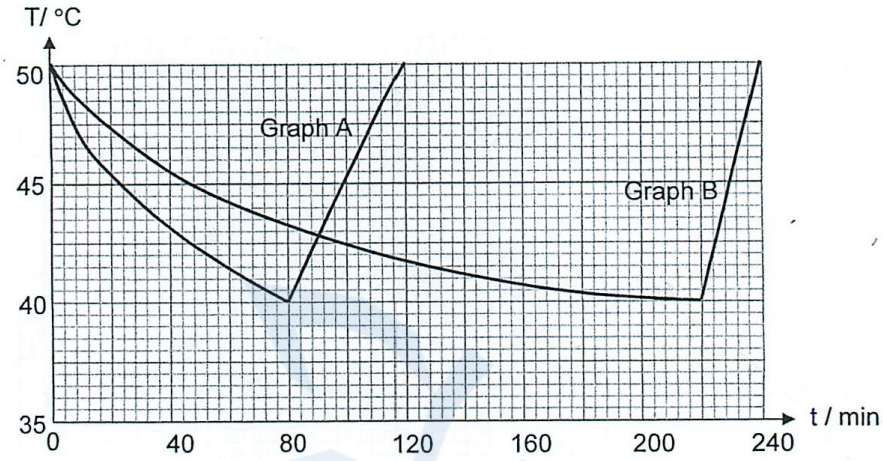
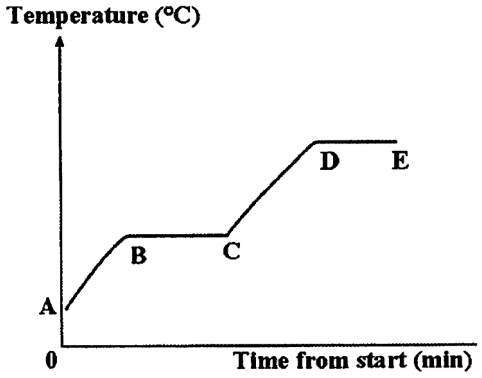
Practice Questions on Thermal Properties of Matter (SQ) Pg 1

Name : _____

1	What is meant by
(a)	Temperature? _____ _____
(b)	Heating? _____ _____
(c)	Internal energy? _____ _____
(d)	What is the relationship between the **temperature** and the **internal energy** of a body? _____ _____
(e)	What does it mean to say that two bodies are in 'thermal equilibrium'? _____ _____
2	What two pieces of information can be inferred from a substance having a high specific heat capacity? _____ _____ _____
3	State two applications of water due to its high specific heat capacity. _____ _____ _____ _____

4	Why is it better to use ice at 0^oC, than an equal mass of water at 0^oC, to cool warm water? _____ _____ _____ _____
5	Desert sand is very hot in the day and very cold in the night. What does this tell you about its specific heat capacity? _____ _____ _____
6	Water has a much higher capacity for storing energy. Because of this water is a very useful cooling agent. Water also takes a long time to cool. This tendency on the part water to resist changes in temperature improves the climate in many places. Name one example and explain briefly. _____ _____ _____
7	When somebody suffers from a fever, the elderly Chinese often suggest covering her body with thick quilts. They maintain that one will feel much better after sweating.
(a)	A person perspires 2.0 litres of sweat in 1.0 hour. How much energy is required to evaporate this amount of sweat?
(b)	If this amount of energy is not removed from the body by perspiration, by how much would the body temperature of a person of mass 60 kg rise? The average specific heat capacity of the human body is 3500 $Jkg^{-1}oC^{-1}$.

8	A heating engineer is asked to find out how much energy can be saved by using a lagged hot-water tank instead of an unlagged one. He has two similar tanks, one of which is lagged and the other unlagged. Both are fitted with a 5.00 kW immersion heater. Each tank has a thermostat attached to it which switches on the heater when the temperature of the water falls to 40°C, and which switches off the heater when the temperature of the water rises to 50 °C. The temperature-time graphs, (A) and (B) below show the cooling-heating cycle for the two tanks. 
(a)	Which graph shows the cooling-heating cycle for the unlagged tank? _____
(b)	Calculate the total time the heater in each tank is switched on during a 24-h period.
(c)	Hence, determine the energy that would be saved during a 24-h period using a lagged tank instead of an unlagged one.
9	A copper calorimeter of mass 120 g contains 70 g of water and 10 g of ice at 0°C. What mass of steam at 100°C must be passed into the calorimeter to raise the temperature to 40 °C? (Specific latent heat of ice 320 J/g, steam 2200 J/g; Specific heat capacity of copper 0.40 J/gK)

10	The graph on the right shows the heating curve of a substance. 
(a)	Explain why the temperature remains constant at B. _____ _____ _____
(b)	Why does the temperature rises when it reaches C? _____ _____ _____