Practice Quiz 4

These are Q's from old quizzes. I do not guarantee that the Q's on this year's quiz will be the same, or even similar.

Water at a pressure of 400 kPa is flowing at 1.5m/s through a pipe, when it encounters an obstruction where the pressure drops by 5%. What fraction of the pipe's area is obstructed?

A) 50% B) 60% C) 70% D) 80% E) 90%

A water tank is filled to a depth of 10m and the tank bottom is 20m above ground. What water pressure is present in a hose 2cm in diameter at ground level? The hose it attached on one end to the bottom of the tank. The density of water is 1000kg per cubic meter.

A) 4e5 N per square meter.
B) 9 N per square meter.
C) 2e4 N per square meter.
D) The cross sectional area of the tank is needed to solve this problem.

Consider a tank of water with 24cm diameter filled with water to a height of 40cm. Consider a very small hole at height 20cm from the bottom. Find the speed at which the water exits the tank through the hole.

A) 2m/s B) 4m/s C) 6m/s D) 22m/s E) 24m/s

A pump is submerged at the bottom of a 100 meter deep well. Does it take less power to pump water the 100m to the surface when the well is full or half empty?

A) full B) half empty
C) doesn't matter D) depends on the diameter of the pump

Answer key: DAAAA

The intensity of light from a localized source decreases as the inverse square of the distance from the sources.

Does that mean that the light looses energy as it propagates?

A) Yes. B) No.

A pump uses a piston of 15 cm diameter which moves 2 cm/s. What is the fluid velocity of a tube 3 mm in diameter?

A) 50 cm/s B) 22 cm/s C) 50 m/s D) 6 cm/s

Water is pumped out of a well at 2.000 m/s through a 9.000–cm–diameter hose. The well is 30.00 ft deep. What power is needed by the pump?

A) 3491 W B) 1141 W

C) 116 W D) Area of the well is needed.

A venturi is constructed of a 7.0–cm–diameter pipe with a 2.0–cm–diameter throat. Water pressure in the pipe is twice atmospheric pressure and it flows with a velocity of 0.40 m/s. What is the pressure in the throat?

A) 2.0 atm B) 2.1 atm C) 1.9 atm D) 0.12 atm

Consider a very small hole in the bottom of a tank 24.0 cm in diameter filled with water to a height of 20.0 cm. Find the speed at which the water exits the tank through the hole.

A) 24.1 m/s B) 22.1 m/s C) 1.98 m/s D) 3.92 m/s

Answer key: BCBCC

Consider a tank of water with 24cm diameter filled with water to a height of 70cm. Consider a very small hole at height 20cm from the bottom. Find the speed at which the water exits the tank through the hole. (Density of water = 1000kg/m^3)

A) 2m/s
B) 3m/s
C) 5m/s
D) 7m/s
E) can't tell unless the diameter of the hole is known.

Water enters a house through a pipe with an inside diameter of 2cm at an absolute pressure of 400 kPa. A 1cm diameter pipe leads from the ground floor (where the water piping enters the house) to the second floor bathroom, 5m above. When the flow speed at the 2cm diameter inlet is 1.5m/s, find the water pressure in the bathroom.(density of water = 1000kg/m^3)

A) 310 kPa
B) 330 kPa
C) 350 kPa
D) 370 kPa
E) 390 kPa

The water in a garden hose is at a gauge pressure of 210kPa, and is moving at negligible speed. The hose terminates in a sprinkler system consisting of many small holes. What is the maximum height reached by the water from the emerging holes?(density of water = 1000kg/m^3)

A) 5m
B) 10m
C) 15m
D) 20m
E) 25m

Answer key: BBD

A venturi flow meter is used to measure the flow rate of water (density = 1000 kg/m^3) through a pipe of diameter 2cm. At the venturi (= the constriction) of the flowmeter the diameter is reduced to 1cm. The manometer tube contains oil with density 0.8 times that of water. If the difference in oil levels on the two sides of the manometer tube is 2cm, what is the volume per second that flows through the pipe?

A) 2 cubic–cm/sec
B) 5 cubic–cm/sec
C) 10 cubic–cm/sec
D) 20 cubic–cm/sec
E) 40 cubic–cm/sec

What are the amplitude, frequency, wavelength, and speed of a water wave whose displacement is described by $y(x,t) = 0.25 \cos (0.52x - 2.3t)$, where x,y are in meters, and t is in seconds.

a. 0.25m, 1Hz, 6m, 6.1m/s
b. 0.25m, 0.4Hz, 12m, 4m/s
c. 0.5m, 0.4Hz, 10m, 2m/s
d. 0.4m, 0.3Hz, 12m, 4.4m/s

Answer key: DB

A boat is moored in a fixed location, and waves make it move up and down. If the spacing between wave crests is 20m and the speed of the wave is 5m/s. How long does it take the boat to go from the top of a crest to the bottom of a trough?

A) 2s B) 4s C) 16s D) 8s E) 1s

At a point 15m from a source of spherical sound waves, you measure a sound intensity of 750mW/m^2.

How much further do you need to walk, directly away from the source, until the sound intensity has changed by –4.4dB.

A) 5m B) 10m C) 15m D) 20m

Answer key: AB