and the piston has an area of 5.0×10^{-4} m^2, the pressur exerted on the piston by the gas in Pa is : Note: Atmospheric pressure is 1.013×10^5 Pa.

a) 2.8×10^4 b) 5.6×10^4 c) 7.3×10^4 d) 1.4×10^5 **e) 2.4×10^5**



Constants : $e = 1.6 \times 10^{-19}$ C ; $\rho_{(water)} = 1 \times 10^3$ kg/m^3

Q1. A column of water of height 70.0 cm supports a column of an unknown liquid as suggested in the figure (not drawn to scale). Assume that both liquids are at rest. The density of the unknown liquid in kg/m^3 is :

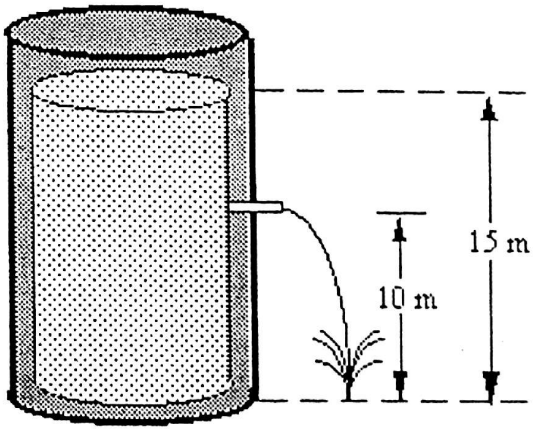


a) 3.9×10^2 b) 2.6×10^3 c) 3.9×10^3 d) 3.3×10^3 e) 1.2×10^3

Q2. A man uses a hose to water his garden. The water enters the hose through a small hole with a 6.0 cm diameter. The speed of the water at the faucet is 5 m/s. If the small hole and the nozzle are at the same height, and the water leaves the nozzle with a speed of 20 m/s, The diameter of the nozzle is :

a) 1.5 cm b) 2.0 cm c) 6.0 cm d) 4.0 cm e) 3.0 cm

Q3. A large closed tank is filled with water to a depth of 15 m. A smaal hole located 10.0 m Above the bottom of the tank is then opened as shown in the drawing. The speed of the water emerge from the hole is :



a) 3.1 m/s b) 17 m/s c) 9.9 m/s d) 14 m/s e) 31 m/s