# CBSE

# THERMAL PROPERTIES OF MATTER WS 1

## Class 11 - Physics

### Section A

1. A brass spring has a spring constant k. When the spring is heated, the spring constant will: **[1]**

   a) remain the same
   b) increase
   c) increase, then decrease
   d) decrease

2. The mechanical equivalent of heat. **[1]**

   a) the mechanical equivalent of heat
   b) has the same dimension as power
   c) has the same dimension as energy
   d) is dimensionless

3. Temperature of atmosphere in Kashmir falls below -10$^{o}$C in winter. Due to this water animal and plant life of Dal-lake **[1]**

   a) survives as only top layer of lake in frozen
   b) frozen in winter and regenerated in summers
   c) survives as only lower layer of lake in frozen
   d) is destroyed in winters

4. Assertion: In a pressure cooker the water is brought to boil. The cooker is then removed from the stove. Now on removing the lid of the pressure cooker, the water starts boiling again. **[1]**
   Reason: The impurities in water bring down its boiling point.

   a) Assertion is true statement but Reason is false
   b) both Assertion and Reason are false statements
   c) both Assertion & Reason are true but the reason is not the correct explanation of the assertion
   d) both Assertion & Reason are true and the reason is the correct explanation of the assertion

5. On observing light from three different stars P, Q and R, it was found that intensity of violet colour is maximum in the spectrum of P, the intensity of green colour is maximum in the spectrum of R and the intensity of red colour is maximum in the spectrum of Q. If $T_P$ ,$T_Q$ and $T_R$ are the respective absolute temperatures of P, Q and R, then it can be concluded from the above observation that **[1]**

   a) $T_P > T_R > T_Q$
   b) $T_P < T_R < T_Q$
   c) $T_P > T_Q > T_R$
   d) $T_P < T_Q < T_R$

6. Heat is associated with **[1]**

   a) kinetic energy of orderly motion of molecules
   b) kinetic energy of random motion of molecules
   c) total kinetic energy of random and orderly
   d) kinetic energy of random motion in some

motion of molecules.

cases and kinetic energy of orderly motion in other.

7. **Assertion:** In a pressure cooker the water is brought to boil. The cooker is then removed from the stove. Now on removing the lid of the pressure cooker, the water starts boiling again. **[1]**
**Reason:** The impurities in water bring down its boiling point.

a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

c) Assertion is correct statement but reason is wrong statement.

d) Assertion is wrong statement but reason is correct statement.

8. **Assertion:** Perspiration from human body helps in cooling the body. **[1]**
**Reason:** A thin layer of water on the skin enhances its emissivity.

a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

c) Assertion is correct statement but reason is wrong statement.

d) Assertion is wrong statement but reason is correct statement.

9. **Assertion (A):** A hotter body has more heat content than a colder body. **[1]**
**Reason (R):** Temperature is the measure of degree of **hotness** of a body.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

10. **Assertion (A):** When heat transfer takes place between a system and surroundings, the total heat content of system or surroundings separately remains same. **[1]**
**Reason (R):** Heat is a form of energy which follows the principle of conservation of energy.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

11. Heat is a form of_____. **[1]**

a) energy

b) solid

c) liquid

d) gas

12. Which of the following statement(s) is/are true? **[1]**

I. Every substance contains heat.

II. For heat to flow between two substances, they must be at different temperatures.

III. The internal energy of a substance is equal to the kinetic energy of the molecules in the substance.

a) II only

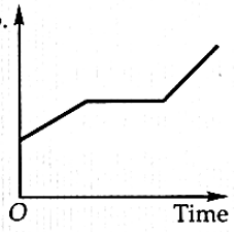
b) III only

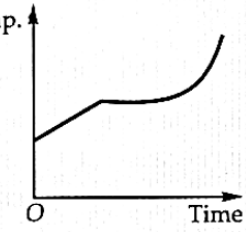
c) II and III only

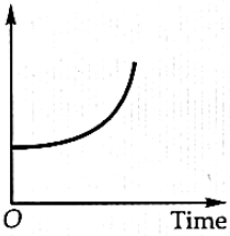
d) I and II only

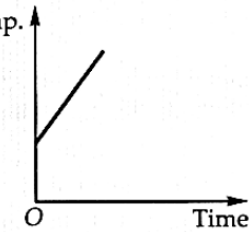
13. Liquid oxygen at 50 K is heated to 300 K at constant pressure of 1 atm. The rate of heating is constant. Which **[1]**

one of the following graphs represents the variation of temperature with time?

a) 


b) 


c) 


d) 


14. Name the various thermometric properties. **[1]**
15. Why is J called a conversion factor? **[1]**
16. After some time of switching on an electric heater, the temperature of the heater becomes constant although current remains continuously flowing in it, why so? **[1]**
17. What is the dynamical theory of heat? **[1]**
18. Is J a physical quantity? **[1]**
19. A spark is produced when two stones are struck against each other. Why? **[1]**
20. What is critical temperature? **[1]**
21. If a piece of iron is hammered, it becomes warmer. Why? **[1]**
22. Why does a rifle bullet get heated on striking a target? **[1]**
23. The readings of air thermometer at 0°C and 100° C are 50 cm and 75 cm of mercury column respectively. What is the temperature at which its reading is 80 cm of Hg column? **[1]**
24. When we rub our hands, they are warmed but only to a certain maximum temperature. Why? **[1]**
25. What is heat? **[1]**
26. Define temperature. **[1]**
27. Is the bulb of a thermometer made of diathermic walls or adiabatic walls? **[1]**
28. Draw the graph showing cooling of hot water with time. **[1]**
29. What are the SI and CGS units of heat? How are they related? **[1]**
30. A body at a higher temperature contains more heat, comment. **[1]**
31. A thermos bottle containing water is vigorously shaken. What will be the effect on the temperature of the water? **[1]**
32. How would a thermometer be different if glass expanded more with increasing temperature than mercury? **[1]**
33. Can a given amount of mechanical energy be completely converted into heat? **[1]**
34. At what temperature will wood and iron appear equally hot or equally cold? **[1]**
35. How does the boiling point of water change with pressure? **[1]**
36. What is the triple point of water on a Fahrenheit scale? What is the absolute zero on this scale? **[1]**
37. What do you mean by a triple point of water? Why it is unique? **[1]**
38. Is temperature a macroscopic or microscopic concept? **[1]**
39. A match stick can be lighted by rubbing it against a rough surface. Why? **[1]**
40. A normal diet furnishes 2000 kcal to a 60 kg person in a day. If this energy was used to heat the person with no losses to the surroundings, how much would the person's temperature increase? The specific heat of the human body = 0.83 cal $g^{-1}$ $^oC^{-1}$. **[1]**

41. Why do the brake drums of a car get heated, when the car moves down a hill at a constant speed? **[1]**

**Section B**

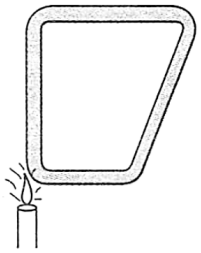
42. Explain why Greenhouse effect is responsible for global warming. **[2]**

43. Calculate the heat required to convert 0.6 kg of ice at -20°C, kept in a calorimeter to steam at 100°C at atmospheric pressure. Given the specific heat capacity of ice = 2100 $Jkg^{-1}$ $K^{-1}$ specific heat capacity of water is 4186 $Jkg^{-1}$ $K^{-1}$, latent heat of ice = $3.35 \times 10^5$ $Jkg^{-1}$, and latent heat of steam = $2.256 \times 10^6$ $Jkg^{-1}$. **[2]**

44. Briefly explain the concept of thermal equilibrium and temperature. **[2]**

45. What is meant by the statement that heat is an energy in transit? **[2]**

46. Water in a closed tube is heated with one arm placed vertically above an arc lamp. Water will begin to circulate along the tube in a counterclockwise direction. Is this true or false? **[2]**



47. The temperature difference between the two ends of a bar 1.0 m long is 50°C and that for the other bar 1.25 m long 75°C. Both the bars have same area of cross-section. If the rates of conduction of heat in the two bars are the same, find the ratio of the coefficients of thermal conductivity of the materials of the two bars. **[2]**

48. Distinguish clearly between heat and temperature. **[2]**

**Section C**

49. What is meant by a triple point of water? What is the advantage of taking the triple point of water as the fixed point for a temperature scale? **[3]**

**Section D**

50. **State True or False:** **[4]**

(a) The absolute zero temperature is regarded as 0 K or +273.15°C. **[1]**

(b) The temperature of a body may also be increased by doing mechanical work on the system. **[1]**

(c) It is correct to call heat as the energy in transit. **[1]**

(d) When two bodies at temperature $T_1$ and $T_2$ ($T_2 > T_1$) are placed in vacuum of a certain separation, they will never attain equilibrium. **[1]**

**Section E**

51. **Fill in the blanks:** **[7]**

(a) On absolute scale, the melting point of ice is _____ and boiling of water is _____. **[1]**

(b) _____ is the measure of degree of hotness or coldness of a body. **[1]**

(c) The lowest possible temperature of - 273.15 °C at which all molecular motion stops is called _____ of temperature. **[1]**

(d) 1 calorie = _____ joule. **[1]**

(e) Heat is the energy in _____ that flows from one body to another due to _____ between them. **[1]**

(f) Temperature cannot take a _____ value on the absolute scale. **[1]**

(g) _____ of a body is the measure of the average kinetic energy of its molecules. **[1]**