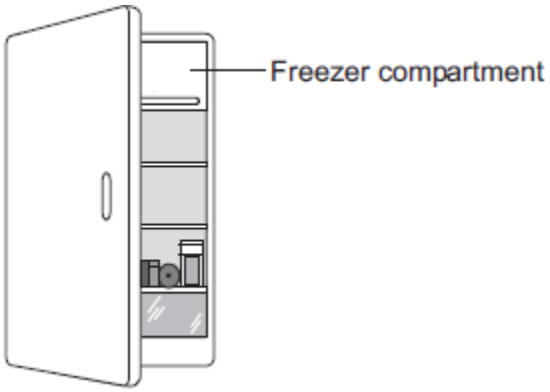
Name of the Student:_____
Max. Marks : 17 Marks **Time : 17 Minutes**

Q1.

(a) The figure below shows a fridge with a freezer compartment.

The temperature of the air inside the freezer compartment is –5 °C.



The air inside the fridge forms a convection current when the fridge door is closed.

Explain why.

_____

_____

_____

_____

_____

_____

_____

_____

(4)

(b) The table below shows information about four fridges.

Fridge	Volume in litres	Energy used in one year in kWh
A	250	300

B	375	480
C	500	630
D	750	750

A householder concludes that the energy used in one year is directly proportional to the volume of the fridge.

Explain why her conclusion is **not** correct.

Use data from the table in your answer.

_____

_____

_____

_____

(2)

(c) New fridges are more efficient than fridges made twenty years ago.

Give **one** advantage and **one** disadvantage of replacing an old fridge with a new fridge.

Ignore the cost of buying a new fridge.

Advantage _____

_____

Disadvantage _____

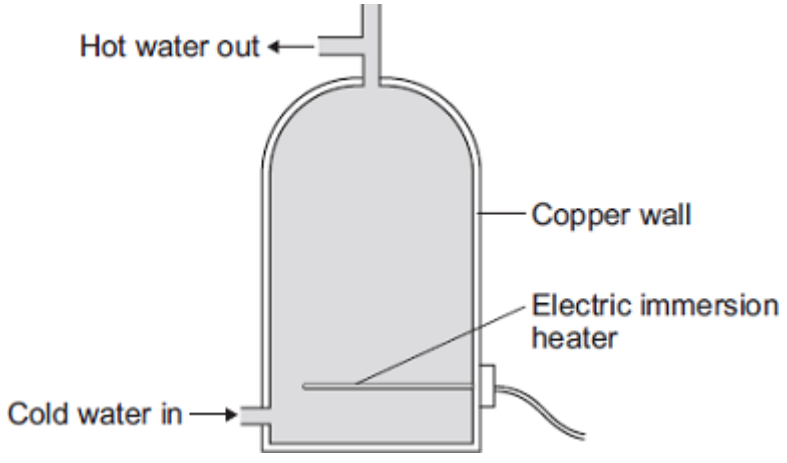
_____

(2)

(Total 8 marks)

Q2.

An electric immersion heater is used to heat the water in a domestic hot water tank.
When the immersion heater is switched on the water at the bottom of the tank gets hot.



(a) Complete the following sentence.

The main way the energy is transferred through the copper wall of the water tank is

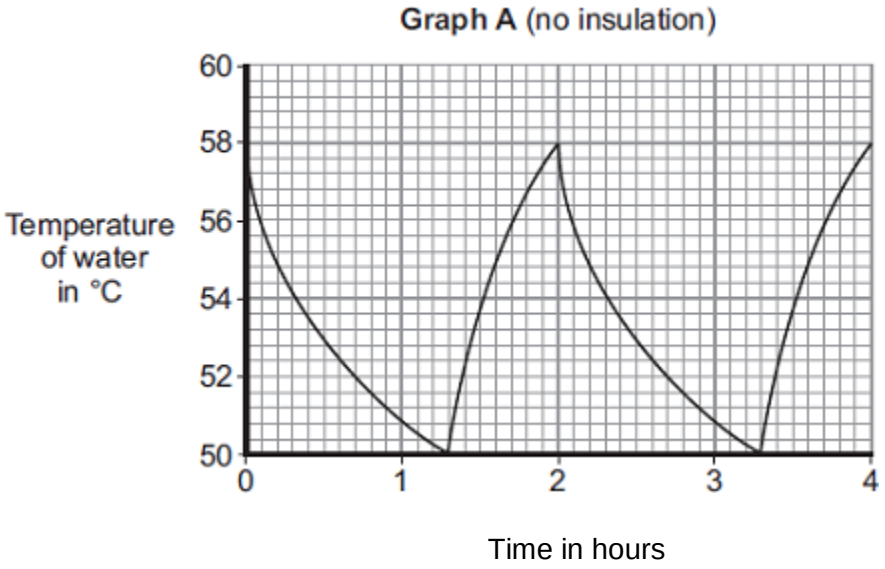
by the process of _____ .

(1)

(b) The immersion heater has a thermostat to control the water temperature.

When the temperature of the water inside the tank reaches 58°C the thermostat switches the heater off. The thermostat switches the heater back on when the temperature of the water falls to 50°C.

Graph A shows how the temperature of the water inside a hot water tank changes with time. The tank is **not** insulated.



(i) The temperature of the water falls at the fastest rate just after the heater switches off.

Explain why.

_____

_____

_____

_____

(2)

(ii) To heat the water in the tank from 50°C to 58°C the immersion heater transfers 4032 kJ of energy to the water.

Calculate the mass of water in the tank.

Specific heat capacity of water = 4200 J/kg°C

_____

_____

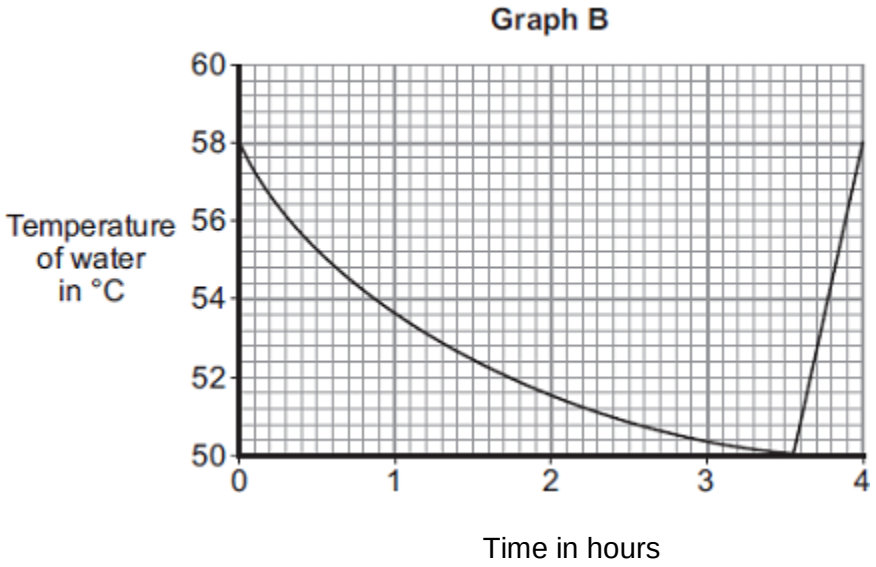
_____

Mass = _____ kg

(3)

(iii) An insulating jacket is fitted to the hot water tank.

Graph B shows how the temperature of the water inside the insulated hot water tank changes with time.



An insulating jacket only costs £12.

By comparing **Graph A** with **Graph B**, explain why fitting an insulating jacket to a hot water tank saves money.

_____

_____

_____

_____

_____

_____

(3)

(Total 9 marks)