PHYSICS

BOOKS - CENGAGE PHYSICS

HEAT AND TEMPERATURE

Examples

1. Our normal body temperature is $37^{\circ}C$. Express this value in Fahrenheit.

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2. Body A is at $30^\circ C$ and a similar body B is at $70^\circ C$. Find the equilibrium temperature.

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3. A plastic bucket contains 5 litres of water at $20^\circ C$. One litre of hot water at $80^\circ C$. is poured into it. Find the final temperature of water, given that the density of water is 1 kg/litre. Neglect the absorption of heat by the bucket and loss to the surrounding

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4. Find the rise in the temperature of 1.5 kg of water if 9000 J of heat is given to it. Given $C_{\text{Water}} = 4200 jkg^{-1}K^{-1}$.

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5. A hot iron ball of mass 0.2 kg is dropped into 2 kg of water at $20^{\circ}C$. The final temperature of water becomes $25^{\circ}C$ Calculate the initial temperature of iron.

$C_{\text{iron}} 480 Jkg^{-1}K^{-1}, C_{\text{water}} = 4200 Jkg^{-1}K^{-1}$

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6. A 1.5 kW water heater is used to heat 25 kg of water from $20^{\circ}C$ to $40^{\circ}C$. Find the time taken assuming there are no losses. $C_{(\text{water})} = 4200Jkg^{-1}K^{-1}$

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7. Find the heat needed to convert 10 g of ice at $0^{\circ}C$ to water at $20^{\circ}C$.

Given

$L_{(ice)} = 336 \times 10^{3}Jkg^{-1}, C_{(\text{water})} = 4200JkgK^{-1}$

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8. How much energy is needed to change 1 kg of ice at $-10^{\circ}C$ to stean at $100^{\circ}C$?

$C_{ice} = 2130 Jkg^{-1}, L_{ice} = 336 \times 10^{3} Jkg^{-1}$

$C_{\text{water}} = 4200 Jkg^{-1}K^{-1}, L_{\text{water}} = 2260 \times 10^{3} Jkg^{-1}$

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9. A copper wire of length 1 m is heated from $20^{\circ}C$ to $120^{\circ}C$. If the length increases by 1.7 mm, calculate it's α

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10. A ball of diameter 5.01 cm is placed on an iron ring of diameter 5 cm. What should be the increase in temperature of the ring so that the ball just passes through the ring?

$a_{(\text{iron})} = 12 \times 10^{-6} / {}^{\circ}C$

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11. Consider a cube of side L_1 at temperature $T_1{}^{\circ}C$. Let it be heated to a temperature $T_2{}^{\circ}C$ when the length becomes L_2 show that $g \approx 3a$.

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12. The density of mercury at $0^\circ C$ is $13.6 \times 10^3 kgm^3$. Find its density at $100^\circ C$ given $y = 1.8 \times 1^4 /^\circ C$

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Mandatory Exercise Exercise Set I

1. Heat always flows from a body having more thermal energy to another having less thermal energy. Is it true or false? Give reason.

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2. A body at higher temperature contains more thermal energy. Comment.

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3. Why the base of a cooking pan is made thick and heavy?

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4. In a solid kept at rest, the magnitude of average molecular displacement is about

A. $10^{-8}cm$

B. $10^{-6}cm$

C. 1 cm

D. 1mm

Answer: A

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5. SI unit of heat is

A. calorie

B. joule

C. watt

D. kelvin

Answer: B

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6. The temperature of $1^{\circ} C$ is same as

A. 1 K

B. $1^{\circ} F$

C. 274 K

D. 272 K

Answer: C

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7. The temperature difference of $1^{\circ}C$ is same as a difference of

A. 1 K

B. $1^{\circ}F$

C. 274 K

D. 272 K

Answer: A

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8. 1 Calorie equals

A. $4.186J$

B. $273.15J$

C. $1.8J$

D. $5/9J$

Answer: A

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9. Temperature of A is $100^\circ C$ and that of B is 250 K. When they are kept in contact, heat

A. flows from B to A

B. flows from A to B

C. flows from B to A only if B is bigger in size

D. flows from B to A only if A is bigger in size

Answer: B

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10. Convert $95^\circ F$ to $^\circ C$

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11. Convert 10 J to calorie.

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12. At what temperature do the Fahrenheit and Celsius scales give the same reading?

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13. A body has 600 J of thermal energy. 100 calorie of heat energy is added to it. What is its total thermal

energy?

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14. When two stones are rubbed together, they become hot. What is the source of energy for this increase in thermal energy?

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15. What is thermal energy of a substance?

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16. Two bodies with thermal energies 500 calories and 800 calories are brought in contact, then

A. Heat flown from lower energy to higher energ

B. Heat flown from higher energy to lower energy

C. No heat flow

D. Can't be predicted with given information

Answer: D

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17. Is the following statement accurate? 'This iron block has 2000 calories heat.

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18. What is the significance of the relation '1 calorie = 4.186 I?

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19. What is temperature?

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20. When are the two bodies in thermal equilibrium?

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21. Which of the following is not a unit of heat?

A. BTU

B. Joule

C. Watt

D. Calorie

Answer: C

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22. Can our skin be used as an accurate measure of temperature? Why?

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23. Give example, where human skin cannot be used as a thermometer.

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24. Explain the working of a Mercury thermometer.

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25. What are the fixed points used by Kelvin. Celsius and Fahrenheit scale?

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26. If the temperature is increased by $1^{\circ}C$, then the increase in Fahrenheit scale will be

A. $\frac{5}{9}^{\circ}F$

B. $\frac{9}{5}^{\circ}F$

C. $\frac{1}{5}^{\circ}F$

D. $\frac{1}{9}^{\circ}F$

Answer: B

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27. The temperature difference of $1^\circ F$ is same

A. 1 k

B. 273 k

C. $\frac{5}{3}k$

D. $\frac{9}{5}k$

Answer: C

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28. What are the melting and boiling points of water according to the three types of scales?

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29. Body A has the temperature $100^{\circ} F$ and body B has temperature 100 K. If they are brought in contact, then

A. heat flows from A to B

B. heat flows from B to A

C. no heat flows

D. depends on their thermal energies

Answer: A

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30. Melting point of iron is $1540^{\circ}C$. What is the melting point in Fahrenheit scale?

A. 2830

B. 284

C. 2766

D. 2724

Answer: B

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31. The temperature of a body is dependent on

A. density of the body

B. potential energy of molecules

C. mass of the body

D. kinetic energy of molecules

Answer: D

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32. At what temperature is the reading in Kelvin scale double the reading in Celcius scale.

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33. At what temperature is the reading in Kelvin scale half the reading in Celsius scale.

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Mandatory Exercise Exercise Set Ii

1. Why is ice at $0^{\circ} C$ more effective on cooling than water at $0^{\circ} C$ Justify.

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2. Which causes more severe burns, boiling water or steam? Explain.

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3. When 1 kg of water and mercury are given the same amount of heat, which one will have a greater rise in temperature? Justify.

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4. Specific heat capacity of an object depends on

A. its mass only

B. its material only

C. its mass and its material

D. the heat given to it

Answer: B

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5. Boiling point of water

A. is always $100^\circ C$

B. can only be $\leq 100^\circ C$

C. can only be $\geq 100^\circ C$

D. can be $< 100^\circ C,\ = 100^\circ C$ or $> 100^\circ C$

Answer: D

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6. Boiling point of water in a pressure cooker is

A. $100^\circ C$

B. $120^\circ C$

C. $0^\circ C$

D. $86^\circ C$

Answer: B

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7. 10 g of water at $20^\circ C$ is mixed with 20 g of water at $10^\circ C$ The resulting temperature is

A. $15^\circ C$

B. $< 15^\circ C$

C. $> 15^\circ C$

D. $30^\circ C$

Answer: B

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8. The value of a is numerically equal to the percentage change in length when the temperature of the rod is increased by

A. $1^\circ C$

B. 1K

C. 273 C

D. $100^\circ C$

Answer: D

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9. How much heat is required to rise the temperature of 20 g of mercury from $20^\circ C$ to $30^\circ C$?

$C_{\text{mercury}} = 140 Jkg^{-1}K^{-1}$

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10. Calculate the amount of ice that can be melted when 1 kg of steam at 100°C condenses to water at

$100^\circ C$.

$L_{ice} = 336 \times 10^3 Jkg^{-1}$ and $L_{\text{water}} = 2260 \times 10^3 Jkg^{-1}$

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11. The length of a rod increases from 50 cm to 50.12 cm, when its temperature is increased from $12^\circ C$ to $212^\circ C$. Calculate its coefficient of liner expansion.

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12. A hot iron ball of mass 200 g is cooled from 373 K to 303 K. If the heat lost is 3220 J, then what will be

the specific heat of iron?

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13. Two bodies A and B having same initial tempera ture are supplied with same current of heat. The final temperature of A is more than that of B, then

A. specific heat capacity of A is higher than B

B. specific heat capacity of B is higher than A

C. thermal capacity of A is higher than B

D. thermal capacity of B is higher than A

Answer: D

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14. The specific heat capacities of Aluminium and Iron are $900 Jkg^{-1}K^{-1}$ and $480 Jkg^{-1}K^{-1}$. If a block of aluminium and a block of Iron are supplied the same amount of heat, then

A. temperature rise is more in aluminium block

B. temperature rise is more in iron block

C. temperature rise is same in both blocks

D. information insufficient

Answer: D

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15. Water can be used as an efficient coolant. Explain.

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16. Sea breeze maintains a moderate climate near sea shors. Explain.

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17. Why is the bulb of a thermometer made small?

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18. In a building with two floors, the ground floor is cooler than the first floor. Explain.

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19. The principle of calorimetry is basically

A. conservation of mass

B. conservation of energy

C. conservation of momentum

D. conservation of charge

Answer: B

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20. Under what condition, is the principle of calorimetry not valid?

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21. What is melting point or freezing point of any material?

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22. What is boiling point of any material?

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23. What is sublimation? Give example.

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24. Phase change is a constant temperature process. Explain.

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25. For a fixed mass of water, at what temperature will the volume become least?

A. $0^\circ C$

B. $4^\circ C$

C. $54^\circ C$

D. $100^\circ C$

Answer: B

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26. A block of ice at $0^\circ C$ is converted to steam at $100^\circ C$. Which process will require the most amount of heat?

A. Melting the block

B. Increasing temperature from $0^\circ C$ to $100^\circ C$

C. Boiling the water

D. Data insufficient

Answer: C

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27. What would happen to glacial rivers if the latent heat for fusion of water is decreased suddenly?

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28. What will be the boiling point of water at the top of a mountain?

A. $100^\circ C$

B. $> 100^\circ C$

C. $< 100^\circ C$

D. Can't be determined

Answer: C

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29. What will be the melting point of water at the top of a mountain?

A. $0^\circ C$

B. $> 0^\circ C$

C. $< 0^\circ C$

D. Can't be determined

Answer: B

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30. Atoms are in constant

A. translation motion

B. rotation motion

C. vibration motion

D. all of these

Answer: D

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31. If melting point and boiling point overlap, then the process is called

A. evaporation

B. evaporation

C. condensation

D. sublimation

Answer: C

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32. The rise in temperature of a body depends on

A. heat supplied

B. nature of material

C. mass of the body

D. all of these

Answer: D

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33. For any material in genera

A. $L_f > L_v$

B. $L_f < L_v$

C. $L_f = L_v$

D. none of these

Answer: B

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34. How much heat is required to convert 1 kg ice at $0^\circ C$ to steam at $100^\circ C$?

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35. 20 g of a substance is melted when 500 J of heat is added. What is the specific latent heat of fusion of the substance?

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36. A bullet of mass 2 kg and speed 10 m/s hits a large block of ice at $0^{\circ}C$ and stops. If all the KE of bullet converts to heat, find the amount of ice that melted.

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Mandatory Exercise Exercise Set Iii

1. Is it possible to boil water below $100^{\circ}C$? If so, how?

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2. Give scientific reasons for the following.

Small gaps are left near the joints between the rails in a railway track.

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3. Give scientific reasons for the following.

Ice floats on water, whereas solid wax sinks in molten

wax.

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4. Give scientific reasons for the following.

Telephone wires sag more in summer.

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5. Give scientific reasons for the following.

Loops are provided in metal pipelines used in factories.

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6. Give scientific reasons for the following.

Food is cooked faster in a pressure cooker.

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7. Give scientific reasons for the following.

Melting point of ice decreases on application of pressure.

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8. Give scientific reasons for the following.

Pipes carrying water sometimes burst during frosty

weather.

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9. Give scientific reasons for the following.

Aquatic plants and animals can live in water even during very cold season.

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10. Give scientific reasons for the following.

ice is slippery.

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11. Give scientific reasons for the following.

Water in an earthen pot becomes cool in summer.

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12. The coefficient of linear expansion for brass is $0.000018/^{\circ}C$. Explain the meaning of this statement.

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13. The relation between β and γ of a solid is

A. $3\beta = 2\gamma$

B. $\beta = 2\gamma$

C. $\gamma = 2\beta$

D. $\gamma = 3\beta$

Answer: A

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14. When ice is converted to water____ changes.

A. volume

B. temperature

C. mass

D. latent heat

Answer: A

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15. When water is heated from $0^{\circ} C$, its volume

A. increases

B. does not change

C. first increases and then decreases

D. first decreases and then increases

Answer: D

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16. The density of water is maximum at:

A. $4^\circ C$

B. $0^\circ C$

C. $100^\circ C$

D. $-10^\circ C$

Answer: A

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17. A plate with a hole is heated. The diameter of the hole

A. increases

B. does not change

C. first increases and then decreases

D. first decreases and then increases

Answer: B

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18. The pendulum of a clock is made of a thin iron rod.

On a hot day the clock will

A. run fast

B. runs slow

C. give accurate time

D. not work

Answer: B

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19. Stars A and B appear to be blue and red in colour, respectively. Then one can infer that

A. star A is hotter than B

B. star B is hotter than A

C. the colour has no relevance to temperature of the star

D. they may have equal temperature

Answer: B

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20. While making homemade ice cream, salt is added to the ice in the container. Why?

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21. Matter expands on heating. Explain

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22. What is the temperature at the bottom of deep lakes and seas?

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23. Explain the importance of anomalous expansion of water to maintain the biodiversity of marine life.

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24. How does a bimetallic strip function?

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25. The length of a piece of wood is measured with a metallic scale on a hot day. The measured value will be

A. more than original value

B. less than original value

C. equal to original value

D. can't predict

Answer: B

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26. The length of a piece of metal is measured with a wooden scale on a hot day. The measured value will be

A. more than original value

B. less than original value

C. equal to original value

D. can't predict

Answer: A

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27. The coefficient of linear expansion for a material is $2 \times 10^{-5} / ^{\circ} C$. What will be the percentage change of area if temperature is increased by $100^{\circ} C$?

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28. Show that density varies with temperature as $\rho_2 = \rho_1(1 - \gamma\Delta T)$ for small change in temperature.

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29. Thermal capacity of an object depends on

A. mass only

B. material only

C. both mass and material

D. heat given to it

Answer: C

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Consolidated Exercise

1. The oceans are the reservoir from which water (1) _____ into the atmosphere to later (2) _____ as rain and snow. Oceans play a major role in moderating the earth's temperature and climate. Because of (3) _____ of water, water is slow to heat up or cool down. When water cools down, a large amount of heat is (4) _____ the surroundings. On the other hand, water (5) _____ great deal of heat before its temperature increases. The large heat capacity is the reason that land bordering the oceans experiences (6)_____

temperatures. The moderating influence of the oceans can be seen when we look at seasonal temperature variations for two cities at the same latitude, with one in the coastal region and the other in the continental region. The city in the continental part experiences strong seasonal fluctuations (7) _____winters and (8) _____ summers. The oceans do a great job of both making summers (9) _____ and winter (10) ____ for a city in the coastal region.

(a) large heat capacity

(b) cooler

(c) cold (d) evaporates

(e) moderate (f) absorbs

(g) warmer (h) hot

(i) precipitate (j) transferred to

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2. Match the following:

Column A	Column B
(1) Thermal energy	(a) $\alpha = \frac{\Delta Q}{m}$
(2) Heat	(b) Two bodies in contact attain the same temperature
(3) Temperature	(c) Expansion in the volume of water below 4 °C
(4) Thermal equilibrium	(d) Degree of hotness
(5) Thermometer	(e) KE + PE
(6) Specific heat capacity	(f) Heat lost by the body = heat gained by the cold body
(7) Principle of calorimetry	(g) Thermal energy that is transferred
(8) Specific latent heat	(h) $C = \frac{\Delta Q}{m\Delta T}$
(9) Anomalous expansion of water	(i) Device that measures temperature

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3. Rankine scale is a temperature scale which takes the absolute zero of temperature as $0^\circ R$ and the magnitude of one part in Rankine scale is same as that in Fahrenheit scale.

Answer the following questions linked with the above statement

How much is $0^\circ R$ (absolute zero) equal to in Fahrenheit scale.

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4. Rankine scale is a temperature scale which takes the absolute zero of temperature as $0^\circ R$ and the

magnitude of one part in Rankine scale is same as that in Fahrenheit scale.

Answer the following questions linked with the above statement

What is the relation between temperature in Fahrenheit scale and temperature in Rankine scale?

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5. Rankine scale is a temperature scale which takes the absolute zero of temperature as $0^{\circ} R$ and the magnitude of one part in Rankine scale is same as that in Fahrenheit scale.

Answer the following questions linked with the above

statement

What is the melting point of water in Rankine scale?

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6. Rankine scale is a temperature scale which takes the absolute zero of temperature as $0^{\circ} R$ and the magnitude of one part in Rankine scale is same as that in Fahrenheit scale.

Answer the following questions linked with the above statement

What is the boiling point of water in Rankine scale?

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7. Rankine scale is a temperature scale which takes the absolute zero of temperature as $0^{\circ} R$ and the magnitude of one part in Rankine scale is same as that in Fahrenheit scale.

Answer the following questions linked with the above statement

How many parts can the interval between boiling point and freezing point of water be divided into in Rankine scale?

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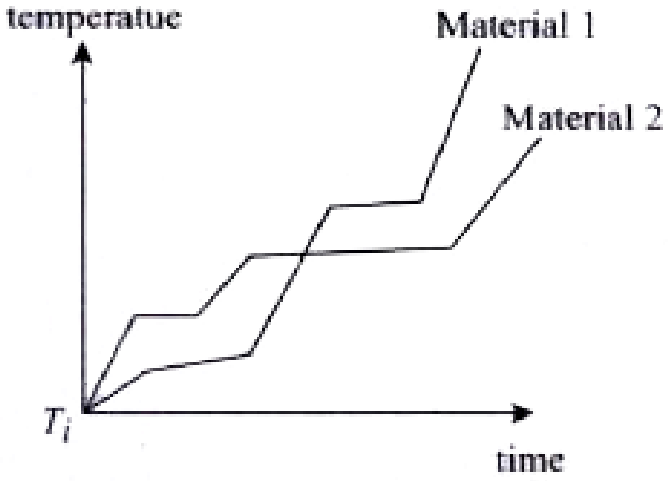
8. Two solid blocks having same mass but different material are supplied heat at a constant rate. They have same initial temperature. The graph between temperature and time is shown.



Answer the following questions on the basis of information given in the above statement.

Which material has higher specific heat capacity in solid state?

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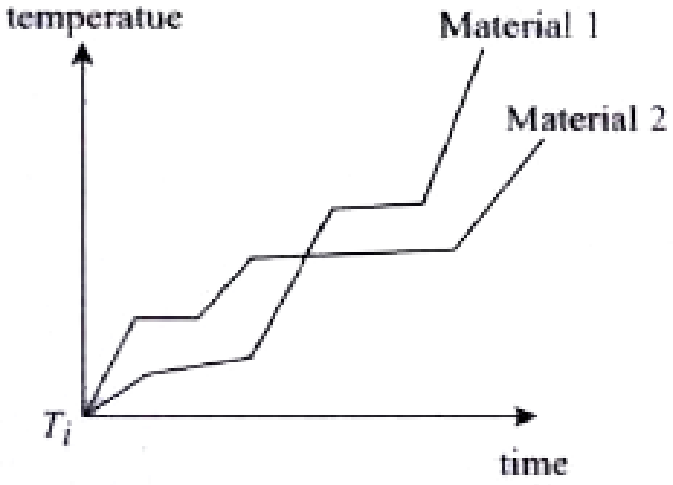
9. Two solid blocks having same mass but different material are supplied heat at a constant rate. They have same initial temperature. The graph between temperature and time is shown.



Answer the following questions on the basis of information given in the above statement.

Which material has higher specific heat capacity in liquid state?

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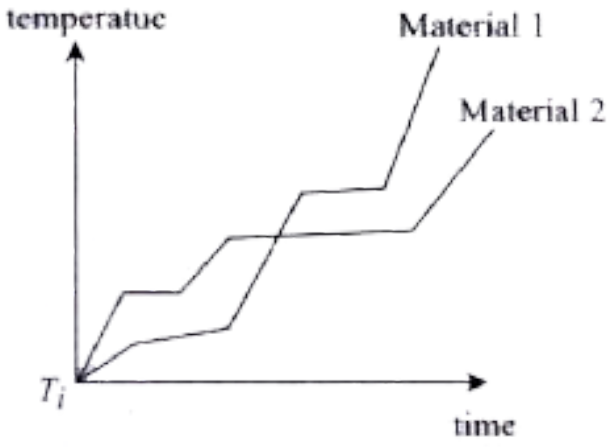
10. Two solid blocks having same mass but different material are supplied heat at a constant rate. They have same initial temperature. The graph between temperature and time is shown.



Answer the following questions on the basis of information given in the above statement.

Which material has higher specific heat capacity in gaseous state?

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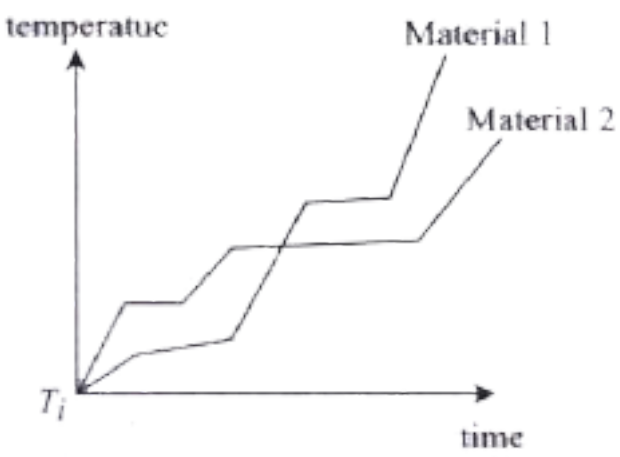
11. Two solid blocks having same mass but different material are supplied heat at a constant rate. They have same initial temperature. The graph between temperature and time is shown.



Answer the following questions on the basis of information given in the above statement.

Which material has higher latent heat of fusion?

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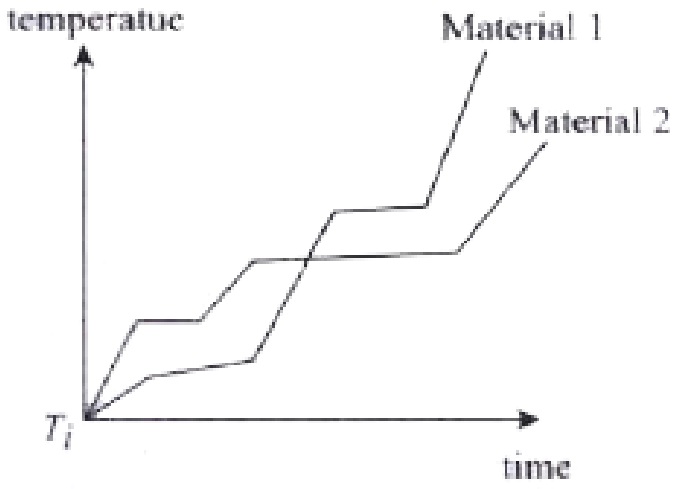
12. Two solid blocks having same mass but different material are supplied heat at a constant rate. They have same initial temperature. The graph between

temperature and time is shown.



Answer the following questions on the basis of information given in the above statement.

Which material has higher latent heat of vaporisation?

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Consolidated Exercise Multiple Choice Questions With One Or More Than One Correct Answer

1. If heat a supplied to a solid, its temperature

A. must increase

B. may increase

C. may remain constant

D. may decrease

Answer: A::B::C::D

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2. The heat capacity of a body depends on

A. the heat supplied

B. the temperature raised

C. the mass of the body

D. the material of the body

Answer: A::C::D

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3. The temperature of a solid object is observed to be constant during a period .In this period

A. heat may have been supplied to the body

B. heat may have been extracted from the body

C. no heat is supplied to the body

D. no heat is extracted from the body

Answer: A::B::D

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4. The temperature of an object is observed to rise in a period. In this period,

A. heat is certainly supplied to it

B. heat is certainly not supplied to it

C. heat may have been supplied to it

D. work may have been done on it

Answer: A::C::D

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Challenging Exercise

1. A brass piece of 0.1 kg at $100^\circ C$ is dropped into 0.25 kg of water at $20^\circ C$. The final temperature is $23^\circ C$ Calculate C_{brass} given $C_{\text{water}} = 4180 Jkg^{-1}K^{-1}$.

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2. A 15 g ice cube at $0^{\circ}C$ is dropped into 100 g of water at $30^{\circ}C$. Calculate the final temperature of water after the full ice has melted, given $L_{ice} = 336 \times 10^{3} Jkg^{-1}, C_{\text{water}} = 4200 Jkg^{-1}K^{-1}$

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3. A 1 kg hammer with a velocity of $50ms^{1}$ strikes a 100 g iron nail driving it into a block of wood. If half of the energy of the hammer goes into heating the nail, find the rise in its temperature, given $C_{\text{iron}} = 480 Jkg^{-1}K^{-1}$

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4. An iron rod of length $50cm$ is joined at an end to an aluminium rod of length $100cm$. All measurements refer to $20^\circ C$. Find the length of the composite system at $100^\circ C$ and its average coefficient of linear expansion. The coefficient of linear expansion of iron and aluminium are $12 \times 10^{-6}/^\circ C$ and $24 \times 10^{-6}/^\circ C$ respectively.

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5. An iron ring measuring 15.00 cm in diameter is to be shrunk on a pulley which is 15.05 cm in diameter. All measurements refer to the room temperature $20^\circ C$.

To what minimum temperature should the ring be heated to make the job possible? Calculate the strain developed in the ring when it comes to the room temperature. Coefficient of linear expansion of iron $= 12 \times 10^{-6} /^{\circ} C$

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Olympiad And Ntse Level Exercises

1. A pendulum clock keeps correct time at $0^{\circ} C$. Its mean coefficient of linear expansions is $\alpha /.^{\circ} C$, then the loss in seconds per day by the clock if the temperature rises by $t^{\circ} C$ is

A. $\frac{\frac{1}{2}\alpha t \times 864000}{1-\frac{\alpha t}{2}}$

B. $\frac{1}{2}\alpha t \times 86400$

C. $\frac{\frac{1}{2}\alpha t \times 86400}{\left(1-\frac{\alpha t}{2}\right)^2}$

D. $\frac{\frac{1}{2}\alpha t \times 86400}{1+\frac{\alpha t}{2}}$

Answer: B

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2. A vertical column 50 cm long at $50^\circ C$ balances another column of same liquid 60 cm long at $100^\circ C$. The coefficient of absolute expansion of the liquid is

A. $0.005/^{\circ}C$

B. $0.0005/^{\circ}C$

C. $0.002/^{\circ}C$

D. $0.0002/^{\circ}C$

Answer: A

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3. Two liquid A and B are at $32^{\circ}C$ and $24^{\circ}C$. When mixed in equal masses the temperature of the mixture is found to be $28^{\circ}C$. Their specific heats are in the ratio of

A. $3:2$

B. $2:3$

C. $1:1$

D. $4:3$

Answer: C

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4. 0.93 watt - hour of energy is supplied to a block of ice weighing 10 gm. It is found that

A. Half of the block melts

B. The entire block melts and the water attains a temperature of $4^\circ C$

C. The entire block just melts

D. The block remains unchanged

Answer: C

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5. 300 grams of water at $25^\circ C$ is added to 100 grams of ice at $0^\circ C$. The final temperature of the mixture is _____ $\hat{}\ \circ C$

A. $-\frac{5}{3}^\circ C$

B. $-\frac{5}{2}^{\circ}C$

C. $-5^{\circ}C$

D. $-0^{\circ}C$

Answer: D

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6. An iron tyre is to be fitted onto a wooden wheel 1.0 m in diameter. The diameter of the tyre is 6 mm smaller than that of wheel the tyre should be heated so that its temperature increases by a minimum of (coefficient of volume expansion of iron is $3.6 \times 10^{-5}/^{\circ}C$)

A. $167^\circ C$

B. $334^\circ C$

C. $500^\circ C$

D. $1000^\circ C$

Answer: C

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7. Two rods having length l_1 and l_2 made of materials with the linear expansion coefficient α_1 and α_2 were soldered together. The equivalent coefficients of linear expansion for the obtained rod

A. $\frac{l_1\alpha_2 + l_2\alpha_1}{l_1 + l_2}$

B. $\frac{l_1\alpha_1 + l_2\alpha_2}{\alpha_1 + \alpha_2}$

C. $\frac{l_1\alpha_1 + l_2\alpha_2}{l_1 + l_2}$

D. $\frac{l_2\alpha_1 + l_1\alpha_2}{\alpha_1 + \alpha_2}$

Answer: C

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8. In a container of negligible heat capacity, 200 g ice at $0^\circ C$ and 100 g steam at $0^\circ C$ are added to 200 g of water that has temperature $55^\circ C$ Assume no heat is lost to the surroundings and the pressure in the

container is constant 1.0 atm.

What is the final temperature of the system?

A. $48^\circ C$

B. $72^\circ C$

C. 94°

D. $100^\circ C$

Answer: D

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9. In a container of negligible heat capacity, 200 g ice at $0^\circ C$ and 100 g steam at $0^\circ C$ are added to 200 g of

water that has temperature $55^{\circ}C$ Assume no heat is lost to the surroundings and the pressure in the container is constant 1.0 atm.

At the final temperature, mass of the total water present in the system, is

A. $472.6g$

B. $483.3g$

C. $493.6g$

D. $500g$

Answer: B

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10. In a container of negligible heat capacity, 200 g ice at $0^\circ C$ and 100 g steam at $0^\circ C$ are added to 200 g of water that has temperature $55^\circ C$ Assume no heat is lost to the surroundings and the pressure in the container is constant 1.0 atm.

Three liquids A, B and C having same specific heat and mass m, 2m and 3m have temperature $20^\circ C, 40^\circ C$ and $60^\circ C$ respectively. Temperature of the mixture when

	Column I		Column II
(i)	A and *B* are mixed	(p)	35°C
(ii)	A and *C* are mixed	(q)	52°C
(iii)	B and *C* are mixed	(r)	50°C
(iv)	A, *B* and *C* all three are mixed	(s)	45°C
		(t)	None

Now match the given columns and select the correct

option the codes given below.

	i.	ii.	iii.	iv.
(A)	t	s	q	r
(B)	t	r	q	t
(C)	q	r	s	t
(D)	p	q	r	s

A. A

B. B

C. C

D. D

Answer: B

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