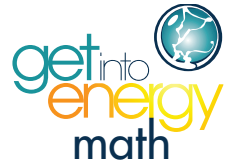**Get Into Energy Math**
Student Quiz 6
Whole Number Operations

1. As part of his duties, Jerry has to measure a new length of wire for an underground service. The new underground service requires 4 feet of wire from the pad mount transformer to reach the underground service, 50 feet of wire to reach the customer's home, 5 feet of wire from the underground service to the customer's meter, and an extra foot of wire on both ends so the connections can be completed. How many feet of wire must Jerry measure to complete the underground service?

A. 54 ft
B. 59 ft
C. 60 ft
D. 61 ft

2. Tom is asked to check the operating pressure of the hydraulic system. The pressure indicates that it is reading approximately 18.8 psi. The normal pressure of the system should be at least 50.5 psi. How many psi must Tom adjust the hydraulic pump output pressure so the system is operating at 50.5 psi?

A. 32.7 psi
B. 50.5 psi
C. 31.7 psi
D. 41.7 psi

3. Ernesto is pulling a new overhead cable. The cable truck has 1,000 feet of cable on the cable spool. The distance between each of the poles is 120 feet. How many complete poles can Ernesto pull the cable across before he has to get another spool of wire? (Round to a whole number.)

A. 8.5 poles
B. 8.0 poles
C. 7.0 poles
D. 8.3 poles

4. Pete has to rig a 1,300-pound transformer up to the top of a pole. If he uses a 3/8-inch polypropylene rope, he can pick up 1.4 times more weight than the 3/8-inch nylon rope he had planned on using. If the 3/8-inch nylon rope can pick up 1,300 pounds, how many additional pounds can Pete pick up using the 3/8-inch polypropylene rope?

A. 1,820 lbs
B. 2,598 lbs
C. 520 lbs
D. 1,300 lbs

5. Camila is working on a power upgrade project for a downtown area of the city. The energy use of all the customers on the circuit is 1,000 watts/hour. Camila has to calculate the energy use of all the customers over a 5.5-hour period. How much power did the downtown area use over the 5.5-hour period?

A. 5,500 watts
B. 550.0 watts
C. 55.0 watts
D. 55,000 watts

6. Craig is a system operator. A storm has hit the utility company service territory, causing major customer outages. On a normal day there are about 32 customer outages at any one time. During this storm the outages are 10,000 times greater. How many customers are without power during the storm?

A. 3,200 customers
B. 3,200,000 customers
C. 32,000 customers
D. 320,000 customers

7. As part of her duties, Jeanne records, computes, and logs the engine hours on each of the diesels monthly. If one engine logged 125.7 hours and the other engine logged 124.9 hours, what was the total running time for both engines for the month?

A. 249.5 hours
B. 248.6 hours
C. 249.6 hours
D. 250.6 hours

8. Jack, a plant operator, has been asked to estimate the amount of lubricant remaining in a 40-gallon drum. He weighed the drum and subtracted the weight of an identical empty drum to determine that the remaining lubricant weighed 176 pounds. He also found that a one-gallon sample weighed 8 pounds. How many gallons of lubricant remain in the drum?

A. 24 gallons
B. 23 gallons
C. 22 gallons
D. 21 gallons

9. To prevent the formation of boiler scale, an additive is added to the water at a rate of 100 parts per million (ppm) by weight. How many pounds of water should Jessica, a plant operator, use to dilute 1 pound of additive to the correct concentration?

A. 100 lbs
B. 1,000 lbs
C. 10,000 lbs
D. 100,000 lbs

10. Mariana is going out on a gas installation job on a busy highway. She has to make sure the crew has sufficient cones to put the entire traffic pattern in place to protect the crew. Mariana needs 20 cones leading up to the trucks, 15 cones alongside the trucks, and 22 cones after the trucks. How many cones should Mariana load onto the truck to cover the entire traffic pattern?

A. 42 cones
B. 37 cones
C. 35 cones
D. 57 cones

11. Gail is doing a butt joint weld between two plates of steel. Her supervisor reviewed the weld, and he determined that the weld had an insufficient amount of weld bead. The weld bead should have been 5/16 of an inch (0.3125 inches) but was only 3/16 of an inch (0.1875 inches). How big of a weld bead does Gail have to add to get the butt joint to the correct size?

A. 0.13-inch bead
B. 0.125-inch bead
C. 0.1350-inch bead
D. 0.15-inch bead

12. Ken is installing a new piping system, which requires a valve for every 300 feet of pipe. If there are 15,000 feet of pipe in the system, how many valves does Ken need to install?

A. 50 valves
B. 5 valves
C. 500 valves
D. 60 valves

13. Regina is fitting a new high-pressure gas distribution piping system today, which is 80 times as much pressure as the 0.4 psi rated residential pipes she usually works with. What is the new piping's psi rating?

A. 30 psi
B. 32 psi
C. 3.2 psi
D. 300 psi

14. A gas transmission line transports 53,000,000 cubic feet/year of natural gas. The gas is evenly distributed to 100 major customers. How many cubic feet/year does each customer use on average?

A. 53,000 ft^3/year
B. 50,000 ft^3/year
C. 530,000 ft^3/year
D. 52,000 ft^3/year

15. Alex is monitoring the volume in the liquefied natural gas tank. The normal volume of the tank is 190,000 gallons. Alex received an alarm that indicates the volume decreased by 1/1,000. How many gallons did the volume decrease?

A. 190 gallons
B. 1,900 gallons
C. 19,000 gallons
D. 19 gallons

16. Melissa and Gabriel are electricians in a power plant. They have been given the task of checking the Motor Control Units (MCUs) in three motor control centers (MCCs). The first MCC has 24 MCUs, the second MCC has 18 MCUs, and the third MCC has 12 MCUs. How many total MCUs will they need to check?

A. 42 MCUs
B. 36 MCUs
C. 54 MCUs
D. 72 MCUs

17. Dominique, an electrician, has been assigned an assistant named Henry. Together they can change 32 filters in an 8-hour period. How many total filters can they change in one hour?

A. 24 filters
B. 16 filters
C. 4 filters
D. 2 filters

18. Electricians Jimmy and Scott are assigned the task of inspecting all the spare electric motors stored in the warehouse. Together the two electricians can inspect 12 motors per hour. If they have 5.5 hours left in the day to work on the task, how many motors can they complete in the remaining time?

A. 58 motors
B. 60 motors
C. 66 motors
D. 72 motors

19. Ernesto and the line crew are troubleshooting a loss of power at a customer's pizza business. The crew identified that the 25-amp fuse has failed. The crew needs to determine if the 25-amp fuse is the correct size by calculating the current needed to run the pizza ovens at the business. To begin, they must multiply the supply voltage of 110 volts by a power factor of 0.8. What would this result be?

A. 0.88
B. 8.8
C. 88
D. 880

20. Tom has to calculate the number of transformers for a residential neighborhood. The average demand for the 12 houses in the neighborhood is 3,500 watts each. The calculation requires multiplying the number of houses by the average demand divided by 1,000, which equals 42. Tom must now multiply by a factor of 0.067 to determine the need. How many transformers are required for this neighborhood? (Round up to the nearest whole number.)

A. 2 transformers
B. 12 transformers
C. 3 transformers
D. 4 transformers

21. Jeanne is overseeing the installation of a new diesel fuel storage tank. The old tank held 157 cubic feet of fuel and the new tank holds 314 cubic feet of fuel. How much additional volume in cubic feet of fuel does the new storage tank hold when compared to the old storage tank?

A. 147 ft³
B. 157 ft³
C. 167 ft³
D. 177 ft³

22. Because diesel fuel is delivered to the plant in gallons, Jeanne needs to calculate the number of gallons the new 300-cubic-foot tank holds. If one cubic foot has a volume of 7.48 gallons, how many gallons, to the nearest whole gallon, can the new tank hold?

A. 2,244 gallons
B. 2,144 gallons
C. 2,158 gallons
D. 2,246 gallons

23. Tyrone has to weld two pieces of plate together to cover a gas trench in the main road. He has one piece of plate that is 0.969 inches thick and a second plate that is 0.156 inches thick. When Tyrone is finished welding the plates together, what will be the total thickness of the plate?

A. 1.125 inches
B. 1.11 inches
C. 0.1125 inches
D. 1.119 inches

24. Alex is doing a welding job on a 1/2-inch piece of plate steel. In order to determine how many pounds of welding rod he will need, Alex will need to multiply the thickness of the plate by the weld angle by how many feet of weld bead is required. In this case, Alex is welding a 0.5-inch plate with a 0.45 weld angle and needs 10 feet of weld bead. How many pounds of welding rod will Alex use to complete the job?

A. 2.0 lbs
B. 2.25 lbs
C. 22.5 lbs
D. 0.225 lbs

25. Harry and the gas crew are doing a system upgrade to replace old class 150 carbon steel pipe with new class 900 carbon steel pipe. The working pressure of the class 150 carbon steel pipe was 150 psig. The new pipe increases the psig by 10 times. What would be the new operating pressure of the system based on this piping upgrade?

A. 9,000 psig
B. 3,000 psig
C. 1,500 psig
D. 15,000 psig