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Continuing Education Course #029
Geothermal Heating and Cooling

1. There are about ____ pounds of carbon in a gallon of gasoline or heating oil.
 - a. 4
 - b. 5
 - c. 6
 - d. 7
2. The ratio of energy efficiency for heating, not cooling, is:
 - a. The Energy Efficiency Ratio(EER)
 - b. Kilowatts per Hour (Kw/Hr)
 - c. The Coefficient of Performance (COP)
 - d. Entropy
3. A modern Ground Source Heat Pump can deliver either heat or air conditioning to a living space, but not both.
 - a. True
 - b. False
4. After heating and cooling, the greatest draw on electric power in a home is:
 - a. The refrigerator
 - b. Lighting
 - c. Water Heater
 - d. Electronics
5. Which of the following is not a desirable characteristic of a property considering a GSHP trench system?
 - a. Deep wet soils
 - b. Extensive landscape trees and structures
 - c. Large acreage
 - d. Nearby meadow area
6. If Call Before You Dig locates underground electric service at the proposed loop field, plan to install under it.
 - a. True
 - b. False
7. The pressure rating on standard HDPE Ground Loop Pipe is:
 - a. 20 psi
 - b. 40 psi
 - c. 100 psi
 - d. 160 psi
8. A 4" dia. footing drain can be crossed by cutting it and placing the CL Pipe below it and re-coupling it.

- a. True
- b. False

9. Wetlands Commissions endorse GSHP systems, so no permits or erosion control measures are needed in their Buffer jurisdictions:

- a. True
- b. False

10. The average ground temperature in Stillwater, OK where the IGSHPA is located is:

- a. 62 degrees
- b. 52 degrees
- c. 47 degrees
- d. 68 degrees

11. What is the average ground temperature from figures 9 and 10 in New York City on April 28th at a depth of -12 feet?

- a. 40 degrees
- b. 48 degrees
- c. 62 degrees
- d. 65 degrees

12. The Thermal Conductivity K in BTU per (hour x foot x degree Fahrenheit) for saturated silty clay is:

- a. 0.2
- b. 0.5
- c. 1.0
- d. 1.4

13. On the U.S. Dept. of Agriculture's Web Soil Survey web site, the soil region to be delineated is the:

- a. Soil Map Unit(SMU)
- b. Area of Interest (AOI)
- c. Web Soil Survey
- d. None of the above

14. OSHA requires a protective system of sloping, shoring or shielding in trenches exceeding which depth?

- a. 2'
- b. 3'
- c. 4'
- d. 5'

15. A ditch witch that can be rented at most equipment rental establishments can easily dig down 6' in most soils and rock.

- a. True
- b. False

16. In choosing Loop Pipe Length, factor in:

- a. Depth
- b. Design BTU load
- c. Soil Type
- d. All of the above

17. It is more efficient to circulate water and Propylene Glycol through a 2" dia. Loop Pipe with less skin friction, than a 1 1/4" or 3/4" Loop Pipe.

- a. True
 b. False
18. 3" diameter and larger loop pipes are uncommon for small residential and commercial trenches.
 a. True
 b. False
19. There are no formulae available to check accuracy of Loop Pipe Lengths.
 a. True
 b. False
20. To make trench loop installation easier, use shorter lengths, and connect them with standard interior type fittings.
 a. True
 b. False
21. Slinky and parallel systems that connect to a buried manifold must be heat fused by certified personnel only.
 a. True
 b. False
22. A Desuperheater is used for:
 a. Air duct humidity control
 b. Maximizing Air Conditioner performance
 c. Domestic Hot Water
 d. None of the above
23. Closed GSHP systems require surveyed topographical elevations to minimize head loss.
 a. True
 b. False
24. A larger building with inferior insulation will require a shorter length of Loop Pipe.
 a. True
 b. False
25. Heating temperatures produced by a heat pump for use in an air handler are:
 a. 140-150 degrees
 b. 110-120 degrees
 c. 60-80 degrees
 d. 40-60 degrees
26. A building with three heating and cooling zones can have combinations of heating and cooling systems.
 a. True
 b. False
27. Among the concerns of drilling through an existing concrete wall for Loop Pipe are:
 a. Dust control
 b. Waterproofing the outside
 c. Securing the Loop Pipe against rubbing fatigue
 d. All of the above
28. A proper GSHP system installed for a homeowner at a cost of \$28,000 in the year 2021 receives a Federal Tax Credit of:

- a. \$1400
- b. \$2800
- c. \$7280
- d. \$9000

29. To become a certified GSHP system installer for large projects, one must take the ___ day IGSHPA course and test:

- a. half
- b. 1
- c. 2
- d. 3

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