Class: 9th

Subject : Physics

Chapter : 7 (Thermal Properties of Matter)

New Book Punjab Board

Short Answer Questions

7.1. Why solids have a fixed volume and shape according to particle theory of matter?

Ans. Solid have fixed volume and shape because their constituent particles are tightly packed and held together by strong forces allowing only vibration in peace without movement.Strong interparticle forces hold these particles in fixed positions, preventing them from moving freely. This rigid structure maintains a constant volume and shape.

7.2. What are the reasons that gases have neither a fixed volume nor a fixed shape?

Ans. Gases have neither fixed volume nor a fixed shape because their particles are far apart move freely and have high energy allowing them to fill any container. This lack of strong interactions allows the gas to expand or compress to match the volume and shape of its container.

7.3. Compare the spacing of molecules in the solid, liquid and gaseous state.

Ans. The spacing of molecules is

Solid : Very close together, tightly packed.

Liquid : Closer together than is gases, Particles can move past one another. but more loosely packed than is solids.

Gas : Very far apart, with large spaces between particles.

7.4. What is the effect of raising the temperatures of a liquid?

Ans. Raising the temperature of a liquid increase molecular movement causing faster evaporation, reduced viscosity and increase expansion. If the temperature get high enough the liquid may boil and turn into gas.

7.5. What is meant by temperature of a body?

Ans. The temperature of the body refers to have hot or cold the bodies typicality around 98.6°F (37°C) in a healthy person it the balance between heat produce and lost by the body abnormal temperature can indicate illness.

7.6. Define heat as energy in transit.

Ans. These is the energy transferred between objects due to a temperature difference. It move from the hotter object to the cooler one and is considered energy in transit as it flow rather than being stored.

7.7. What is meant by thermometric property of a substance? Describe some thermometric properties.

Ans. The thermometric property of a substance is a physical property that change predictable with temperature and is used to measure it.

Examples:

Step Academy

(1) Length: Expansion of liquid in a thermometer (e.g mercury).

(2) Volume: Gas expansion at constant pressure.

(3) Pressure: Change in gas pressure at constant volume.

(4) Electrical resistance: Resistance of metal (used in resistance thermometer).

(5) Color: Color change in thermo chromatic materials.

7.8. Describe the main scales used for the measurement of temperature.

Ans. Main temperature scales:

(1) Celsius (°C) water freezes at 0°C and boils at 100° C

Fahrenheit (°F) water Freezes at 32°F and boil at 212°F

Kelvin (v) Absolute scale 0 k is absolute zero and water boils at 373.15 K

Relations:



.9. What is meant by sensitivity of a thermometer?

Ans. The sensitivity of a thermometer is its ability to detect small temperature change indicated by a noticeable response in its thermometric property.

7.10. What do you mean by the linearity of a thermometer?

Step Academy

Ans. Linearity of a thermometer means that equal changes in temperature produce equal changes in the thermometric properly being measured. A linear thermometer has a uniform scale.

7.11. What makes the scale reading of a thermometer accurate?

Ans. A thermometer's accuracy depends on proper calibration, consistent thermometric properties high quality materials and clear scale markings.

7.12. What determine the direction of heat flow?

Ans. The direction of heat flow is determined by the temperature difference between two objects or systems. Heat always flows spontaneously from a hotter object untill thermal equilibrium is reached.

7.13. Distinguish between the heat and internal energy.

Ans. Heat is energy transferred due to temperature difference while internal energy is the total energy stored within a system. Heat is a process and internal energy is a state function.

7.14. When you touch a cold surface, does cold travel from the surface to your hand or does energy travel from your hand, to cold surface?

Ans. When you touch a cold surface, heart flows from your hand to the cold surface.

7.15. Can you feel your fever by touching your own forehead? Explain.

Step Academy

Ans. No, we cannot reliable feel our own fever by touching our forehead. Our forehead are at approximately the same temperature, so there is no heat flow to give a sensation of temperature difference. A thermometer is needed for accurate fever measurement.

Constructed Response Questions

7.1. Is kinetic molecular theory of matter applicable to the plasma state of matter? Describe briefly.

Ans. The kinetic molecular theory of matter is applicable to the plasma state of matter, as plasma is a high-energy state of matter where atoms or molecules are ionized, and particles have kinetic energy.

7. 2. Why is mercury usually s preferred to alcohol as a thermometric liquid?

Ans. Mercury is preferred to alcohol as a thermometric liquid because it has a higher coefficient of expansion, making it more sensitive to temperature changes. Additionally, mercury has a higher boiling point, allowing it to measure higher temperatures.

7.3. Why is water not suitable for use in thermometers. Without calculations, guess what is equivalent temperature of 373K on Celsius and Fahrenheit scales?

Ans. Water is not suitable for use in thermometers because it freezes at 0°C and boils at 100°C, limiting its temperature range. Additionally, water's coefficient of expansion is relatively low, making it less sensitive to temperature changes.

7.4. Mention two ways in which the design of a liquid in glass thermometer may be altered to increase its sensitivity.

Step Academy

Ans. Two ways to increase the sensitivity of a liquid-in-glass thermometer are:

1) using a liquid with a higher coefficient of expansion,

2) increasing the length of the thermometer's stem, allowing for more precise temperature readings.

7.5. One litre of water is heated by a stove and its temperature rises by 2°C. If two litre of water is heated on the same stove for the same time?

Ans. When heating two liters of water on the same stove for the same time, the temperature rise will be less than 2°C, as the heat energy is distributed over a larger volume of water.

7.6. Why are there no negative number on the Kelvin scale?

Ans. There are no negative numbers on the Kelvin scale because it is an absolute temperature scale, where 0 K is the theoretical temperature at which all molecular motion ceases. Temperatures cannot be negative on this scale.

7.7. Comment on the statement, "A thermometer measures its own temperature."

Ans. The statement "A thermometer measures its own temperature" is true, as a thermometer measures the temperature of the liquid or gas inside it, which is in thermal equilibrium with the surrounding environment.

7.8. There are various objects made of cotton, wood, plastic, metals etc. In a winter night, Compare their temperatures with the air temperature by touching them with your hand.

Step Academy

Ans. On a winter night, objects made of different materials (cotton, wood, plastic, metals) will have temperatures close to the air temperature, but may vary slightly due to differences in thermal conductivity and specific heat capacity.

7.9. Which is greater, an increase in temperature 1 $^{\circ}\text{C}$ or one 1 $^{\circ}\text{F}?$

Ans. An increase in temperature of 1°C is equivalent to an increase of 1.8°F. Therefore, a 1°C increase is greater than a 1°F increase.

7.10. Why would not you expect all the molecules in a gas to have the same speed?

Ans. In a gas, molecules have different speeds due to collisions and thermal motion. The kinetic molecular theory of gases assumes that molecules have a distribution of speeds, with some molecules moving faster or slower than others.

7.11. Does it make sense to talk about the temperature of a vacuum?

Ans. It does not make sense to talk about the temperature of a vacuum, as temperature is a measure of the average kinetic energy of particles in a substance. In a vacuum, there are no particles to measure.

7.12. Comment on the statement: "A hot body does not contain heat".

Ans. The Sun is indeed composed of matter, primarily hydrogen and helium plasma. Although it is often thought of as a massive ball of energy, the Sun's energy is actually generated through nuclear reactions involving matter.

Step Academy

7.13. Discuss whether the Sun is matter.

Ans. The statement "A hot body does not contain heat" is true. Heat is a form of energy transfer, and a hot body contains internal energy, not heat. When a hot body transfers energy to a cooler body, we say that heat is transferred, but the hot body itself does not contain heat Capacity.

Search Youtube

- Step Academy
- @waqarhaider1
- Online Academy Available
- > Website:
- https://stepacademyofficial.com/

ہوم اکی**ڑی کی سہولت موجود ہیں۔(صرف گو جرانوالہ میں)** نوٹس میں کوئی غلطی ہو تولاز می آگاہ کریں

Step Academy