Q & A for Operators . . .

These sample questions are provided to help new and experienced operators who might be interested in a refresher course on basic mathematical equations and basic information required for operators. If you would like to have a different question answered, please contact Kansas Rural Water Association at 785/336-3760 or by email krwa@krwa.net.

Q A rectangular tank measures 80-ft long, 30-ft wide, and 20-ft deep. If 100,000 gal of water is pumped into the tank, how high will the level of the tank rise?
   a. 2.5 ft
   b. 5.6 ft
   c. 25.5 ft
   d. 55.5 ft

A To obtain the answer you first must find the capacity of the tank. Multiply length x width x height to get the cubic foot. Then multiply 7.48 by the number of cubic feet. (80x30x20) = 48,000 cubic feet x 7.48 = 359, 040 gallons. Next divide the 100,000 gallons of water into the total capacity 359,040 then multiply by the depth of the tank. (100,000 / 359,040 = .278 feet) x 20 = 5.6 feet. The answer is b. The tank will rise 5.6 feet with 100,000 gallons of water added.

Q A new water treatment facility for a small town is estimated to cost $1,493,472. What is the average cost per person if 1986 people live in the town?
   a. $5720
   b. $2750
   c. $752
   d. $572

A The mathematical formula to this one is fairly easy. You take the cost ($1,493,472 divided by the number of people. ($1,493,472 / 1986 = $752 per person. Note this is per person, not per connection. The answer is c.

Q *Anabaena* can cause what undesirable characteristic in water?
   a. color and decomposition
   b. evaporation and contamination
   c. hardness and "blue babies"
   d. taste and odor

A *Anabaena* is any freshwater alga of the genus *Anabaena,* sometimes occurring in drinking water, giving it a fishy taste and smell. The answer is d.

Q A centrifugal-type pump should never operate empty except momentarily because
   a. a serious counter-pressure would be built up by excessive vacuum.
   b. it is useless to run a pump without getting water.
   c. the excessive end thrust of the shaft would damage the thrust bearing.
   d. the parts lubricated by water would be damaged

A Centrifugal pumps must have lubrication at the bearings that hold the shaft in place. Typically a small amount of water is sufficient to provide the lubrication. The answer is d.

Q If a fuse continues to blow, you should
   a. inspect the affected equipment to determine the cause.
   b. provide a jumper in the box.
   c. replace it with a fuse of lower capacity.
   d. replace it with a higher capacity fuse.

A Blowing fuses continually is a sign that something is significantly wrong. You should inspect the affected equipment to determine what is causing the fuse to blow. Never install a higher capacity fuse. This may damage the machine or cause short-circuiting in the wiring, which could cause fires. The answer is a.

Q The carrying capacity of water mains is often reduced by
   a. high pressure.
   b. looping.
   c. tuberculation.
   d. vacuum breakers.

A Waterlines will begin to collect sediment almost as soon as they are put in service. Depending on water quality and time in service this buildup (tuberculation) will begin to reduce the flow of water through the lines. The answer is c.

Q A double check valve assembly
a. can be constructed from two reliable check valves.
b. has the relief port blocked off.
c. is less susceptible to vandalism.
d. is not recommended where a health hazard would result from its failure

A Double check valves are designed to stop backflow and backsiphonage for contaminants that are not considered a health hazard. An approved air gap or an RPZ are designed to protect from a health hazard. The answer is d.

Q A meter in a well discharge line reads 0005678 gallon on Monday and 0356098 gal on the following Monday. What is the average daily pumpage?
a. 35,042 gpd
b. 43,802 gpd
c. 50,060 gpd
d. 350,420 gpd

A To find the average water pumped daily you must first determine the weekly total. Take end reading of 0356098 and subtract 0005678. The total weekly amount pumped is 350,420 gallons. Next divide 350,420 by seven days. The answer is 50,060 gallons per day average.

Q A flow of 650 gpm is _____ mgd?
a. 0.472
b. 0.936
c. 1.714
d. 1.923

A To find the million gallon per day (mgd) from a specified flow rate in gallons per minute (gpm), you need to multiply the gpm by the number of minutes in a day to obtain the total gallons. (650 gpm x 1440 min/day = 936,000 gallons). Next divide 936,000 gallons by 1,000,000 = 0.936 mgd. The answer is b.

Q Sodium thiosulfate crystals are placed in bacteriological sample bottles to
a. hold pH at a constant value.
b. kill any pathogens that may be present in the sample.
c. neutralize any chlorine present in the sample.
d. preserve the sample.

A Sodium thiosulfate neutralizes the chlorine in bacteriological samples. Do not rinse the bottle when obtaining bacteriological samples. The answer is c.

Q Fire fighting may cause low pressure in an area of a distribution system. The low pressure might lead to
a. contamination of the system by backsiphonage.
b. ice formation in the pipes.
c. loss of chlorine residual.
d. muddy water.

A Water utilities with minimal pressure may experience very low pressure due to higher than normal usage, such as fighting a fire. The minimum pressure in a distribution system is 20 psi. If pressure is allowed to go below 20 psi, it is possible to siphon water of unknown quantity back into the distribution system. The answer is a.

Q An operator is caught in a room where chlorine gas is leaking. If the operator does not have a mask, what should the operator do?
a. keep mouth closed, keep head as high as possible, and quickly walk out of the room, holding breath if possible.
b. lay down on the floor and quickly crawl out of the room.
c. pull shirt over mouth and face and quickly walk out of the room.
d. walk out of the room quickly.

A Gas chlorine is heavier than air and is very dangerous at small concentrations. If you are caught in a room where there is a gas leak, quickly leave the room, holding your breath, keeping your mouth closed and head held high. The answer is a.

Q What is the percent unaccounted for water (water loss) when pumpage is 550,000 gpd and the total of customers meter readings is 63,800 ft3?
a. 1%
b. 2%
c. 13%
d. 15%

A To answer this questions we need to convert the customer readings from cubic feet to gallons. There are 7.48 gallons of water per cubic foot; the equation is as follows. (63,800 x 7.48 = 477,224 gallons). Next we need to subtract the customer readings from the total pumped. (550,000 – 477,224 = 72,776 gallons not accounted for). It is easier to round up the water to the nearest thousand gallons. 550 – 477 = 73 thousand gallons. Next divide the unaccounted for water into the total water pumped. (73 / 550 = 0.13 then multiply by 100 = 13.2%). The closest answer above is c.