PHYSICS

BOOKS - ICSE

HEAT

Solved Examples

1. The temperatures of two bodies differ by $10^{\circ} C$ on the Celsius scale. How much will they differ on the Fahrenheit scale

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2. The temperatures of two bodies differ by $10^{\circ} C$ on the Celsius scale. How much will they differ on the Kelvin scale ?

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3. Convert $10^{\circ} C$ in degree farhenheit

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4. Convert $10^{\circ} C$ in kelvin

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5. The normal temperature of human body is $37^{\circ} C$. What will be its value on the Fahrenheit scale?

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6. The normal temperature of human body is $37^{\circ} C$. What will be its value on the Kelvin scale ?

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7. The temperature of an object is 25° C. What will be its temperature in $^{\circ}$F?

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8. Temperature of the human body is 37°C Convert into $^{\circ}$F What will be its temperature in the Kelvin scale?

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9. Water freezes at 32°F What will be the temperature in degree Celsius and K

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10. The average temperature in Udhagamandalam (Ooty) is 74°F What is the temperature in the Celsius scale? What will be the temperature in K?

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Test Yourself True Or False

1. On touching a lump of ice, we feel cold because some heat passes from our body to

the ice

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2. Heat flows from a body at a high temperature to a body at a low temperature when they are kept in contact

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3. All solids expand by the same amount when heated to the same rise in temperature.

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4. Telephone wires are kept tight between two poles in summer

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5. Equal volumes of different liquids expand by different amounts when they are heated to the same rise in temperature.

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6. Solids expand the least and gases expand the most on being heated.

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7. A mercury thermometer makes use of the property of expansion of liquids on heating.

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8. Kerosene contracts on heating. Given statement is true or false?

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9. Water is a bad conductor of heat.

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10. Medium is necessary for the transfer of heat by radiation.

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11. Land and sea breezes are convection currents of cold and warm air.

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12. Liquids are heated by conduction and radiation.

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13. Black surfaces are poor absorbers of heat radiations.

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Test Yourself Fill In The Blanks

1. Heat is a form of.....

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2. ..... determines the degree of hotness or coldness of a body.

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3. On heating a body, its temperature.....

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4. We use a ..... for measuring the temperature of a body.

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5. The S.I. unit of temperature is .....

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6. In a thermometer, the commonly used liquid is.....

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7. The temperature of a normal human body is ..... $^{\circ}C$.

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8. A person is said to have fever if his body temperature is more than ..... $^{\circ}F$.

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9. A hot metallic piece is placed in tap water contained in a bucket. Heat will flow from .....to.....

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10. The temperature of boiling water is.....

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11. Liquids expand .....than solids

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12. Gases expand ..... than liquids.

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13. Heat transfer in solids is by.....

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14. Heat transfer in liquids and gases is by.....

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15. Metals are ..... of heat.

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16. Still air is an ..... of heat.

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17. Black and dull surfaces are ..... of heat.

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Test Yourself Match The Column

1. Match the following

Column A	Column B
(a) mercury	(i) insulator
(b) wood	(ii) water from 0°C to 4°C
(c) aluminium	(iii) absorbs
(d) contracts	(iv) conductor
(e) black surface	(v) thermometer

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Test Yourself Select The Correct

1. If we add a lump of ice to a tumbler containing water :

A. heat flows from water to ice

B. heat flows from ice to water

C. heat flows from water to ice if water is more

D. heat flows from ice to water if ice is more.

Answer: A

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2. The temperature of pure melting ice is :

A. $0^\circ C$

B. $100^\circ C$

C. $95^\circ C$

D. $98.6^\circ F$

Answer: A

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3. A thermometer uses :

A. water

B. mercury

C. air

D. none of the above

Answer: B

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4. Which statement is correct :

A. Iron rims are cooled before they are placed on cart wheels

B. A glass stopper gets tight on warming the neck of the bottle

C. Telephone wires sag in winter, but become tight in summer

D. A little space is left between two rails on a railway track.

Answer: D

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5. Heat in a liquid is transferred by :

A. conduction

B. convection

C. radiation

D. conduction and radiation

Answer: B

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6. In the process of convection, heat travels :

A. sideways

B. downwards

C. upwards

D. in all directions

Answer: C

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7. The vacuum kept in between the walls of a thermos flask reduces the heat transfer by :

A. conduction only

B. convection only

C. radiation only

D. conduction and convection.

Answer: D

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Test Yourself Short Long Answer Type Questions

1. What is heat ? State its S.I. unit

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2. What is meant by the term, temperature' ?

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3. State the three units of temperature.

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4. Name the instrument used to measure the temperature of a body.

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5. What is the Celsius scale of temperature ?

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6. What is the Fahrenheit scale of temperature ?

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7. What is the Kelvin scale of temperature ?

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8. How are the Celsius and Fahrenheit scales inter related ?

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9. How is the size of a degree defined on a Celsius scale ?

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10. How is the size of a degree defined on a Fahrenheit scale ?

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11. State the temperature of ice point, on the Celsius scale.

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12. State the temperature of steam point, on the Celsius scale.

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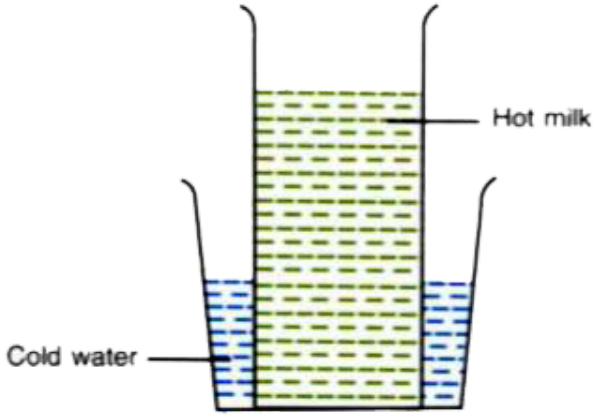
13. Write down the temperature of lower fixed point, on the Fahrenheit scale.

14. Write down the temperature of upper fixed point, on the Fahrenheit scale.

15. The Fig. shows a glass tumbler containing hot milk which is placed in a tub of cold water. State the direction in which heat will flow.



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16. Draw a neat labelled diagram of a laboratory thermometer

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17. Write down the body temperature of a healthy person.

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18. What do you understand by thermal expansion of a substance ?

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19. Name two substances which expand on heating.

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20. Why do telephone wires sag in summer ?

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21. Iron rims are heated before they are fixed on the wooden wheels. Explain the reason.

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22. Why are gaps left between successive rails on a railway track ?

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23. A glass stopper stuck in the neck of a bottle can be removed by pouring hot water on the neck of the bottle. Explain why?

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24. Why is a cement floor laid in small pieces with gaps in between?

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25. One end of a steel girder in a bridge is not fixed, but is kept on rollers. Give the reason.

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26. Describe one experiment to show that liquids expand on heating.

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27. State one application of thermal expansion of liquids.

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28. Describe an experiment to show that air expands on heating.

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29. An empty glass bottle is fitted with a narrow tube at its mouth. The open end of the tube is kept in a beaker containing water. When the bottle is heated, bubbles of air are seen escaping into the water. Explain the reason.

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30. State which expands more, when heated to the same temperature : solid, liquid or gas ?

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31. Name the three modes of transfer of heat.

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32. Name the mode of transfer of heat in the solid

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33. Name the mode of transfer of heat in the liquid

Watch Video Solution

34. Name the mode of transfer of heat in the gas

Watch Video Solution

35. Name the mode of transfer of heat in the vacuum

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36. What are good and bad conductors of heat ? Give two examples of each.

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37. Name a liquid which is a good conductor of heat.

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38. Name a solid which is a good conductor of heat.

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39. Select good and bad conductors of heat from the following: copper, mercury, wood, iron, air, saw-dust, cardboard, silver, plastic, wool.

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40. Why is an oven made of double walls with the space in between filled with cork ?

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41. Why do we use cooking utensils made up of copper ?

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42. Why is a tea kettle provided with an ebonite handle ?

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43. In summer, ice is kept wrapped in a gunny bag. Explain the reason.

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44. Explain why we wear woolen clothes in winter ?

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45. Explain why the water pipes are covered with cotton during very cold weather ?

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46. Why are quilts filled with fluffy cotton ?

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47. State the direction of heat transfer by way of convection.

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48. Ventilators are built high up in a room. Give reason.

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49. Why are chimneys provided over furnaces in factories?

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50. What are land and sea breezes ? Explain their formation.

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51. Why is the freezing chest in a refrigerator fitted near its top ?

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52. Explain briefly the process of heat transfer by radiation.

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53. Give one example of heat transfer by radiation.

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54. Give reason

We wear dark coloured clothes in winter and light coloured clothes in summer.

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55. The bottom of a cooking utensil is painted black. Give the reason.

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56. Draw a labelled diagram of a thermos flask. Explain how the transfer of heat by conduction, convection and radiation is reduced to a minimum in it.

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Test Yourself Numericals

1. The temperature of a body rises by $1^{\circ}C$. What is the corresponding rise on the

Fahrenheit scale

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2. If the temperature of an object rises by $1\ ^{\circ}C$, what is the corresponding rise in the Kelvin scale.

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3. The temperature rises by $18^{\circ}F$. What is the rise on the Celsius scale ?

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4. Convert $5^\circ F$ to the celsius scale

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5. Convert $40^\circ C$ to the fahrenheit scale

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6. Convert $40^\circ C$ to the kelvin scale

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7. Convert $-40^{\circ} F$ to the celsius scale.

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Questions

1. Match the following

1. Heat	i. 212 °F
2. Temperature	ii. 273 K
3. Boiling point of water	iii. 37 °C
4. Human body temperature	iv. Energy
5. Freezing point of water	v. Degree of hotness or coldness

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Questions Write T For True And F For False Correct The False Statements

1. Paper is a non-flammable substance.

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2. When you blow on a cold glass or a mirror, you can see the hot air condensing on it.

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3. Alcohol has a boiling point greater than the boiling point of water.

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4. Liquids can change into gas at any temperature when left in the open.

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5. A common method of food preservation, which slows down both food decay and growth of microorganisms.

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6. The conduction of heat can take place within an object or between any two objects in contact with each other. It stops when the objects obtain the same temperature

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7. The rate of conductivity of heat is same for all metals.

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8. Materials that trap air inside are bad conductors of heat.

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9. Heat radiations cannot travel through a vacuum.

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10. Dark, rough, and dull surfaces absorb radiation better than light, smooth, and shiny surfaces.

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11. A good reflector absorbs lots of radiant energy.

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12. A thermos flask keeps only hot things hot and cannot keep cold things cold.

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Questions Choose The Correct Option To Fill In The Blank

1. Generally all solids, liquids, and gases ..... (contract/expand) on heating and ..... (contract/expand) on cooling.

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2. Thermal expansion in gases is the ..... (least/most).

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3. Bridges are kept on rollers to allow for their expansion in (summer/ winter) and contraction in ..... (summer/winter).

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4. Some glasses do not break when heated because their thermal expansion is ..... (large/small) with temperature.

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Questions Choose The Correct Option To Fill In The Blank

1. Convection can occur only in fluids.

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2. Winds are caused by ..... (convection/conduction) currents.

Watch Video Solution

3. During the day, breeze tends to blow from the sea towards the land and is called ..... (land breeze/sea breeze).

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Exercise Section I

1. Name the following

Transfer of energy due to difference in temperature .

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2. Name the following

Degree of hotness of coldness of a body.

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3. Name the following

SI unit of temperature

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4. Name the following

Change of state from vapour to liquid .

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5. Name the following

The fixed temperature at which a liquid changes into vapour state .

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6. Name the following

Materials that do not conduct heat easily .

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Exercise Section I Choose The Correct Option

1. In the Fahrenheit scale, the difference between the freezing point and the boiling point of water is divided into

A. 100 equal parts

B. 273 equal parts

C. 180 equal parts

D. 212 equal parts

Answer:

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2. Water boils at

A. $100^\circ C$

B. $373K$

C. $212^\circ F$

D. All of these

Answer:

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3. Dew is formed due to

A. condensation of water vapour

B. melting of water vapour

C. solidification of water vapour

D. boiling of water

Answer:

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4. A common method of food preservation, which slows down both food decay and growth of microorganisms.

A. Boiling

B. Freezing

C. Melting

D. Sublimation

Answer:

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5. Which state of matter is absent in sublimation?

A. Solid

B. Liquid

C. Gas

D. Water

Answer:

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6. When objects attain the ..... temperature, they are said to be in a state of thermal equilibrium

A. same

B. different

C. zero

D. maximum

Answer:

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7. Conduction occurs mainly in:

A. Solids

B. Liquids

C. Gases

D. all of these states

Answer:

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8. The transfer of heat due to actual movement of particles as a result of temperature difference

A. Conduction

B. Convection

C. Radiation

D. Solidification

Answer:

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9. Clean snow is a good.... ..... of heat.

A. absorber

B. emitter

C. reflector

D. conductor

Answer:

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Exercise Section I Write T For True And F For False Correct The False Statements

1. Water freezes at 32° F

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2. There is no transfer of heat at thermal equilibrium.

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3. Heat changes the arrangement of particles in a substance when there is a change of state.

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4. Frost is formed due to sublimation.

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5. Water and air are good conductors of heat .

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6. Wood and plastic are good conductors of heat, so they are used to make handles of cookware.

Watch Video Solution

7. Convection can occur only in fluids.

Watch Video Solution

8. White or shining bodies are good reflectors of radiant energy

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9. Dirty snow melts very slowly

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10. Heat radiation can travel in all directions and does not require any medium

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Exercise Section I Choose The Correct Option To Fill In The Blank

1. The difference between the freezing point and the boiling point of water in the Kelvin scale is ..... (100 equal parts/273 equal parts).

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2. The minimum temperature at which a substance catches fire and starts burning is known as its ..... (inflammable temperature/ignition temperature)

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3. The change of state from a liquid into a vapour at a temperature below the boiling point is ..... (evaporation/condensation)

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4. Boiling and evaporation are examples of .....(vaporization/liquefaction).

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5. Freezing involves ..... (absorption of energy/release of energy)

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6. Generally solids .....(expand/contract) on cooling and .....(expand/ contract) on heating.

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7. Moth balls and camphor are materials that undergo .....(sublimation/vaporization).

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8. Different types of solids and liquids expand by ..... (same/different) amounts when given the same amount of heat.

Watch Video Solution

9. Good absorbers are ..... (bad/good) emitters of radiant heat.

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Exercise Section Ii Give Reason

1. Give reason

We use thermometers and not our hands to measure temperature

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2. Give reason

Evaporation causes cooling.

Watch Video Solution

3. Give reason

There are some glasses which do not break when heated.

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4. Mud houses are coller in summer and water in winter because

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5. Give reason

A bench made of aluminium feels colder than a wooden one.

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6. Give reason

A heater should be placed low in a room to warm the room.

Watch Video Solution

7. Give reason

We wear dark coloured clothes in winter and light coloured clothes in summer.

Watch Video Solution

8. Give reason

Petrol storage tanks are made of aluminium.

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Exercise Section Ii Distinguish Between

1. Distinguish between Flammable and non-fiammable

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2. Distinguish between Fahrenheit and Celsius scale

Watch Video Solution

3. Distinguish between Boiling and evaporation

Watch Video Solution

4. Distinguish between Good conductors and bad conductors of heat

Watch Video Solution

5. Distinguish between Conduction and convections

Watch Video Solution

6. Distinguish between Sea breeze and land breeze

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Exercise Section Ii Short Answer Questions

1. Give an example to show that heat is a form of energy.

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2. What do you mean by change of state? Name any two change of state.

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3. Telephone wires are laid a little loose in summer and a little tight in winter. Why?

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4. Explain why we wear woolen clothes in winter ?

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5. Write any two applications of good conductors of heat.

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6. Write two applications of bad conductors of heat.

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7. What do you mean by radiation of heat?

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Exercise Section Ii Long Answer Questions

1. What are the different scales for measuring temperature? Briefly describe each one of them.

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2. Explain melting, solidification, sublimation, and deposition with examples.

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3. Describe an experiment to prove that solids expands on heating and contract on cooling.

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4. Describe one experiment to show that liquids expand on heating.

Watch Video Solution

5. What is heat transfer ? Explain conduction of heat.

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6. Explain how convection happens in fluids.

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7. Write an experiment to prove that water is a bad conductor of heat.

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8. Write two practical applications of convection currents.

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9. What are the basic differences between , conduction, convection and radiation?

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10. Explain how heat transfer is reduced in a thermos flask.

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Exercise Section Ii Numerical Questions

1. Convert $86^{\circ} F$ to degree Celsius.

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2. Convert 122° F to degree Celsius and kelvin.

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3. A Kelvin scale reads temperature to be 318 K.

What is the temperature in $^{\circ}C$ and in $^{\circ}F$?

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4. India recorded its highest temperature of 51° C in the town of Phalodi, Rajasthan. Covert

into degree Farenheit.

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5. A patient's temperature is found to be $103^\circ F$. What is her temperature in degree Celsius?

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Exercise Picture

1. Give reason

Why does the balloon inflate when the bottle is put in hot water?

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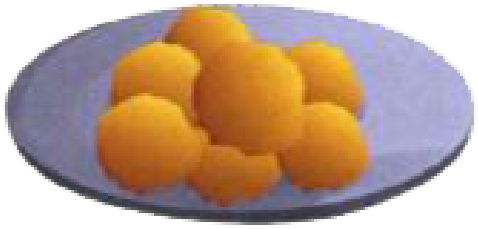
2. Give reason

Why do the pooris puff up in hot oil?



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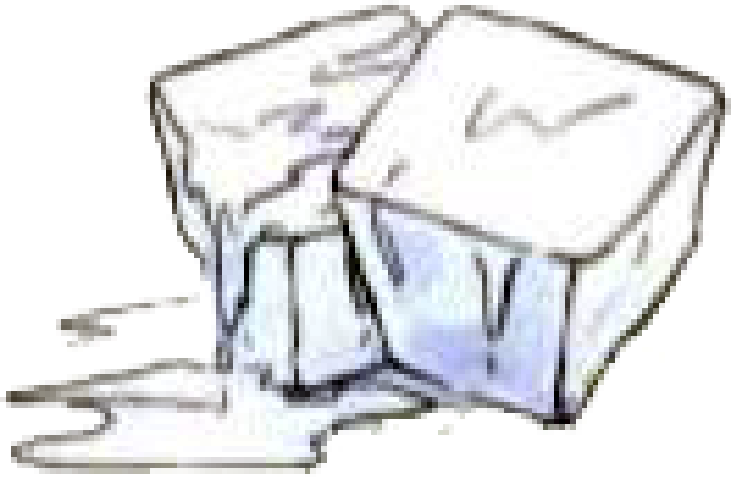
3. Name the change of state that happens in the following picture



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4. Name the change of state that happens in the following picture

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5. Name the change of state that happens in the following picture

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6. When paper is tightly rolled around an iron bar and then placed in a flame, the paper does

not catch fire. Explain.

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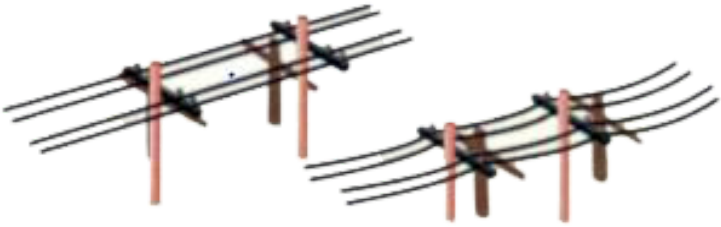
7. Telephone lines are laid in different ways in winter and summer. Explain.



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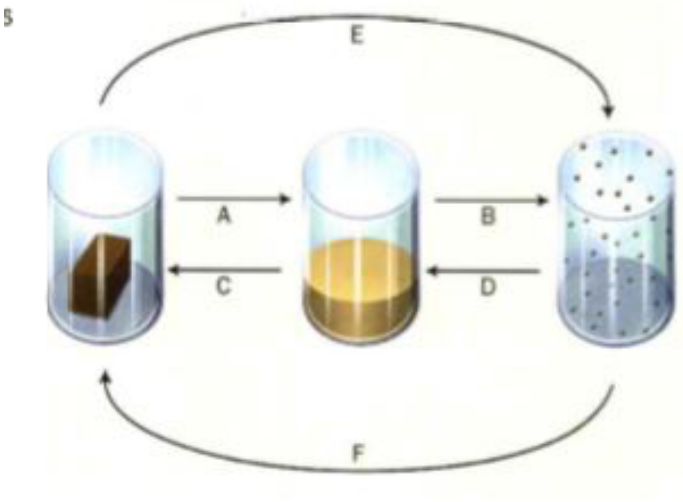
8. Write phase changes in the diagram.



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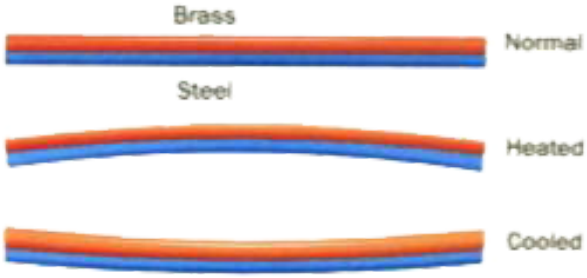
9. What is the name of the metallic strip shown alongside? Where is it used? Why does the strip bend to one side when heated and to the opposite side when cooled?



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10. When a beaker of water is heated with a bit of potassium permanganate at the bottom you can see purple coloured water move up and down in circular paths. Why?

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