

**Name**

**TITLE OF EXPERIMENT**

**THE ZEEMAN EFFECT: EXPERIMENT No 5**

**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 components you will use to achieve your aim

5

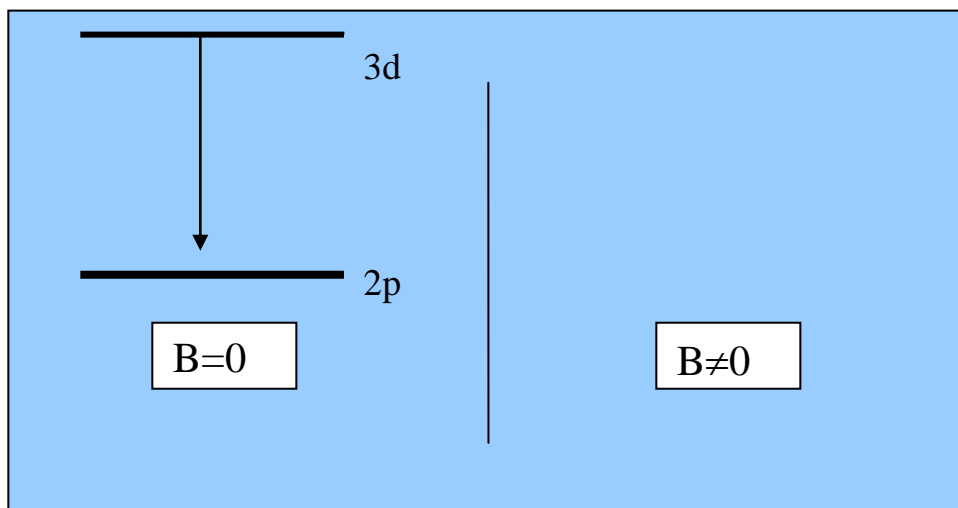
What do you predict according to quantum theory to observe on the telescope?

6

Because... (Explain how do the (3) spectral lines occur using an example)

In the absence of a constant magnetic field there is only wavelength associated with the transition from  $n=3d$  to  $n=2p$ . Complete the figure below in the case that a magnetic field  $B$  is applied. How will the spectral lines split and what will be the possible transitions? *Hint:* Follow the polarisation rules.

5



In which case do the (3) spectral lines reduce to (2) in the presence of a constant magnetic field?	4
What is meant by the anomalous Zeeman effect?	4
What values do you predict to get for $e/m$ ?	3
Which factors you suggest should be controlled in order to make sure that your results are accurate and reliable?	3

<b>PART B: OBTAINING EVIDENCE</b>	
<p>Your data. Use the correct units and convert appropriately.</p>	

<b>PART C: ANALYSING AND CONSIDERING YOUR EVIDENCE</b>	
Graph (use graph paper)	
Calculations	
My evidence leads to the following result.	
Compare your results with theoretical values.	

<b>PART D: EVALUATION [10 MARKS]</b>	
<b>What was good or bad about the experiment you did was ...</b>	<b>2</b>
<b>Some ways you could improve the experiment were...</b>	<b>2</b>
<b>You had the following anomalies.</b>	<b>2</b>
<b>The explanation for your anomalies was</b>	<b>2</b>
<b>You believe my evidence is reliable/unreliable for the following reasons.</b>	<b>2</b>