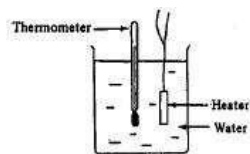
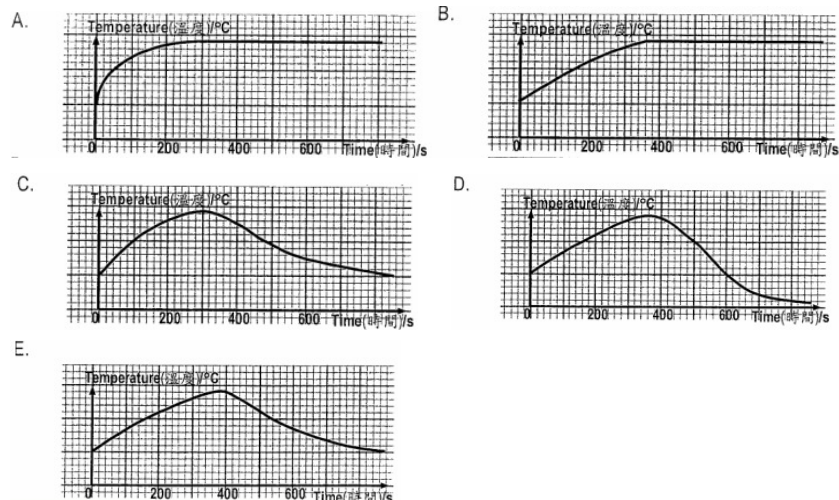


1. 1992/II/20



In the above diagram, the water is initially at room temperature. The electric beaker is switched on for 300 seconds and then switched off. Which of the following graphs correctly describes the variation of the reading of the thermometer?



2. 1993/II/16

Water is used as a coolant in motor car engines because

- A. Water has a low specific heat capacity.
- B. Water has a high specific heat capacity.
- C. Water has a low specific latent heat of vaporization
- D. Water has a high specific latent heat of vaporization
- E. Water is non-volatile.

3. 1993/II/18

16500 J of energy is supplied to a metal block of mass 0.5 kg and its rise in temperature is 64°C. The specific heat capacity of the metal is

- A.  $\frac{16500 \times 0.5}{64} \text{ J kg}^{-1} \text{ K}^{-1}$
- B.  $\frac{16500 \times 64}{0.5} \text{ J kg}^{-1} \text{ K}^{-1}$
- C.  $\frac{16500}{64 \times 0.5} \text{ J kg}^{-1} \text{ K}^{-1}$
- D.  $\frac{16500}{(64 + 273) \times 0.5} \text{ J kg}^{-1} \text{ K}^{-1}$
- E.  $\frac{16500 \times 0.5}{64 + 273} \text{ J kg}^{-1} \text{ K}^{-1}$

4. 1994/II/16

An equal amount of energy is supplied to each of the following substances. Which one of them will have the smallest rise in temperature?

	Substance	Mass/kg	Specific heat capacity/ $\text{J kg}^{-1} \text{ K}^{-1}$
A.	P	1	4200
B.	Q	2	2300
C.	R	3	2200
D.	S	4	900
E.	T	5	480

5. 1995/II/18

Which of the following statements about heat is/are true?

- (1) Heat is used to describe the total energy stored in a body.
- (2) Heat is used to describe the energy transferred from one body to another as a result of temperature difference between them.
- (3) A body's internal energy is increased when it is heated.

- A. (1) only    B. (2) only    C. (1) and (3) only    D. (2) and (3) only    E. (1), (2) and (3)

6. 1996/II/18

Which of the following phenomenon concerning water can be explained by its high specific heat capacity?

- (1) Water is used as a coolant in car engines
- (2) Inland areas generally have hotter summers and cooler winters than coastal areas of similar latitude and altitude.
- (3) The body temperature of human beings changes slowly even when the surrounding temperature changes sharply.

- A. (2) only    B. (3) only    C. (1) and (2) only    D. (2) and (3) only    E. (1), (2) and (3)

7. 1996/II/43

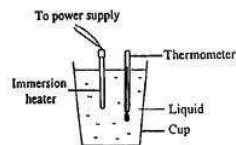
**1<sup>st</sup> statement**

The internal energy of a body always increased when the body is heated.

**2<sup>nd</sup> statement**

The temperature of a body always increased when the body is heated.

8. 1997/II/19



The above apparatus is used to find the specific heat capacity of a liquid. Which of the following can improve the accuracy of the experiment?

- (1) Taking the final temperature of the liquid immediately after switching off the power supply.
- (2) Covering the cup with a lid.
- (3) Stirring the liquid throughout the experiment.

A. (1) only    B. (3) only    C. (1) and (2) only    D. (2) and (3) only    E. (1), (2) and (3)

9. 1997/II/20

An immersion heater of power 100 W is used to heat 0.3 kg of a liquid with specific heat capacity  $2000 \text{ kg}^{-1} \text{ K}^{-1}$ . If the initially temperature of the liquid is  $23^\circ\text{C}$ , find its temperature after 2 minutes. Assume all the energy is absorbed by the liquid.

- A.  $(0.3 \times 2000 \times 23)^\circ\text{C}$     B.  $(\frac{0.3 \times 2000 \times 23 \times 2}{100})^\circ\text{C}$     C.  $(\frac{100 \times 120 \times 0.3}{2000} + 23)^\circ\text{C}$
- D.  $(\frac{100 \times 120}{0.3 \times 2000} + 23)^\circ\text{C}$     E.  $(\frac{0.3 \times 2000}{100 \times 120} + 23)^\circ\text{C}$

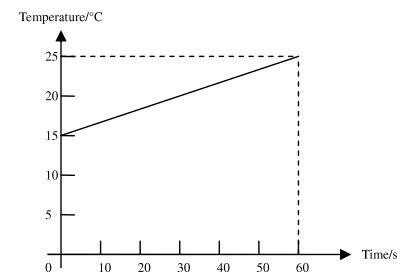
10. 1998/II/19

Which of the following statement about latent energy, heat and temperature is/are true?

- (1) The internal energy of a body is a measure of the total kinetic and potential energy of the molecules in the body.
- (2) Two bodies of the same temperature always have the same amount of internal energy.
- (3) Heat is a measure of the energy transferred from one body to another as a result of temperature difference between the two bodies

A. (1) only    B. (2) only    C. (1) and (3) only    D. (2) and (3) only    E. (1), (2) and (3)

11. 1998/II/21



The above graph shows the variation of the temperature of a liquid with time when the liquid is heated by a 400 W heater. The mass of the liquid is 2 kg. Find the specific heat capacity of the liquid.

- A.  $83 \text{ J kg}^{-1} \text{ K}^{-1}$     B.  $480 \text{ J kg}^{-1} \text{ K}^{-1}$     C.  $1200 \text{ J kg}^{-1} \text{ K}^{-1}$     D.  $2400 \text{ J kg}^{-1} \text{ K}^{-1}$     E.  $12000 \text{ J kg}^{-1} \text{ K}^{-1}$

12. 1998/II/43

**1<sup>st</sup> statement**

The temperature of a pool of water changes slowly even when the temperature of the surroundings changes rapidly.

**2<sup>nd</sup> statement**

Water has a high specific heat capacity.

13. 1998/II/44

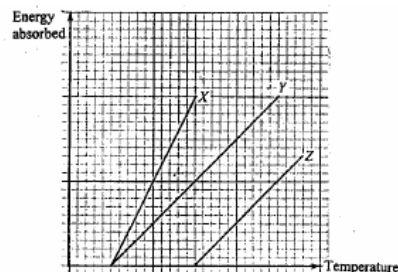
**1<sup>st</sup> statement**

When hot water is mixed thoroughly with cold paraffin in a polystyrene cup, the energy gained by the paraffin is equal to the energy lost by the water.

**2<sup>nd</sup> statement**

When hot water is mixed thoroughly with cold paraffin in a polystyrene cup, the changes in temperature of the water and paraffin are identical.

14. 1999/II/16



The above graph shows the variation of the energies absorbed by the liquids with their temperature.

Let  $c_x$ ,  $c_y$  and  $c_z$  be the specific heat capacities of X, Y and Z respectively. Which of the following is correct?

- A.  $c_x = c_y > c_z$       B.  $c_x = c_y < c_z$       C.  $c_x > c_y > c_z$       D.  $c_x > c_y = c_z$       E.  $c_x < c_y = c_z$

15. 1999/II/44

**1<sup>st</sup> statement**

Two bodies of the same temperature always have the same amount of internal energy.

**2<sup>nd</sup> statement**

The internal energy of a body is the sum of kinetic and potential energy of the molecules in the body.

16. 2000/II/20

Equal mass of five different liquids are separately heated at the same rate. The initial temperature of all the liquids are all 20°C. The boiling points and specific heat capacities of the liquids are shown below.

Which one of them will boil first?

	Liquid	Boiling point / °C	Specific heat capacity / J kg <sup>-1</sup> K <sup>-1</sup>
A.	P	50	1000
B.	Q	60	530
C.	R	80	850
D.	S	80	1710
E.	T	360	140

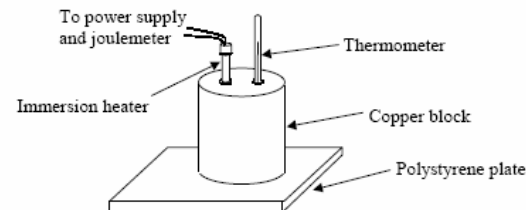
17. 2001/II/16

A melting ice block of mass 0.05 kg is mixed with  $x$  kg of water at 0°C in a well-insulated container. If 25000 J of energy is supplied to the mixture, the mixture changes to water at 4°C. Find the value of  $x$ .

(Given : specific latent heat of fusion of ice =  $3.34 \times 10^5$  J kg<sup>-1</sup>,  
specific heat capacity of water = 4200 J kg<sup>-1</sup> K<sup>-1</sup>)

- A. 0.37      B. 0.44      C. 0.49      D. 1.44      E. 1.49

18. 2001/II/17



The above apparatus is used to find out the specific heat capacity of a copper block. The result is as follows:

Mass of copper block =  $m$  kg

Initial temperature = 21°C

Final temperature = 47°C

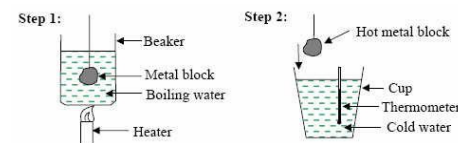
Initial joulemeter reading =  $R_1$  J

Final joulemeter reading =  $R_2$  J

Which of the following expressions give the specific heat capacity of copper (in J kg<sup>-1</sup> K<sup>-1</sup>)?

- A.  $26m(R_1 - R_2)$       B.  $\frac{R_1 - R_2}{26m}$       C.  $\frac{R_2 - R_1}{26m}$       D.  $\frac{m(R_1 - R_2)}{26}$       E.  $\frac{m(R_2 - R_1)}{26}$

19. 2002/II/20



(For question 20 and 21) The specific heat capacity of a metal is measured using this method :

A metal block is first immersed in boiling water for some time. The block is then transferred to a cup of cold water. After a while, the temperature of the water is measured.

The result of the experiment is as follows:

Mass of metal block = 0.8 kg

Mass of water in the cup = 0.3 kg

Initial temperature of water in the cup = 23°C

Final temperature of water in the cup = 38°C

Find the specific heat capacity of the metal (in J kg<sup>-1</sup> K<sup>-1</sup>)

(Given : Specific heat capacity of water = 4200 J kg<sup>-1</sup> K<sup>-1</sup>)

- A. 236      B. 381      C. 622      D. 953

20. 2002/II/21

The result obtained in Q.19 is found to be higher than the true value of the specific heat capacity of the metal. Which of the following is a probable reason?

- A. Some hot water is still adhered to the metal block when the block is transferred to cold water.
- B. Some energy is lost to the surroundings when the metal block is transferred to cold water.
- C. Some energy is absorbed by the cup.
- D. The temperature of the metal block is still higher than 38°C when the final temperature of the water in the cup is measured.

21. 2003/II/19

If there is no heat flow between two bodies when they are in contact, then two bodies must have the same

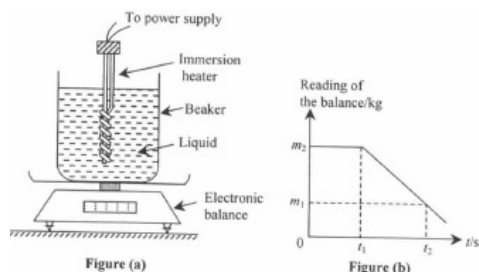
- A. temperature B. internal energy C. specific heat capacity D. specific latent heat of vaporization

22. 2003/II/20

The difference in absolute temperature of two bodies is 100 K. Express the temperature difference in degree Celsius.

- A. -173°C B. 100°C C. 273°C D. 373°C

23. 2003/II/21



As shown in Figure(a), some liquid in a beaker is heated by a 1000 W immersion heater. Figure(b) shows the variation of the reading of the electronic balance with time  $t$ . Which of the following statement about the liquid is **incorrect**?

- A. It starts to boil at  $t = t_1$
- B. Its temperature increases during the period  $t = 0$  to  $t_1$
- C. Its specific heat capacity can be estimated by  $\frac{1000 t_1}{m_2}$
- D. Its specific latent heat of vaporization can be estimated by  $\frac{1000(t_2 - t_1)}{m_2 - m_1}$

24. 2004/II/44

**1<sup>st</sup> statement**

The watery fluids in human bodies help to maintain their body temperature even when the surroundings

**2<sup>nd</sup> statement**

The watery fluids in human bodies have a high specific heat capacity.

temperature changes sharply

25. 2005/II/27

**1<sup>st</sup> statement**

When two objects are in contact, there must be heat transfer from the object with more internal energy to the one with less internal energy.

**2<sup>nd</sup> statement**

The internal energy of an object increases with its temperature.

26. 2005/II/33

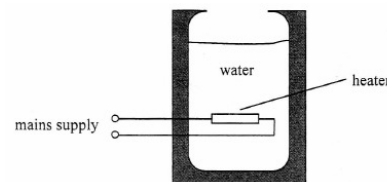
If equal masses of boiling water and melting ice cubes are mixed, which of the following best describe the state of the mixture?

Note : Specific heat capacity of water =  $4200 \text{ J kg}^{-1} \text{ K}^{-1}$ ,

Specific latent heat of fusion of ice =  $3.34 \times 10^5 \text{ J kg}^{-1}$

- A. Water at 0 °C
- B. Water at a temperature higher than 0°C
- C. A mixture of water and ice at 0°C
- D. It cannot be determined since the masses of the water and ice are not given.

27. 2007/II/8



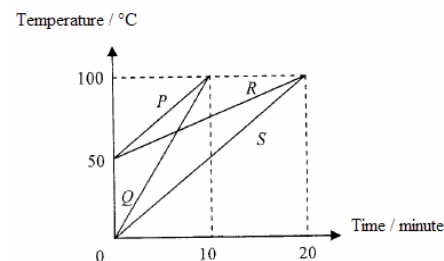
In an experiment, 2 kg of water at 20°C is heated inside a boiler for 20 minutes. Water is boiled to 100°C and 1.7 kg of water remains after boiling. What is the estimated power of the boiler?

Given : Specific heat capacity of water =  $4200 \text{ J kg}^{-1} \text{ °C}^{-1}$

Specific latent heat of vaporization of water =  $2.26 \times 10^6 \text{ J kg}^{-1}$

- A. 565 W B. 649 W C. 1125 W D. 3762 W

28. 2007/II/10

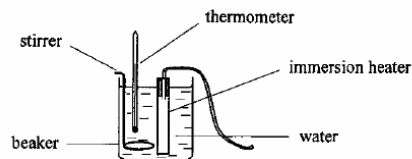


Which liquids has the highest specific heat capacity?

- A. P B. Q C. R D. S

29. 2008/II/10

A 100 W immersion heater is used to heat 0.5 kg of water, which is being stirred by a stirrer. After 3 minutes the water temperature increases from 25°C to 30°C. What is the estimated energy loss in this period?



Given : specific heat capacity of water =  $4200 \text{ J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$

- A. 7 500 J    B. 10 500 J    C. 18 000 J    D. 28 500 J

30. 2008/II/11

Which of the following statement is/are correct?

- (1) Energy transfers from an object with higher internal energy to an object with lower internal energy
- (2) An object must absorb energy when it changes its state
- (3) Energy transfers from an object with higher temperature to an object with lower temperature.

- A. (2) only    B. (3) only    C. (1) and (2) only    D. (1) and (3) only

31. 2008/II/34

Which of the followings has the highest average speed of the molecules?

- A. 1 g of ice cube at  $-10^{\circ}\text{C}$   
 B. 10 g of melting ice cube  
 C. 100 g of water at room temperature  
 D. 0.1 g of steam at  $100^{\circ}\text{C}$

32. 2008/II/35

What physical properties does the temperature of an object represent?

- (1) A measure of the degree of hotness of the object
- (2) A measure of the internal energy of the object
- (3) A measure of the average kinetic energy of the molecules of the object.

- A. (1) and (2) only    B. (1) and (3) only    C. (2) and (3) only    D. (1), (2) and (3)

1. 2005/II/7

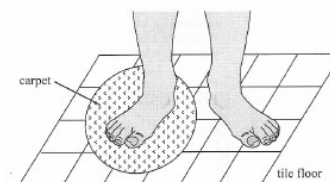


The photograph shows a hot potato wrapped by shiny aluminium foil. By what means can the foil help reducing the rate of energy lost from the potato to the surroundings?

- (1) conduction
- (2) convection
- (3) radiation

- A. (2) only    B. (3) only    C. (1) and (2) only    D. (1) and (3) only

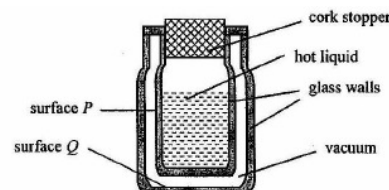
2. 2005/II/8



Cynthia places a carpet on a tile floor. After a while, she stands in bare feet with one foot on the tile floor and the other on the carpet as shown above. She feels that the tile floor is colder than the carpet. Which of the following best explains this phenomenon?

- A. The tile is a better insulator of heat than the carpet.  
 B. The tile is at a lower temperature than the carpet.  
 C. The specific heat capacity of the tile is smaller than that of the carpet.  
 D. Energy transfers from Cynthia's foot to the tile at a greater rate than that to the carpet.

3. 2006/II/9



The figure shows a vacuum flask with two glass walls. Which of the following statements are correct?

- (1) The surfaces *P* and *Q* are painted silvery to reduce heat loss.
- (2) The cork stopper reduces heat loss by conduction and convection.
- (3) The vacuum between the double glass walls reduces heat loss by radiation.

- A. (1) and (2) only    B. (1) and (3) only    C. (2) and (3) only    D. (1), (2) and (3)