BOĞAZİÇİ UNIVERSITY

Physics Department

PHYL202 Applied Exam-2: BALMER LINES

Fall '26
Duration: 40 minutes

Name & Surname: _____ **Student ID:** _____

Lab Section: _____ **Table #:** _____ **Date:** _____

ATTENTION: Correct answers without valid calculations on the Extra Sheet get **NO** credit. Include correct significant figures (sf) and units! **All data must be measured from your own setup during the exam; writing pre-memorized or unmeasured values will result in an automatic ZERO (0).**

REFERENCE FORMULAS:

Diffraction: $d \sin\theta = m\lambda$ $(m = 1)$ Grating Spacing: **600 lines per 1.000 mm** Error: $\frac{|R_{avg} - R_{tv}|}{R_{tv}} \times 100$

Rydberg Formula: $\frac{1}{\lambda} = R\left(\frac{1}{n_f^2} - \frac{1}{n_i^2}\right)$ Theoretical Rydberg Const (R_{tv}): 1.097×10^7 m^{-1}

PART I) Diffraction Angles & Wavelengths

Measure angles from left and right. Calculate avg angle and λ.

Grating Spacing, d (nm) =

Color	θ_L **(Left)**	θ_R **(Right)**	θ_{avg} **(Average)**	λ **(nm)**
Red				
Blue-Green				
Violet				

PART II) Calculating the Rydberg Constant (R)

Using the initial (n_i) and final (n_f) states, calculate R for each line, the average R, and % Error.

Color	$n_i \to n_f$	**Calculated R (m^{-1})**
Red	$3 \to 2$	
Blue-Green	$4 \to 2$	
Violet	$5 \to 2$	

Final Results:

Average R =

% Error =

TOTAL SCORE

/ 6

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EXTRA CALCULATION SHEET

Name & Surname: _____ **Student ID:** _____

Lab Section: _____ **Table #:** _____ **Date:** _____

NOTE:

This sheet is provided for your calculations to support your final answers.

Your final answers MUST be written in the designated 18 cells/boxes on the first page.

If a final answer is correct, this sheet will be checked. NO points will be awarded for correct answers lacking valid supporting calculations.

Calculations Space (Show all steps for Part I and Part II):