INDIAN SCHOOL AL WADI AL KABIR

CLASS: VII	**DEPARTMENT: SCIENCE 2025 - 26**	**DATE: 13/11/2025**
WORKSHEET NO: 9 WITH ANSWERS	**TOPIC: HEAT TRANSFER IN NATURE**	**NOTE: A4 FILE FORMAT**
NAME OF THE STUDENT:	**CLASS & SEC:**	**ROLL NO.**

I. OBJECTIVE-TYPE QUESTIONS:

1. When a metal spoon is placed in hot soup, its handle also becomes hot after some time. This happens because ─

   a) Heat is transferred by conduction through the spoon

   b) Heat is transferred by convection

   c) Soup radiates heat to the spoon

   d) Air around the spoon heats it up

2. 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 travels from the base of the iron to the clothes by conduction.

   b) The handle prevents heat from reaching the hand of the person using the iron.

   c) The base of the iron is made of a good conductor of heat.

   d)The handle of the iron is made of a good conductor of heat.

3. Which of the following methods helps in replenishing groundwater?

   a) Boiling water

   b) Rainwater harvesting

   c) Melting glaciers

   d) Using sprinklers

4. At the campsite, there are tents of three shades. One is made of black fabric, the other is made of white fabric, and one is a combination of black and white. 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

5. 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 by convection, and cold air fills its place, as a 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.

6. Why is there no convection or conduction in space?

a) There are no particles to transfer heat.

b) The temperature is too low.

c) Radiation does not work in space.

d) Space reflects all heat energy.

7. Which of the following processes in the water cycle involves water changing from a gas to a liquid?

a) Evaporation

b) Precipitation

c) Condensation

d) Transpiration

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

8. **Assertion (A):** The air near the ceiling of a room is usually warmer than the air near the floor.

   Reason (R): Warm air rises and cool air sinks due to convection currents in the air.

9. **Assertion (A):** Sea breeze helps coastal areas remain cooler during the nighttime.

   Reason (R): Land heats up faster than the sea, so cooler air from the sea moves towards the land, replacing the warm air during the sea breeze.

10. **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.

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

1. How does the rate of seepage vary in different types of soil — gravel, sand, and clay? Explain.

   [Hint: The rate of seepage is fastest in gravel because the spaces between its particles are large and well-connected.

   It is slower in sand, as the spaces are smaller, and slowest in clay, where the particles are very fine and tightly packed, allowing very little water to pass through.]

2. Why does warm air rise while cool air sinks?

   [Hint: Warm air becomes lighter and less dense, so it rises. Cool air is heavier and denser, so it sinks. This movement forms convection currents.]

3. Give reason:

   a) 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.]

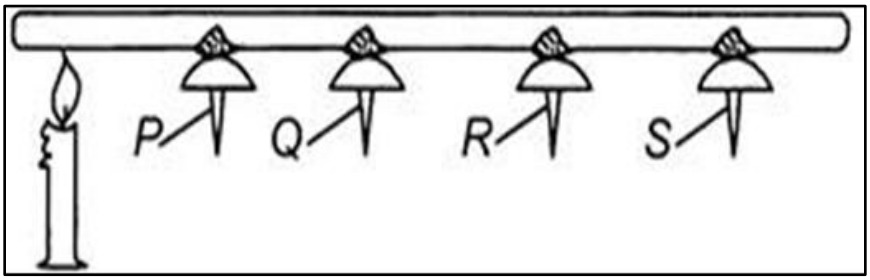
   b) Outer walls of houses in hot regions painted white.

   [Hint: White colour reflects most of the sunlight and absorbs very little heat. This helps to keep the interiors of the house cooler.]

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 a 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. How does heat transfer help in the water cycle on Earth?

[Hint: Sun's rays heat surface water, causing evaporation. The water vapour rises, cools, and condenses to form clouds.

Convection currents in air help distribute moisture, leading to rainfall — all processes driven by heat transfer.]

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

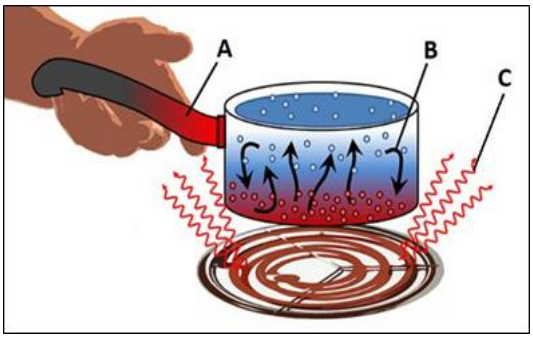
[Hint: Convection – i) Room heater warms the air near the floor. When the warm air rises up, the cool air sinks to the floor, which results in effective heating of the room.

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.]

4. Why do places near the sea have moderate climates compared to inland areas?

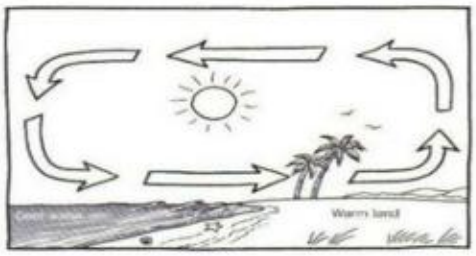
[Hint: Places near the sea are affected by sea breeze and land breeze. These regular air movements keep the temperature of coastal areas from becoming too hot during the day or too cold at night, resulting in a moderate climate compared to inland areas.]

5. How do woollen clothes keep us warm in winter?

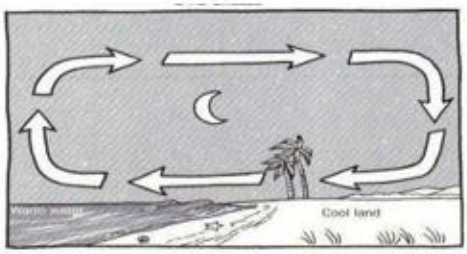
[Hint: Woollen clothes keep us warm because wool traps air between its fibres. Air is a poor conductor of heat, so it prevents the body's heat from escaping to the cold surroundings. Thus, the layer of trapped air acts as an insulator, keeping us warm in winter.]

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

1. 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 a land breeze.]**

V. SOURCE-BASED/ CASE STUDY-BASED QUESTIONS

Read the passage and answer the following questions:

Why is it 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 between the blankets.

i) Which colour absorbs more heat?

[Hint: Dark colour clothes absorb more heat]

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 keeps 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.]

MCQ ANSWERS

1-a,2-d,3-b,4-b,5-b,6-a,7-c,8-i,9-iv,10-i

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