
*Student**Class***Section 1 – Human Needs for Heat Technologies**

1. In early times, people observed that heat – because it seemed to flow from a hot place to a cold place – must be an invisible fluid that they called ...
 - A. **temperature**
 - B. **energy**
 - C. **thermal**
 - D. **caloric**

2. The Franklin stove, invented by Benjamin Franklin, is a heating technology that has a dual purpose. Besides heating a room, it was also used as a
 - A. **smokehouse**
 - B. **foot warmer**
 - C. **cooking stove**
 - D. **bar-b-cue grill**

3. The chimney first appeared in Europe in the ...
 - A. **1200s**
 - B. **1400s**
 - C. **1700s**
 - D. **1800s**

4. The reappearance of central heating occurred in the late 1700s, as coal became the main fuel source. Central heating was originally developed around 100 B.C. by the ...
 - A. **Americans**
 - B. **Canadians**
 - C. **Romans**
 - D. **Greeks**

5. This type of Thermal Energy source can be used to cook food, but they are hard to control, dangerous and messy.
 - A. **open fire**
 - B. **Franklin stove**
 - C. **pioneer stove**
 - D. **modern gas stove**

6. Choose the technology that you would need so that you could heat a large room in your house, and maintain a constant comfortable temperature in that room.
 - A. **a gas furnace**
 - B. **a wood-burning fireplace**
 - C. **an electric fireplace**
 - D. **a digital thermostat**

7. What unit of energy does the heating company use to determine the amount of money they charge to help fuel the heating technology in your house ...
 - A. **kilowatt**
 - B. **gigajoule**
 - C. **watt**
 - D. **joule**

Section 2 – Heat affects Matter in different ways

8. The Particle Model of Matter helps to explain ideas about Thermal Energy. This model includes each of the following points EXCEPT ...
- A. all substances are made up of tiny particles that are too small to see**
 - B. the particles are always in motion**
 - C. the particles increase their energy output when they collide**
 - D. the particles have spaces between them**
9. The energy of movement is the kind of energy the particles of matter have. This energy is called ...
- A. potential energy**
 - B. kinesthetic energy**
 - C. phase energy**
 - D. kinetic energy**
10. As more heat is transferred to a solid, the particles vibrate and some of the particles in the solid break loose. The solid begins to change state. This is an example of ...
- A. heating a solid**
 - B. heating a liquid**
 - C. melting a solid**
 - D. freezing a liquid**
11. During a change of state, the temperature remains the same, so the particles have ...
- A. less average energy**
 - B. more average energy**
 - C. the same average energy**
 - D. a faster speed**
12. A device, used to show the expansion of air when there was an increase in temperature, was used as early as 200 B.C. This device is now generally known as a ...
- A. thermometer**
 - B. thermograph**
 - C. thermoscope**
 - D. thermopile**
13. The thermal energy of a substance is the ...
- A. total kinetic energy of all the particles**
 - B. average kinetic energy of the particles**
 - C. kinetic energy of each particle separately**
 - D. measure of how hot or cold the substance is**
14. Which of the following energy transfers would be correct?
- A. thermal energy in a hot drink is transferred to cold hands**
 - B. thermal energy is transferred from a room to a heater, so it can be heated**
 - C. an ice cube loses thermal energy when it melts in hot lemonade**
 - D. thermal energy is lost snowball when it melts**
15. Estimating temperature, without using a thermal sensing device, is something that we do automatically. Touching something to see how hot or cold it is represents one technique that we use. Another is to ...
- A. use a thermometer**
 - B. look at the moving particles**
 - C. observe the color**
 - D. use the back of your hand**

16. When air is heated inside a balloon, the air makes the balloon rise. This happens because – compared to the air outside the balloon, the heated air is ...
- A. less dense**
 - B. more dense**
 - C. warmer**
 - D. cooler**
17. Solids made of different metals were all heated to 100°C to determine how their volume and length would be affected. Which statement describes the most likely outcome of this experiment?
- A. All the volumes changed the same amount and the lengths remained constant.**
 - B. All the volumes changed, but each substance was the same length.**
 - C. Only some of the volumes changed with their length being increased.**
 - D. All of the volumes changed and so did their lengths.**
18. When thermal energy is added to a solid the volume of the solid will change. Steel beams bending or even breaking in a bridge, because of an extreme change in temperature are a result of thermal...
- A. conduction**
 - B. contraction**
 - C. expansion**
 - D. design**
19. A balloon filled with helium was put into a freezer to determine what the effect the lowering of the temperature would have on a gas. The responding variable in this experiment was the ...
- A. amount of gas in the balloon before and after**
 - B. the volume of the balloon before and after**
 - C. the temperature variation of the freezer**
 - D. the amount of time needed to change the balloon**
20. Special thermal protection tiles cover the underside of the space shuttles. As the shuttles reenter the Earth's atmosphere these tiles can withstand 1400°C of heat caused by friction in the atmosphere. The material that these tiles are made of is ...
- A. plastic**
 - B. fiberglass**
 - C. ceramic**
 - D. thermofilm**
21. One of the key characteristics of conduction is that heat transfers in only one direction – from areas of ...
- A. greater kinetic energy to areas of less kinetic energy**
 - B. less kinetic energy to areas of greater kinetic energy**
 - C. greater potential energy to areas of less potential energy**
 - D. less potential energy to areas of greater potential energy**
22. Materials that allow an easy transfer of heat are called ...
- A. conductors**
 - B. insulators**
 - C. energizers**
 - D. thermals**
23. Plastic, cork and wood are materials that do not allow an easy transfer of heat. They reduce the amount of heat that can transfer from a hot object to a colder object. They are called ...
- A. conductors**
 - B. insulators**
 - C. energizers**
 - D. thermals**

24. In a liquid the particles are moving quickly. When heat is added they have more energy, but this energy is transferred from particle to particle in a different way than in a solid. The reason for this is because of the ...
- A. speed of the particles**
 - B. space between the particles**
 - C. types of particles**
 - D. temperature of the particles**
25. Storm windows were used in the past to prevent heat from leaving the inside of the house in the winter. They weren't very efficient, because the space between the two panes of glass allowed convection current to take heat out even more. The new energy efficient windows prevent this from happening by preventing convection from happening. Krypton gas fills the space between the panes of glass because it is a ...
- A. better conductor than air**
 - B. better insulator than air**
 - C. poor insulator**
 - D. noble gas**
26. Energy systems have five things in common - input energy, energy transfer, output energy, waste energy and ...
- A. collisions between particles**
 - B. energy source**
 - C. energy equilibrium**
 - D. concentrated flow**

Section 3 – Understanding Heat and Temperature

27. Solar energy is an excellent natural thermal energy source. This type of energy is produced inside of the Sun by ...
- A. biological processes**
 - B. nuclear reactions**
 - C. magnetic waves**
 - D. electric storms**
28. Thermal energy from inside the Earth's crust can be harnessed as a useful thermal energy source. Volcanoes, hot springs and geysers are example of this type of thermal energy source. This type of thermal energy is ...
- A. an environmental pollutant**
 - B. a clean alternative to using fossil fuels**
 - C. called geovolcanic energy**
 - D. used to generate fossil fuel resources**
29. The thermal efficiency of a building's design can be measured by how well it prevents ...
- A. heat gain**
 - B. heat loss**
 - C. direct sunlight**
 - D. convection currents**
30. Solar cells are arranged in panels, which are connected in a series, and then placed to capture and store the Sun's energy in low voltage batteries. The panels are connected in a series to form what is called a solar ...
- A. system**
 - B. field**
 - C. array**
 - D. site**

31. Relative temperature for a comfortable room is maintained by using a thermostat, that is connected to a central heating system. The relative temperature of a comfortable room is ...
- A. 18°C
 - B. 20°C
 - C. 37°C
 - D. 100°C
32. Air that is heated by burning fuel in a furnace and then sent throughout the house through ducts to a register in every room is an example of this type of heating system ...
- A. forced-air
 - B. hot-water
 - C. convection
 - D. conventional
33. When a fireplace becomes too hot, this device - a moveable plate, that controls the flow of air to the fire - can be adjusted ...
- A. cooler
 - B. deflector
 - C. airfoil
 - D. damper
34. Basic parts of a cooling system are: a storage tank, a compressor, a freezer unit, condenser coils, and a ...
- A. fan
 - B. cooler
 - C. evaporator
 - D. refrigerant
35. A material's ability to transfer heat by conduction is reflected by its thermal ...
- A. capacity
 - B. rating
 - C. conductivity
 - D. energy
36. In an average house heat is lost (transferred to the outside) in five major places. The least amount of heat is lost through the ...
- A. walls
 - B. windows
 - C. through the floor
 - D. gaps and poorly sealed areas
37. To determine where heat is lost in a building, contractors can ask a photographer to take this type of photo of the house.
- A. A thermogram
 - B. A radiogram
 - C. A thermal negative
 - D. An infogram
38. Insulators are rated by their insulating ability. R-value is given to each material that is used in the construction of a building. The best insulating product would have a ...
- A. low R-value
 - B. high R-value
 - C. fractional R-value
 - D. restricted R-value

Section 4 – Technologies that Use Heat – Benefits and Cost to Society and the Environment

39. The costs of treating lakes, that have been damaged by acid rain, have to be paid for by every citizen. This makes this type of cost ...
- A. personal**
 - B. economic**
 - C. environmental**
 - D. societal**
40. An alternative for thermal energy that is inexpensive, practical and renewable, and does not require increased technological advances is wind power. This technology utilizes a windmill to generate electrical power that can then be converted into thermal energy. Unfortunately this alternative is not practical where there is no ...
- A. wind**
 - B. sunshine**
 - C. shelterbelt**
 - D. sloping terrain**
41. Canadian scientists developed the Canada Deuterium-Uranium reactor to provide nuclear energy in parts of Canada and to sell to other countries. The major problem with this reactor is the ...
- A. long time to produce thermal energy**
 - B. cost and distribution of the power**
 - C. long term storage of waste materials**
 - D. safety record it has worldwide**
42. The three main energy users are ...
- A. home, transportation, industry**
 - B. recreation, transportation, streetlights**
 - C. shopping, transportation, industry**
 - D. home, transportation, recreation**
43. Thermal energy has the power to hurt us and destroy our possessions. All of the following practices are dangerous and harmful EXCEPT ...
- A. recycling programs**
 - B. dumping of toxic chemicals**
 - C. forest fires**
 - D. volcanic eruptions**
44. A dangerous by-product, from the use of fossil fuels (coal, natural gas and oil) enters the atmosphere when industries burn this fuel. A by-product can react with water in the air to form acid rain. The by-product is ...
- A. carbon dioxide**
 - B. sulfur dioxide**
 - C. carbon monoxide**
 - D. nitrogen monoxide**
45. Co-generation is a process in which two forms of energy are produced at the same time from one energy source. The two forms of energy produced are usually ...
- A. heat and light**
 - B. kinetic and solar**
 - C. electricity and heat**
 - D. mechanical and light**