# INDIAN SCHOOL AL WADI AL KABIR

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| **CLASS: VII** | **DEPARTMENT: SCIENCE 2024 - 25** | **DATE: 06/05/2024** |
| **WORKSHEET NO: 2 WITH ANSWERS** | **TOPIC: HEAT** | **NOTE: A4 FILE FORMAT** |
| **NAME OF THE STUDENT:** | **CLASS & SEC:** | **ROLL NO.** |

## I. OBJECTIVE-TYPE QUESTIONS:

1. Refer to the following statements:

   A. To study the behaviour of substances at different temperatures

   B. To measure boiling point and freezing point during a science experiment

   C. To measure human body temperature

   Which of these statements justifies the need for laboratory thermometers?

   a) Only A  b) Only C

   c) Both A and C  **d) Both A and B**

2. At a campsite there are tents of two shades – one made with black fabric and the other with white fabric. Which one will you prefer for resting on a hot summer afternoon?

   a) Tent made up of white fabric as it is a good absorber of heat.

   b) Tent made up of black fabric as it is a good reflector of heat.

   **c) Tent made up of white fabric as it is a good reflector of heat.**

   d) Tent made up of black fabric as it is a good absorber of heat.

3. A child observes the process of ironing clothes. The base of the iron is very hot. The clothes are warm; however, the top handle of the iron is not warm at all. Which of the following is an incorrect conclusion, based on his observations?

   **a) Heat is trapped inside the iron's handle.**

   b) Heat is conducted by the iron on to the clothes.

   c) The material of the iron's handle is an insulator.

   d) The handle will not radiate any heat to bare hands.

4. What is the average range of a laboratory thermometer and how does it compare to the range of a clinical thermometer?

   **a) -10 to 110°C; much greater than the range of clinical thermometers**

   b) -100 to 100°C; much greater than the range of clinical thermometers

   c) 10 to 50°C; much lesser than the range of clinical thermometers

   d) 37 to 40°C; much lesser than the range of clinical thermometers

5. At the campsite there are tents of three shades. One is made of black fabric the other is white fabric and one is a black-and-white combination. Which will you prefer for resting on a hot summer afternoon -

   a) Black fabric **b) White fabric**

   c) Combination of both d) None of the above

6. In coastal areas, in the daytime, the air circulation between unevenly heated land and sea, causes a sea breeze. Which natural processes are responsible for such air movements?

   a) Warm air from the sea is radiated upwards and cold air rushes in, creating a sea breeze.

   **b) Warm air from land rises up by convection and cold air fills its place, as sea breeze.**

   c) Warm air from the sea is conducted to the air and cold air rushes in, creating a land breeze.

   d) Warm air from land and warm air from sea, both rise and are cooled by insulation.

**For the following questions, two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (i), (ii), (iii), and (iv) as given below:**

***i) Both A and R are true and R is the correct explanation of the assertion.***

***ii) Both A and R are true but R is not the correct explanation of the assertion.***

***iii) A is true but R is false.***

***iv) A is false but R is true***

7. **Assertion (A):** All hot bodies radiate heat.

   **Reason (R):** When heat falls on an object, a part of it is reflected, a part is absorbed and a part may be transmitted.

   **ii) Both A and R are true but R is not the correct explanation of the assertion.**

8. **Assertion (A):** The temperature of boiling water can be measured by a clinical thermometer.

   **Reason (R):** The range of a clinical thermometer is from 35˚C to 42˚C.

   **iv) A is false but R is true.**

9. **Assertion (A):** Woollen clothes keep the body warm in winter.

   **Reason (R):** There is air trapped in between woollen fibres and air is a bad conductor of heat.

   **i) Both A and R are true and R is the correct explanation of the assertion.**

10. **Assertion (A):** The materials which allow heat to pass through them easily are conductors of heat.

    **Reason (R):** Aluminum is a poor conductor of heat.

    **iii) A is true but R is false.**

## II. VERY SHORT ANSWER TYPE QUESTIONS (2 M):

1. What are the conditions necessary for heat to be conducted?

   **[Hint: Two bodies should be in solid state, they should be in direct contact with each other and their temperatures should be different.]**

2. Mention the use of a kink in a clinical thermometer.

   **[Hint: Kink prevents immediate backflow of mercury from the tube to the bulb, thus it allows us to read the temperature conveniently.]**

3. Give reason:

   a) A clinical thermometer has a range between 35 ˚C to 42 ˚C.

   **[Hint: The temperature of the human body does not go below 35 ˚C or above 42 ˚C.]**

   b) A few sharp jerks are given to a clinical thermometer before using it.

   **[Hint: Jerks are given a clinical thermometer before using it to settle down the mercury level below normal temperature so that the measurement taken is accurate.]**

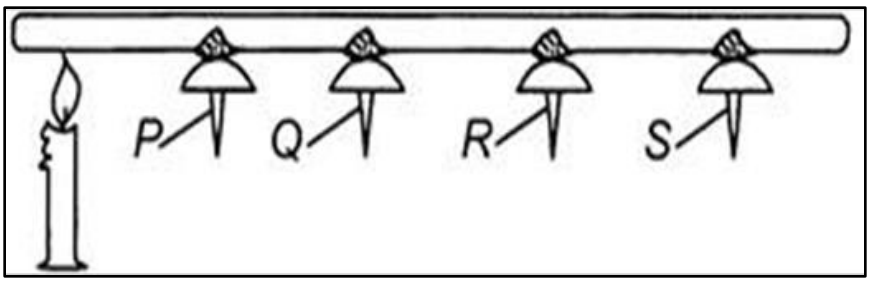
   c) In a mercury thermometer, the level of mercury rises when its bulb comes in contact with a hot object. **[Hint: As the temperature increases, expansion in mercury takes place which leads to a rise in the level of mercury in the thermometer.]**

   d) The handle of a pressure cooker is covered with thick plastic.

   **[Hint: Plastic is a bad conductor of heat due to which the heat from the cooker does not flow to its handle and we can hold it easily.]**

4. How does the heat travel in the air? **[Hint: Heat travels in the air by convection. The air molecules near the heat source get heated, become lighter, and rise. The air from the sides comes in to take its place. In this way the air gets heated.]**

5. Some pins are stuck to a metal rod with wax and a lighted candle is kept below the rod as shown in the diagram below:




Which one of the pins will fall off the metal rod first? Give reason.

**[Hint: The pin 'P' nearest to the flame falls first because heat is transferred from the hot end of the metal rod to its colder end by the process of conduction.]**

6. Write the difference between conductors and insulators of heat. Give suitable examples.

**[Hint: <u>Conductors</u> – The materials which allow heat to pass through them easily. eg. Iron and Copper**

**<u>Insulators</u> – The materials which do not allow heat to pass through them easily. eg. Wood and plastic]**

## III. <u>SHORT ANSWER TYPE QUESTIONS (3M):</u>

1. What is meant by heat transfer? Explain.

**[Hint: The flow of heat from one object to another with or without a medium is called the transfer of heat. Heat always flows from a body at a higher temperature to another body at a lower temperature. The flow of heat stops when the temperature of both bodies becomes equal. Transfer of heat takes place through the methods of conduction, convection and radiation.]**

2. Write any two applications of convection and radiation in daily life.

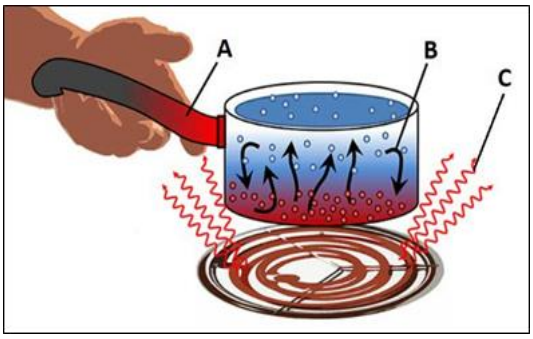
**[Hint: Convection – i) Room heater warms the air near the floor. When the warm air rises up, the cool air sinks to the floor which results in effective heating of the room.**

**ii) Exhaust fans are fitted near the ceiling for hot air to escape.**

**Radiation – i) In cold and hilly areas, the outer walls and roofs are usually painted dark to keep the houses warm,**

**ii) During summer, we feel comfortable wearing light-coloured clothes. In winter, wearing dark-coloured clothes keeps our bodies warm. This is because light colours are poor absorbers of heat and dark colours are good absorbers.]**

3. Observe the figure given below, identify A, B and C and explain each of them.




**[Hint: A – <u>CONDUCTION</u>: The process by which heat is transferred from the hotter end to the colder end of an object without actual movement of particles.**

**B – <u>CONVECTION</u>: The method in which heat is transferred by the actual movement of the particles of a substance.**

**C – <u>RADIATION</u>: It is a process of heat transfer which does not require any material medium.]**

## IV. <u>LONG ANSWER TYPE QUESTIONS (5M):</u>

1. What are the precautions to be taken while using a clinical thermometer and a laboratory thermometer?

**[Hint: *<u>Clinical thermometer:</u>***

**i) The thermometer should be washed before and after use, preferably with an antiseptic solution.**

**ii) Ensure that the mercury level is below 35˚C.**

**iii) Our eyes should be at the level of mercury while reading the temperature.**

**iv) Handle the thermometer with care. If it hits some hard object, it can break.**

**v) Do not hold the thermometer by the bulb while reading it.**

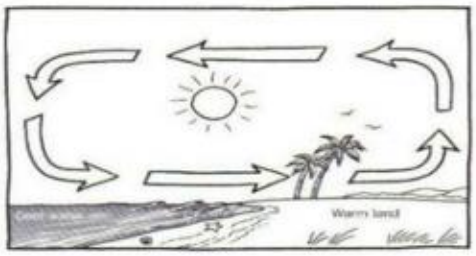
***<u>Laboratory thermometer:</u>***

**i) Handle the thermometer with care. If it hits some hard object, it can break.**

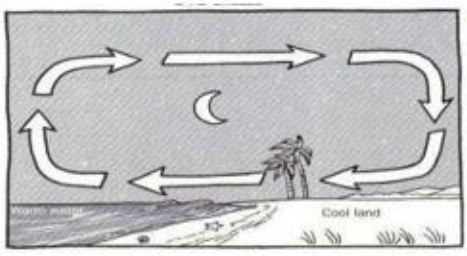
**ii) Should be kept upright not tilted.**

**iii) The bulb should be surrounded from all sides by the substance of which the temperature is to be measured. The bulb should not touch the surface of the container.]**

2. Explain the differences between sea breeze and land -breeze with the help of labelled diagrams.



SEA BREEZE

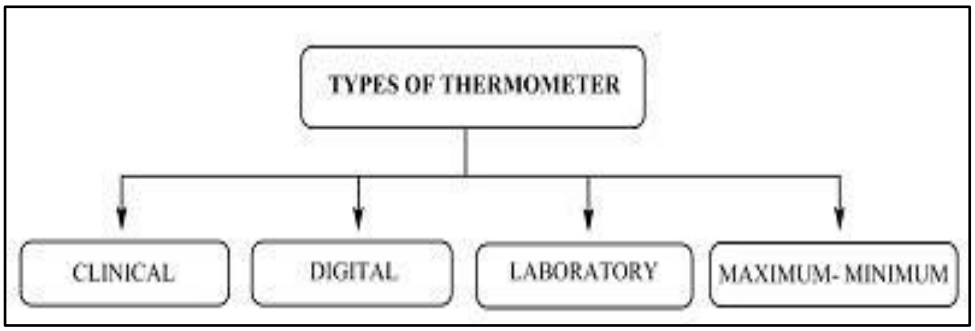


LAND BREEZE

**[Hint: *SEA BREEZE* - During the day, the land heats up much faster than seawater. So, the air above the land becomes hotter and rises. The cool air above the sea surface moves towards land to fill the space. This flow of air from the sea towards the land is called sea breeze.**

***LAND BREEZE* – The land cools much faster at night than the seawater. So, the air above the land surface is cooler than the air over the sea. The warm air above the sea surface rises up. The cool air from the land moves towards the sea. This flow of air from land towards the sea is called land breeze.]**

3. Describe different types of thermometers.




**[Hint: i) *Clinical thermometer:* The thermometer that measures our body temperature is called a clinical thermometer. It consists of a long, narrow, uniform glass tube. It has a bulb at one end which contains mercury. A clinical thermometer reads the temperature from 35˚C to 42˚C.**

**ii) *Digital thermometer:* Digital thermometers are preferred over clinical thermometers nowadays due to the high toxicity of the mercury present in clinical thermometers and difficulty in its disposal in cases when the thermometer breaks, digital thermometers are manufactured that can measure the accurate temperature without the use of mercury.**

**iii) *Laboratory thermometer:* A laboratory thermometer is used to measure the temperature of things other than the human body. The range of a laboratory thermometer is generally from -10˚C to 110˚C.**

**iv) *Maximum-minimum thermometer*: The daily maximum and minimum temperatures reported in weather reports, are all measured by a thermometer known as the Maximum-minimum thermometer.]**

## V. SOURCE-BASED/ CASE STUDY-BASED QUESTIONS

***Read the passage and answer the following questions:***

Why it is more comfortable to wear white or light-coloured clothes in the summer and dark-coloured clothes in the winter? Dark surfaces absorb more heat and, therefore, we feel comfortable with dark-coloured clothes in the winter. Light-coloured clothes reflect most of the heat that falls on them and, therefore, we feel more comfortable wearing them in the summer. In the winter, we wear woollen clothes. Wool is a poor conductor of heat. Moreover, there is air trapped in between the wool fibres. This air prevents the flow of heat from our body to the cold surroundings. So, we feel warm. Suppose you are given the choice in winter of using either one thick blanket or two thin blankets joined together. What would you choose and why? Remember that there would be a layer of air in between the blankets.

i) Define temperature. [Hint- **A reliable measure of the hotness of an object is its temperature.]**

ii) Using two thin blankets rather than one thick blanket is preferred. Explain.

**[Hint: The two thin blankets joined together will have a layer of air trapped in between them. Air doesn't allow our body heat to escape to the cold surroundings and hence keep us warm.]**

iii) Why do we wear light-coloured cotton clothes in summer?

**[Hint: Light-coloured cotton clothes give us a feeling of coolness by reflecting heat.]**

iv) The houses in Oman are painted with light colours. Why?

**[Hint: Because white colour reflects most of the sun's heat rays. This keeps the house cool.]**

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