Unit 9 · Heat and Temperature

WORKSHEET

Full marks 33

Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 33

1 Key words [4]

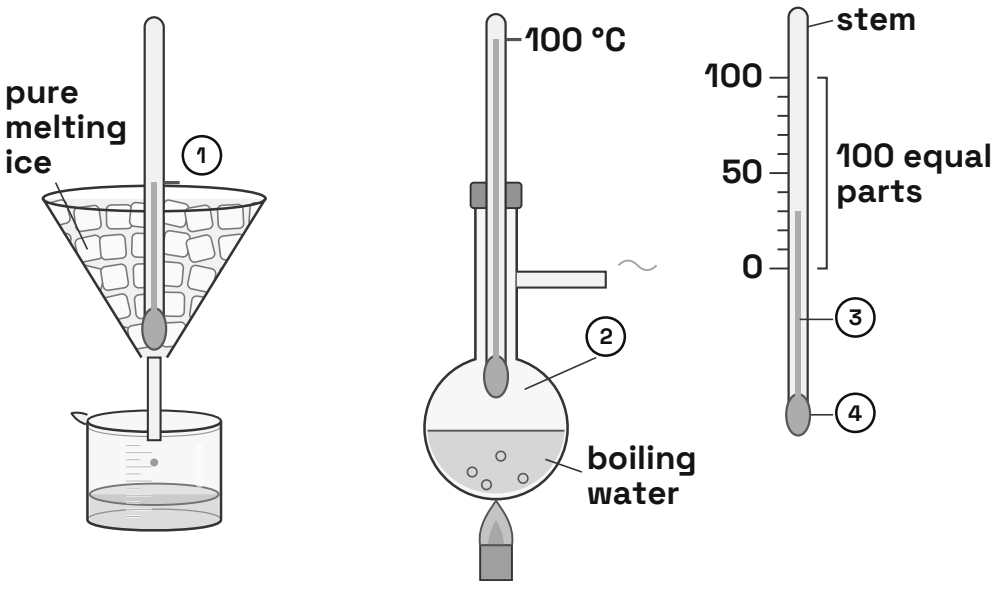
Fill in the blanks with words from the box. Two words in the box are not needed. Each blank carries 0.5 mark.

absolute zero	**calibration**	**calorimeter**	**heat**	**humidity**	**kelvin**	**thermal energy**
thermal equilibrium	**thermometric property**	**zeroth law**				

The energy of the random motion of a body's molecules is its _____. Energy that flows from a hotter body to a colder one because of their temperature difference is _____. Two bodies in contact with no net flow of heat between them are in _____. If A and B are each in equilibrium with C, they are in equilibrium with each other: this is the _____ of thermodynamics. A property that changes steadily with temperature is a _____. Marking the fixed points on a thermometer and dividing the space between them is called _____. The lowest possible temperature is _____, 0 K, and the SI unit of temperature is the _____.

2 Label the diagram [2]

The diagram shows how a Celsius thermometer is made. Write the word or temperature that belongs in place of 1 to 4. Each carries 0.5 mark.



1. _____ 2. _____

3. _____ 4. _____

3 Multiple choice [5]

Choose the correct option for each of the following questions.

i. The SI unit of heat is: [1]

a. calorie **b.** joule
c. kelvin **d.** degree Celsius

ii. A thermocouple measures temperature by the change in its: [1]

a. length **b.** volume
c. e.m.f. **d.** colour

iii. A temperature of 300 K on the Celsius scale is about: [1]

a. 573 °C **b.** 27 °C
c. −27 °C **d.** 300 °C

iv. When marking the upper fixed point, the bulb is held in the steam just above boiling water, not in the water, because: [1]

a. the water is too hot for the glass
b. impurities dissolved in the water raise its boiling point, but not the steam's temperature
c. steam conducts heat better
d. the mercury would boil in the water

v. Absolute zero is: [1]

a. 0 °C **b.** −100 °C
c. −273.15 °C **d.** −459.67 °C

4 Short answers [7]

Write short answers to the following questions.

a. Write any two differences between heat and temperature. [2]

b. A swimming pool at 25 °C holds far more thermal energy than a cup of tea at 80 °C. A cup of tea is poured into the pool. Which way does the heat flow? Give a reason. [2]

c. A platinum resistance thermometer has a resistance of 10.0 Ω in melting ice and 13.9 Ω in steam at standard pressure. In an oven its resistance is 12.0 Ω. Find the oven's temperature on this thermometer's scale. **[3]**

5 Long answer **[4]**

Write a long answer to the following question.

Describe how a liquid-in-glass thermometer is calibrated on the Celsius scale. Why must it be done at standard pressure? What would go wrong if it were done in an open pan in Bhaktapur?

6 Numerical problems **[8]**

Solve the following problems. Show your working.

a. A doctor's old thermometer reads 98.6 °F for a healthy person. Find this temperature i. in °C and ii. in K. iii. If a patient's temperature rises by 1.8 °F, by how much has it risen in kelvin? **[4]**

Answer:

b. Asha makes her own temperature scale, the N scale: the ice point is 20 °N and the steam point is 220 °N. i. What does her scale read for water at 50 °C? ii. At what temperature do the N scale and the Celsius scale give the same reading? **[4]**

Answer: _____

7 Think **[3]**

Why can't an ordinary clinical thermometer measure the temperature of a single drop of hot water correctly?

_____

_____

_____

_____

_____

8 Activity: Can your hands measure temperature? (not marked)

Fill three bowls: one with cold water, one with lukewarm water and one with warm water (not hot). Put your left hand in the cold water and your right hand in the warm water for one minute. Then put both hands into the lukewarm water at once.

	Left hand (from cold)	Right hand (from warm)
How the lukewarm water feels		
Reading of a thermometer in it (°C)		

Both hands are in the same water. Why do they feel it differently?

_____

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