Name of the Student:_____
Max. Marks : 19 Marks **Time : 19 Minutes**

Q1.

A wet handkerchief is dried in 56 s using a hot iron rated at 2400 W.

Determine whether energy is transferred to the water in the handkerchief at a greater rate than it is transferred to the iron.

initial temperature of wet handkerchief = 18 °C

initial mass of wet handkerchief = 35.9 g

final mass of dry handkerchief = 18.2 g

specific heat capacity of water = 4.19×10^3 J kg^{-1} K^{-1}

specific latent heat of vaporisation of water = 2.26×10^6 J kg^{-1}

(5)

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(Total for question = 5 marks)

Q2.

A gas cylinder of volume 0.052 m^3 contains oxygen gas at a temperature of 22°C and a pressure of 2.0×10^5 Pa. Some of the oxygen in the cylinder is used and the gas pressure falls to 1.6×10^5 Pa.
The temperature remains constant.

Calculate the number of molecules removed from the cylinder

(3)

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Number of molecules removed = ...

(Total for question = 3 marks)

Q3.

A car of mass 1200 kg is travelling at a speed of 25 m s^{-1}. During braking, 25% of the kinetic energy of the car is transferred to the brake pads.

Calculate the increase in temperature of the brake pads.

total mass of brake pads = 5.3 kg
specific heat capacity of brake pads = 450 J kg^{-1} K^{-1}

(4)

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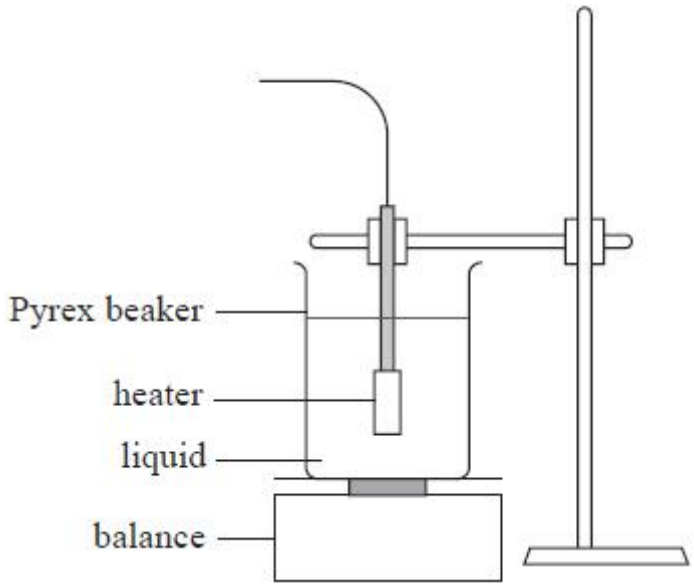
Increase in temperature = ...

(Total for question = 4 marks)

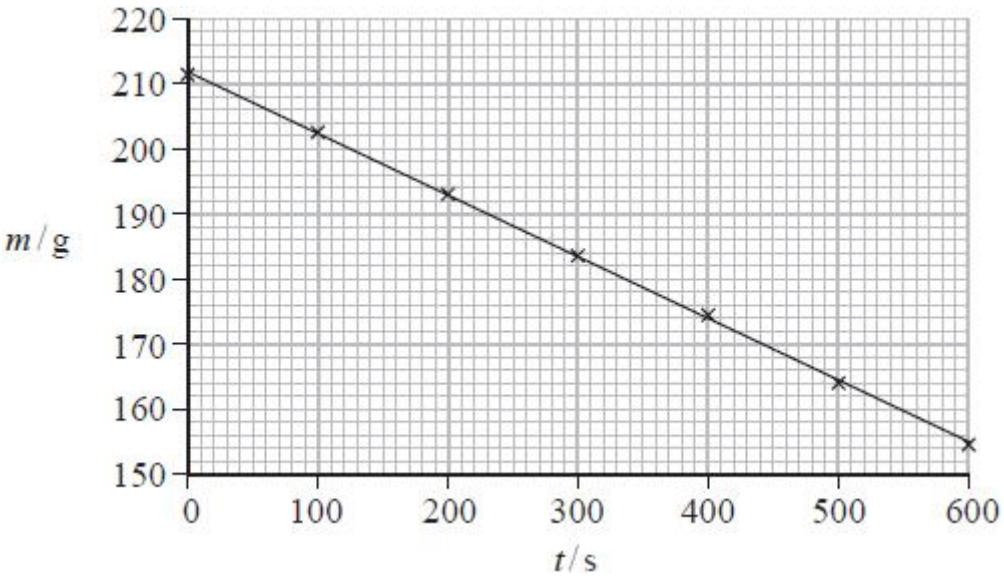
Q4.

A student determined the latent heat of vaporisation of a liquid using an electrical heater to boil the liquid in a Pyrex beaker.

The apparatus used is shown below.



The student monitored the mass of the beaker and the liquid *m* over the time *t* for which the liquid was boiling. Her results are plotted on the graph.



The student used her graph to determine a value for the latent heat of the liquid in the beaker. She concluded that the liquid was pure water.

Liquid	Latent heat of vaporisation / MJ kg^{-1}
Pure water	2.26
Weak salt water solution	2.10
Strong salt water solution	2.00

Comment on the validity of the student's conclusion.

V = 20.5 *V*

I = 10.5 A

(7)

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(Total for question = 7 marks)