Name

TITLE OF EXPERIMENT

STEFAN BOLTZMANN'S RADIATION LAW: EXPERIMENT No 1

## **MODERN PHYSICS LAB**

## **PHYS 393 COURSEWORK**

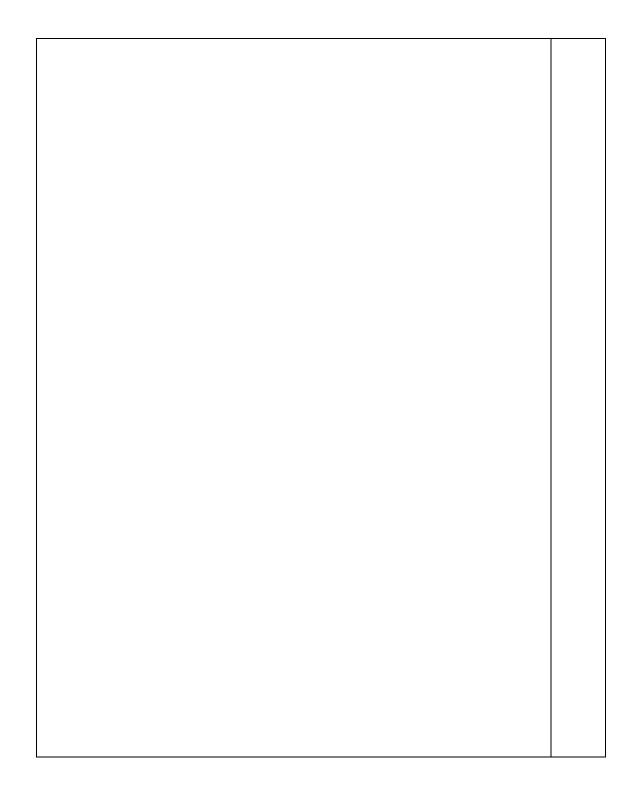
## **REPORTING SHEET**

PART A: SCIENTIFIC KNOWLEDGE AND PLANNING [30 MARKS]	
Aim:	
Methodology - Draw your set up, explaining the use of the different	5
components you will use to achieve your aim	5
How do you predict the plot between Utherm and T (temperature) to look	4
like according to your knowledge of Stefan Boltzmann's radiation Law?	

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Draw the intensity radiated by a blackbody versus the wavelength for different temperatures according to Wien.	4
Introduce graphs that describe the comparison between experimental evidence and the Rayleigh-Jeans Law in describing the black-body spectrum. What is meant by the 'ultraviolet catastrophe'?	4

How did Planck explain the above controversy?	
Show that Planck's formula reduces to the Rayleigh Jeans law at short	4
wavelengths.	
A small hole in the wall of a cavity in an object of any kind behaves like an ideal body. At what rate does radiation escape from a hole $10 \text{ cm}^2$ in area in	4
the wall of a furnace whose interior is at temperature of 700° C?	
You are given $\sigma = 5.67 \times 10^{-8} \text{W/m}^2 \text{K}^2$	
(i) 53.56 W/s	
(ii) 13.60 W	

(iii) 1.00 J/s	
(iv) 50.81 W	
Going to the lab to perform the above experiment, you found that the space	_
was very little and had to set up the equipment vertically. Sketch the	5
equipment and give reasons for your choice of ordering.	
equipment and give reasons for your enoice of ordering.	
PART B: OBTAINING EVIDENCE	1
Your data. Use the correct units and convert appropriately.	



Graph (use graph paper)	PART C: ANALYSING AND CONSIDERING YOUR EVIDENCE	I
My evidence leads to the following result.	Graph (use graph paper)	
	Calculations	
Compare your results with theoretical values.	My evidence leads to the following result.	
Compare your results with theoretical values.		
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PART D: EVALUATION [10 MARKS]	
What was good or bad about the experiment you did was	2
Some ways you could improve the experiment were	2
You had the following anomalies.	2
The explanation for your anomalies was	2
You believe my evidence is reliable/unreliable for the following reasons.	2