Topic Test 1: Heating and Cooling 1Test

Name: Mark/22: \_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_

A data sheet with appropriate physics constants will be provided for this test.

Question 1

4000 J of energy are required to raise the temperature of 1 kg of paraffin by 2°C. How much energy is required to raise the temperature of 5 kg of paraffin by 1°C? (2 marks)

A 20 kJ

B 2 kJ

C 1 kJ

D 10 kJ

E 10 MJ

Question 2

An insulated container is filled with equal amounts of hot and cold water. The hot water is originally at 75.0°C and the cold water at 23.0°C. Calculate the temperature of the final mixture, assuming that no energy is gained or lost from the container. (3 marks)

Question 3

How much energy, in joules, is needed to raise the temperature of 100 kg of water from a room temperature of 20.0°C to a comfortable bath temperature of 35.0°C? (Assume no losses to the surrounding environment.) (2 marks)

Question 4

If the particles within two objects have the same average kinetic energy, are the two objects at the same temperature? Explain your answer. (2 marks)

**Question 5**

In a solid; state where the internal potential energy and kinetic energy is contained: (2 marks )

Potential energy : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Kinetic energy : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Question 6**

1. Define absolute zero? (1 mark)
2. Explain why it is acceptable to calculate the temperature difference in either °C or K. ( 1mark)
3. Convert the following : ( 2marks)

200 °C to K \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 598K to °C \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. A gas is at 70 °C . The temperature is increased, which temperature of gas is twice as energetic:

A: 200 °C

B: 140 °C

C: 413 °C

D: 600 °C

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (2 marks)

Question 7

A student attempts to identify a metal by measuring its specific heat capacity. 100 g of the metal is heated to 75°C and then transferred to a 70 g copper calorimeter containing 200 g of water at 20°C. The temperature of the final mixture is 25°C. Calculate the specific heat of the metal and identify what metal the student is most likely to be testing. (5 marks)

Approximate specific heat capacities of some common materials.

|  |  |
| --- | --- |
| Material | Specific heat capacity (J kg–1 K–1) |
| human body | 3500 |
| methylated spirits | 250 |
| air | 1000 |
| aluminium | 900 |
| glass | 840 |
| iron | 440 |
| copper | 390 |
| brass | 370 |
| lead | 130 |
| mercury | 140 |
| water | 4180 |
| ice | 2100 |
| liquid | 4200 |
| steam | 2000 |