Name

TITLE OF EXPERIMENT

STEFAN BOLTZMANN'S RADIATION LAW: EXPERIMENT No 1

MODERN PHYSICS LAB

PHYS 393 COURSEWORK

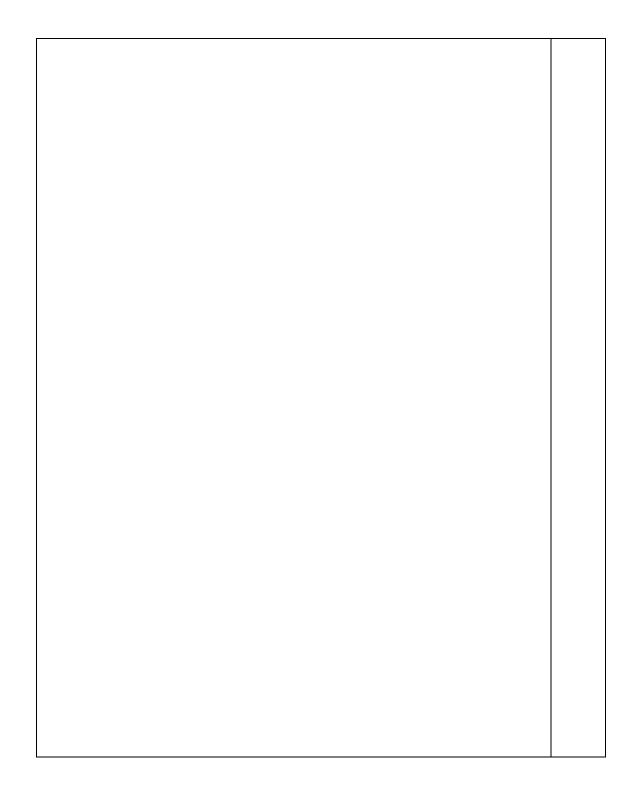
REPORTING SHEET

| PART A: SCIENTIFIC KNOWLEDGE AND PLANNING [30 MARKS] | |
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| Aim: | |
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| Methodology - Draw your set up, explaining the use of the different | 5 |
| components you will use to achieve your aim | 5 |
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| 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. | |
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| 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 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 | |
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| 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. | |
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| PART B: OBTAINING EVIDENCE | 1 |
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| Your data. Use the correct units and convert appropriately. | |
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| Graph (use graph paper) | PART C: ANALYSING AND CONSIDERING YOUR EVIDENCE | I |
|---|---|---|
| My evidence leads to the following result. | Graph (use graph paper) | |
| | Calculations | |
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| 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] | |
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| What was good or bad about the experiment you did was | 2 |
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| 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 |