

Heat Concepts Quiz 1:





Name: _____ Class No.: _____ Marks: _____ / 100





Instructions: 1. Time allowed: 30 minutes 2. Closed-book Quiz





1. State one kind of temperature scale? (5 marks)
2. Given that there is a new alcohol-in-glass thermometer with no scale marked. Suggest a method to calibrate the said thermometer from 0 °C to 100 °C. You should state all the necessary steps clearly. (10 marks)
3. What is the meaning of “melting point” and “boiling point” of a substance? (5 marks)
4. A clinical thermometer is used for measure patient’s body temperature. State two special designs which a clinical thermometer should have. (10 marks)
5. There is a special thermometer called “resistance thermometer”. State clearly its working principle. You may draw a diagram and give necessary equation(s) to support your answers (Hints: Ohm’s law: $R = \frac{V}{I}$, R: Resistance of a wire V: Potential Difference across the wire I: Current passing through a wire) (10 marks)
6. What is the relationship between the average kinetic energy of all the particles and the temperature of the substance? (10 marks)
7. State two kinds of energy transfer process. (10 marks)
8. What is the relationship between internal energy, potential energy and kinetic energy of a substance? (5 marks)
9. What is the meaning of “specific heat capacity of a water”? (5 marks)
10. What is the difference between “specific heat capacity of water” and “heat capacity of water”? You may use any appropriate equation(s) to support your answers. (5 marks)
11. State three importance of the high specific heat capacity of water. (15 marks)
12. The specific heat capacities of two liquids P and Q are 1000 J kg⁻¹ °C⁻¹ and 1500 J kg⁻¹ °C⁻¹ respectively. When 2kg of liquid P at 10 °C is mixed with 1 kg of liquid Q, the final temperature is 35 °C. If no energy is lost to the surroundings, find the initial temperature of liquid Q. (15 marks)

The End.

Heat Concepts Quiz 1 Answers (with detailed Solutions)

No.	Solutions	Marks
1.	<p><u>Degree Celsius / Degree Fahrenheit</u></p> <p>黎 Sir 提提你  :</p>	5 marks.
2.	<p>1. Put the (alcohol-in-glass) thermometer <u>in a cup of ice-water and marked the liquid level</u> as L1.</p> <p>2. Put the (alcohol-in-glass) thermometer <u>in a cup of boiling water and marked the liquid level</u> as L2.</p> <p>3. <u>Divide the length</u> between two liquid levels <u>into 100 divisions evenly</u>.</p> <p>4. Marked the L1 <u>as 0 °C</u> and marked L2 <u>as 100 °C</u>. <u>Each division represents 1 °C</u>.</p> <p>黎 Sir 提提你  :</p>	<p>2.5 marks</p> <p>2.5 marks</p> <p>2.5 marks</p> <p>2.5 marks</p>
3.	<p>Melting Point of a substance means the temperature where the state of the substance <u>change from solid to liquid</u>.</p> <p>Boiling Point of a substance means the temperature where the state of the substance <u>change from liquid to gas</u>.</p> <p>黎 Sir 提提你  :</p>	<p>2.5 marks</p> <p>2.5 marks</p>
4.	<p>1. Temperature Range should be <u>a few degrees around Human Body Temperature</u> (32 °C to 42 °C).</p> <p>2. It should be <u>made up of mercury for fast response to temperature change</u> and high temperature.</p> <p>3. <u>The design of constriction</u> is to <u>prevent the immediate falling back of the mercury liquid when taking off from the mouth</u> to avoid underestimate of the temperature.</p> <p>黎 Sir 提提你  :</p>	<p>Any 2,</p> <p>5 marks each</p>

5.	<p>By $R = \frac{V}{I}$, <u>if the potential difference between the resistance wire remains unchanged, an increase in resistance will lead to an decrease in current.</u> Since when <u>temperature of a resistance wire increase, the resistance of a resistance wire will increase in a fixed rate.</u> It leads to a decrease in current and so the change in temperature can be recorded.</p> <p>黎 Sir 提提你  :</p>	5 marks 5 marks
6.	<p><u>An increase in Temperature will lead to an increase in average kinetic energy of a substance.</u></p> <p>黎 Sir 提提你  :</p>	5 marks
7.	<p>1. <u>Heat</u> 2. <u>Doing Work</u></p> <p>黎 Sir 提提你  :</p>	5 marks 5 marks
8.	<p><u>Internal Energy = Sum of Potential Energy and Average Kinetic Energy of all particles.</u></p> <p>黎 Sir 提提你  :</p>	5 marks

9.	<p>Specific heat Capacity of water means <u>the energy requires increasing 1 kg of water by 1 °C.</u></p> <p>黎 Sir 提提你  :</p>	5 marks
10.	<p>Specific heat Capacity of water is <u>independent of the mass of the water</u> to be measured while heat capacity of water is <u>dependent of the mass of the water</u> to be measured. By equation $C = mc$, C: Heat Capacity of water m: mass of water c: Specific heat capacity of water.</p> <p>黎 Sir 提提你  :</p>	5 marks
11.	<p>1. <u>Water is used as a coolant in engine.</u> For the coolant used in car, some chemicals are added to prevent it from rusting and freezing.</p> <p>2. <u>Water is used for storing energy in a solar heater.</u></p> <p>3. <u>Human body is about 70% of water.</u> It helps us to maintains a constant body temperature.</p> <p>4. <u>The temperature change is small in coastal area.</u> Since a certain mass of water needs 5 times more heat for its temperature to rise 1 °C than does the same mass of soil.</p> <p>黎 Sir 提提你  :</p>	Any 3, 5 marks each.
12.	$m_p c_p (\Delta T_p) = m_Q c_Q (\Delta T_Q)$ $(2)(1000)(35 - 10) = (1)(1500)(T - 35)$ $50000 = 1500T - 52500$ $T = 68.3 \text{ } ^\circ\text{C}$ <p>黎 Sir 提提你  :</p>	5 marks 5 marks 5 marks

The End.