

Conduction Practice Problems:

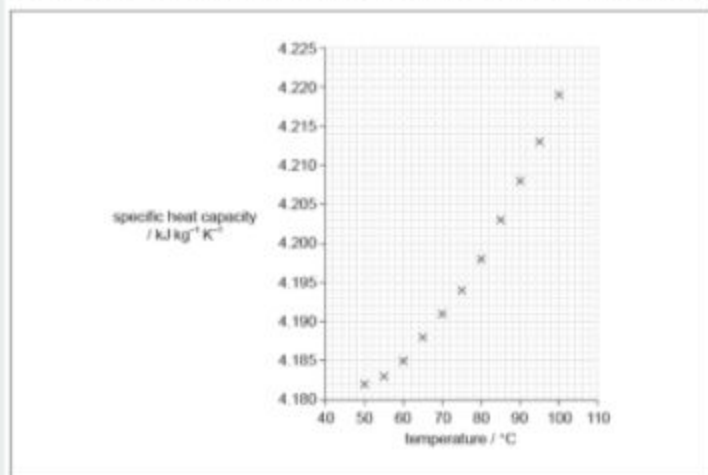
1.

A sealed container contains water at 5 °C and ice at 0 °C. This system is thermally isolated from its surroundings. What happens to the total internal energy of the system?

- A. It remains the same.
- B. It decreases.
- C. It increases until the ice melts and then remains the same.
- D. It increases.

2.

In an experiment, data were collected on the variation of specific heat capacity of water with temperature. The graph of the plotted data is shown.



The uncertainty in the values for specific heat capacity is 5%.

Water of mass (100 ± 2) g is heated from (75.0 ± 0.5) °C to (85.0 ± 0.5) °C.

- a. Draw the line of best-fit for the data. [1]
- b.i. Determine the gradient of the line at a temperature of 80 °C. [3]
- b.ii. State the unit for the quantity represented by the gradient in your answer to (b)(i). [1]
- c.i. Calculate the energy required to raise the temperature of the water from 75 °C to 85 °C. [1]
- c.ii. Using an appropriate error calculation, justify the number of significant figures that should be used for your answer to (c)(i). [3]

Convection Practice Problems:

3. How many types of convection are there?

- a) 4
- b) 3
- c) 2
- d) 1

4. Which of the following heat flow situations pertains to free or natural convection?

- a) Air conditioning installations and nuclear reactors
- b) Flow of water inside the condenser tubes
- c) Cooling of internal combustion engine
- d) Cooling of billets in atmosphere

5. A body cooling from 80 degree Celsius to 70 degree Celsius takes 10 minutes when left exposed to environmental conditions. If the body is to cool further from 70 degree Celsius to 60 degree Celsius under the same external conditions, it will take

- a) Same time of 10 minutes
- b) More than 10 minutes
- c) Less than 10 minutes
- d) Time will depend upon the environmental conditions

Radiation Practice Problems:

6.

X and Y are spherical black bodies that radiate the same power. The temperature of X is 350 K and the temperature of Y is 700 K.

What is the ratio $\frac{\text{radius of X}}{\text{radius of Y}}$?

- A. 16
- B. 4
- C. $\frac{1}{4}$
- D. $\frac{1}{16}$

7.

Global warming reduces the ice and snow cover on Earth. Which of the following correctly describes the changes in albedo and rate of energy absorption by Earth?

	Albedo	Rate of energy absorption
A.	increase	increase
B.	decrease	increase
C.	increase	decrease
D.	decrease	decrease