

GENERAL SCIENCE NOTES FOR 7TH CLASS (FOR ISLAMABAD)

magnetic fields vibrate perpendicular to wave travel just the particles in transverse waves Therefore, electromagnetic waves are transverse waves.

4. What is the purpose of hearing aid device?

Ans: A hearing aid is a small electronic device that you wear in or behind your ear. It makes some sounds louder so that a person with hearing loss can listen, communicate and participate more fully in daily activity A hearing aid device can help people hear more in both quiet and noisy situations.

5. Name the some electromagnetic waves.

Ans: Light, Microwaves, infrared, X-rays, Ultraviolet rays and Radio waves.

6. Light reaches us earlier than the thundering sound. Why?

Ans: During lightening in the sky both light and sound are produced at the same time but light reaches us earlier than thundering sound because light is faster than sound.

7. What is Echo?

Ans: Echo is repetition of sound due to reflection of sound waves from a hard surface back to speaker.

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HEAT AND TEMPERATURE

Questions and Activities

A. MCQs (Choose the correct option)

1. "J" is the symbol for unit joule, it is the unit of:

- a. Temperature b. Heat
c. Power d. Voltage

Ans: b. Heat

2. If your class room temperature is 27°C, what is its value in kelvin scale?

- a. 27 K b. 373 K
c. 300 K d. 246 K

Ans: c. 300 K

3. Which of the following is the best conductor?

- a. Wood b. Water
c. Metal d. Plastic

Ans: c. Metal

4. Which temperature of the followings is representing melting point of ice?

- a. 0K b. 32°C
c. 273K d. 0°F

Ans: c. 273K

5. Mercury thermometer is used to measure temperature of a body. Which process is used in it?

- a. Convection b. Radiation
c. Thermal expansion
d. Insulation

Ans: c. Thermal expansion

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6. Which of the followings is the worst conductor?

- a. Metal b. Wood
c. Wool d. Air

Ans: d. Air

7. Conduction of heat best takes place in

- a. solids. b. fluids.
c. gases d. vacuum.

Ans: a. solids.

8. Materials that trap air like fur, wool and saw dust are heat:

- a. Insulators b. Conductors
c. Reflectors
d. Convectional devices

Ans: a. Insulators

9. The heat transfer that occurs due to a density difference in fluids is

- a. conduction. b. radiation.
c. convection. d. insulation

Ans: c. convection.

10. Huge amount of heat is being generated on sun. This heat reaches from sun to earth by

- a. radiation only.
b. convection only.
c. convection and radiation.
d. conduction, convection and radiation

Ans: a. radiation only.

B. True and False (correct the statement if it is False)

1. Heat and temperature are two same things.

Ans: False. Heat and temperature are two different things.

2. Only Radiations can pass through vacuum.

Ans: True

3. On heating, solids expand more than liquids.

Ans: False. On heating, liquids expand more than solids.

4. At hot end of a metal rod, its particles vibrate faster than its colder end.

Ans: True

5. In double glazed windows, heat can flow from room to outside but heat cannot enter from outside to room.

Ans: True

C. Short questions.

1. Define these terms; thermal energy, temperature and heat. Write their SI units.

Ans: **Thermal energy.** The total kinetic energy and potential energy of all the particles in a substance is called thermal energy. SI unit of its joules (J). **Temperature:** It is the measure of how hot or cold a body is. More scientifically, we define temperature as "Temperature of a body is measure of average kinetic energy of its particles". The SI unit of temperature is kelvin (K). Other famous units are degree centigrade ($^{\circ}\text{C}$) and degree Fahrenheit ($^{\circ}\text{F}$).

Heat: Heat is a form of energy that flows from hotter body to colder body. The SI unit of heat is joule. (J).

2. Temperature of hot iron rod is 1000°C . Convert this temperature into kelvin and degree fahrenheit.

Ans: $K = C + 273$

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$$= 1000 + 273 = 1273 \text{ K}$$

$$F = 1.8 T (C) + 32$$

$$= 1.8 + 1000 + 32$$

$$= 1,033.8^{\circ}F$$

3. **Why base of cooking utensils is made up of steel but handles are made up of plastic?**

Ans: Cooking utensils are made up of metals because metals conduct heat fast and Cooks the food easily. Handles are made up of plastic because plastic and wood are insulators which means they are bad conductors of heat.

4. **If you put a dented ping pong ball in hot water, its dented part gets the proper shape. How does it happen?**

Ans: The water will heat up the air inside the Ping Pong ball. This causes the air to expand, popping the ball back into shape.

5. **How can gliders fly very high without any engines? Give reason.**

Ans: Gliders fly using the basics of aerodynamics. the Principles of flight do not actually require an engine. Engines simply gives you the thrust you need to more fully counter the weight are drag of your aircraft's own mass.

6. **Why most materials become less dense as their temperature is increased?**

Ans: Because when a substance is heated, the molecule, move faster causing the molecule to push outward making them further apart from each other.

7. **Why exhaust fans are connected near the room ceiling?**

Ans: Because warm air rises and find exit path out of the room through the exhaust fans and effectiveness increases. Cool fresh air rushes into the room through the doors and windows.

8. **Briefly explain the expansion joints use in the bridges.**

Ans: Bridges have long span but it is divided into small sections with expansion joints between them. Due to these expansion joints, bridge can expand contract easily during summer without any damage to bridge.

9. **How false ceiling helps to keep room at lower temperature than outside during the summer?**

Ans: False ceiling below the roof is done with air trapped between ceiling and roof. Air being good insulator reduce the heat flow from roof to room.

D. Long questions

1. **Differentiate between heat and temperature on the basis of Kinetic molecular theory.**

Ans: Heat is nothing but the amount of energy in a body. As against these temperature is something that measures the intensity of heat. Heat measures both kinetic and potential energy contained by molecules in an object. On the other hand, temperature measures average kinetic energy of molecules in substance.

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2. Solids are good conductors but gas are not. Explain in detail on the basis of kinetic molecular theory.

Ans: According to kinetic molecular theory, particles in solids only vibrates about their mean position but do not leave their position. Particles in solid have smallest kinetic energy. Particles in gases are more free to move than solids particles in gases have greater kinetic energy as compared to liquids and solids.

3. What is conduction? how heat is transferred by conduction? Why metals are good conductor of heat?

Ans: **Conduction:** "Conduction" is the method of transfer of heat from hot body to cold body by the vibration of particle". In solids, its particles are very close to each other. When one end of metal rod is heated then particles at that end begins to vibrate more energetically. They collide with neighbouring particles and transfer a part of heat energy to them. In this way, energy transfers to its other end. Metals are good conductors of heat, because metals have free electrons. These free electrons move fast and transfer the energy to other part of the metal quickly.

4. What is convection? How heat is transferred by convection?

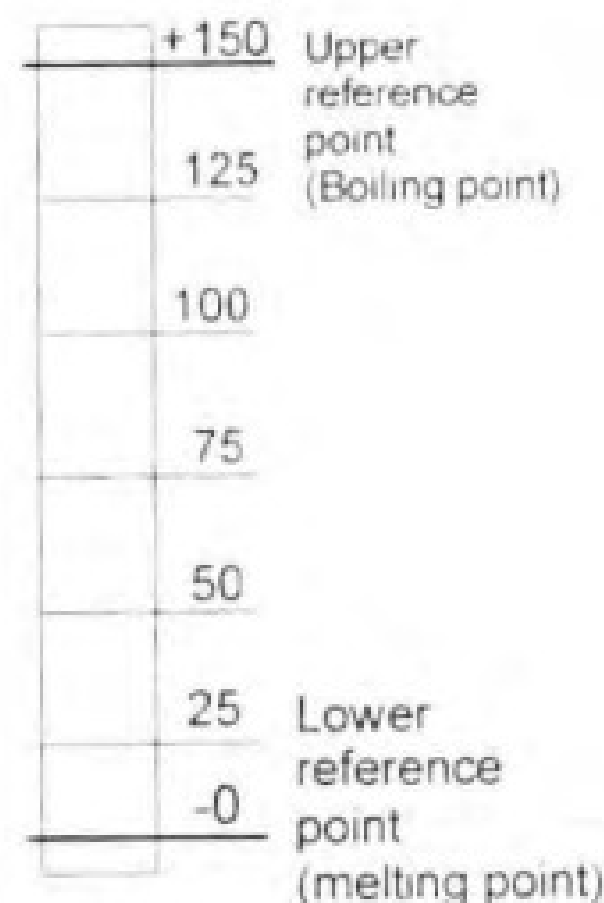
Ans: **Convection:** Transfer of heat by actual movement of molecules

from hot place is known as convection. Convection can take place in fluids (liquid and gases) only. When cold water is heated it expands and becomes less dense. The cold water (denser) flows downward and hot water (lighter) rises up. This process continues and circulating flow of water is established. We see that this is the method of transfer of heat due to actual movement of particles from bottom to top.

E. Structured questions

1. You are asked to design a temperature scale. Let's call it "atto" temperature scale with unit symbol "^oA". If melting point of ice on it is 25^oA and boiling point of water is 125^oA. Draw and label the diagram with values on lower and upper reference point.

Ans:



- b. Find the number of division on it. Also draw on the scale.

Ans: The number of division are 100.

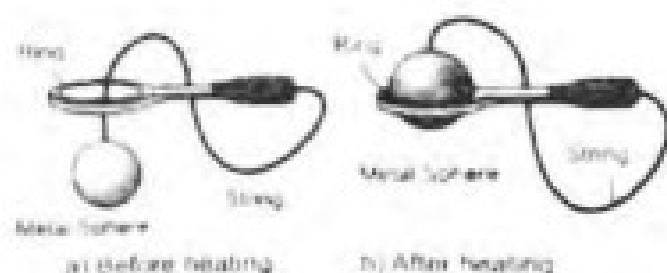
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- c. Which one is greater, 1°A or 1K ?

Ans: 1K is greater.

2. Consider the apparatus shown in the figure, the metal ball can pass easily through the ring.

Ans:



When metal ball is heated and we try to pass it through the ring again, it will not pass. Why? Because on heating metal ball expands so and volume rises. So, it will not pass through ring.

3. Water is boiling in a pot as shown in the figure.

- a. Identify which letter A/B/C is representing each of following processes:

- A Radiation
B Conduction
C Convection

- b. Explain how heat is transferred from stove to the base of pot?

Ans: Heat is transferred from stove to the base of pot due to convection process.

- c. Explain how heat is transferred from water to air?

Ans: Heat is transferred from water to air due to the process of radiation.

- d. Pot handle is made up of plastic, will it get hot? If yes, justify your answer.

Ans: Pot handle is made up of plastic. It will not get hot because plastic is an insulator.

4. A building is shown in the figure. You want to thermally insulate it.

- a. How would you insulate its rooftop?

Ans: By laying down reflectors or shining silvered surface and the top of the roof. White washing the rooftop on start of summer season.

- b. What steps would you take to insulate it from inside?

Ans: Thickness of the walls may be increased so heat will take longer to conduct through it. Nowadays, wall insulating panel are attached with the front walls just like the false ceiling methodology.



5. A balloon is fixed on the mouth of a glass bottle which has a little amount of water, when this glass bottle is placed on hot plate balloon is inflated. Explain why?

Ans: The heat from the water causes the air inside the bottle to heat up. The molecules of the air begin to move faster and take up more space. The air from the bottle then moves into the balloon causing it to inflate.

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F. Project Work

Make a cooler that could keep ice without melting for long time.

Ans: Simply procure a plastic container, cover it fully with aluminium foil (shiny side facing outwards) and then insulate the inside of the container. The thick material will insulate the box, preventing the coldness of the ice from seeping out.

A. MCQs (Choose the correct option)

1. There are _____ states of matter.

- a. three b. four
c. one d. five

Ans: a. three

2. Particles have kinetic energy due to their

- a. rest b. speed
c. motion d. distance

Ans: c. motion

3. Human body temperature is

- a. 30°C b. 39°C
c. 42°C d. 37°C

Ans: d. 37°C

4. Boiling point of water is

- a. 32°F b. 0°C
c. 100°C d. 38.6°F

Ans: c. 100°C

5. Which scale has only positive values _____.

- a. Celsius b. Kelvin
c. Fahrenheit d. Thermal

Ans: b. Kelvin

6. Amount of _____ in a body also depends upon amount of matter in it.

- a. temperature b. expansion
c. heat d. contraction

Ans: c. heat

7. We take reading of the fever temperature from the _____ scale.

- a. Kelvin b. Fahrenheit
c. Celsius d. None of them

Ans: b. Fahrenheit

8. Hot air balloons rising high in the sky. It is the example of _____.

- a. Conduction b. radiation
c. Convection d. insulator

Ans: c. Convection

9. _____ is the best climber.

- a. Parrot b. Dove
c. Sparrow d. Eagles

Ans: d. Eagles

10. Blowing of winds especially near _____ areas is due to convection.

- a. Sea b. river
c. lake d. pond

Ans: a. Sea

11. Radiation method is used to warm the green house even in _____.

- a. Summer b. Autumn
c. winter d. Spring

Ans: c. winter

12. _____ and _____ clours are good reflection of heat.

- a. Red and Green
b. Blue and Yellow
c. Violet and orange
d. white and silver

Ans: d. white and silver

13. Visible light and gamma rays are examples of _____ waves.

- a. Water b. sound
c. electromagnetic d. radiation

Ans: c. electromagnetic

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14. _____ which is mixture of gases is one of the best insulators.

- a. air b. water
c. sound d. sand

Ans: a. air

15. Absolute _____ is the temperature at which all molecules stop moving.

- a. one b. two
c. zero d. four

Ans: c. zero

More Short Questions

1. How molecules are formed?

Ans: Matter consists of tiny particles called atoms and atoms combine to form molecules.

2. What is thermal energy?

Ans: The total kinetic energy and potential energy of all the particles in a substance is called thermal energy.

3. What is the use of three temperature scales?

Ans: Kelvin is mostly used for scientific calculations. Degree Fahrenheit is usually used for clinical purpose and degree centigrade is used for normal daily life temperature.

4. Write down the conversion of temperature between different scale?

Ans: a) From Celsius to kelvin scale.

$$T(K) = T(C) + 273$$

b) From Celsius to Fahrenheit scale.

$$T(F) = 1.8 T(C) + 32$$

c) From Fahrenheit to Cesium scale

$$T(C) = \frac{5}{9} (F-32)$$

5. Define thermal equilibrium.

Ans: If two bodies at different temperature are touched to each other, heat will continue to flow from hot body to cold body until they attain same temperature is called thermal equilibrium.

6. A full glass of hot water has temperature of 40°C and it has 200 J of heat. If we pour half of water in another glass, what will be new amount of heat in the remaining half glass of water?

Ans: The amount of heat in the remaining half glass of water is 100 J.

7. Two electric wires (blue and red wire) are tied to poles as shown which wire may break during winters?

Ans: Red wire may break during winter.

8. Why gaps are left in the railways tracks?

Ans: gaps are left in the railway tracks because they expand and contract easily in summers without bucking.

9. Define conductor and insulator.

Ans: **Conductor.** A substance in which heat can easily passed are called conductor. e.g. Metals, Solids.

Insulator: A substance in which heat cannot easily passed are called insulator e.g wood, plastic, wool, fur, air etc.

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10. We wear cool sweater and wool clothes in winter, Why?

Ans: We wear cool sweater and wool clothes to keep our body warm because they trap the air inside it. Air being insulator do not allow heat to conduct easily. Heat is not lost by our body and we remain warm.

11. Write down some methods which used to insulate buildings?

Ans:

- 1) False ceiling below the roof.
- 2) By laying down reflectors or shining silver surface on the top of the roof. White washing the roof.
- 3) Thickness of the walls may be increased.
- 4) Nowadays, wall insulating panel are attached with the front walls.
- 5) Double glazed windows and doors are installed to reduce the heat transmission.

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TECHNOLOGY IN EVERY DAY

Questions and Activities

A. MCQs (Choose the correct option)

1. The Percentage of fresh water on earth is not more than only

- a. 2% b. 30%
c. 20% d. 25%

Ans: a. 2%

2. Drip irrigation system is useful for agriculture

- a. Spread equally
b. Reach roots directly
c. Sprinkles d. Evaporates

Ans: b. Reach roots directly

3. Given below from the list is not a way to preserve food.

- a. Freezing b. Pickling
c. Curing d. Garnishing

Ans: d. Garnishing

4. The best way to preserve vegetables is

- a. Salting b. Drying
c. Curing d. Pickling

Ans: b. Drying

5. The instrument used by doctors for listening to heart beats is called

- a. Stethoscope b. Microscope
c. Periscope d. Ophthalmoscope

Ans: a. Stethoscope

6. Which of the following is used for making a working model of a stethoscope

- a. Funnels, plastic tube, balloons and duct taps
b. Funnels and duct tape only
c. Tubing and duct tape only
d. Balloons and duct tape only

Ans: a. Funnels, plastic tube, balloons and duct taps

7. Use of hand sanitizer helps in

- a. Killing germs from the skin and keeping it safe
b. Removing germs
c. Keeping skin safe
d. Keeping skin moisturized

Ans: a. Killing germs from the skin and keeping it safe