BOĞAZİÇİ UNIVERSITY
Physics Department

PHYL101 Applied Exam 1
BALLISTIC PENDULUM

Fall '26
Duration: 30 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 and units! Use parentheses in the tables to indicate the units. Use only a scientific calculator.

REFERENCE FORMULAS:

- Momentum: $(m_{ball} + m_{pend})v_{final} = m_{ball}v_{initial}$
- Energy: $\frac{1}{2}(m_{ball} + m_{pend})v_{final}^2 = (m_{ball} + m_{pend})gH$
- Initial Velocity: $v_{initial} = \sqrt{2gH}\left(\frac{m_{ball}+m_{pend}}{m_{ball}}\right)$
- Height: $H = L(1 - \cos\theta)$
- Gravity (g): 981 cm/s^2 (CGS) or 9.81 m/s^2 (MKS)

- **Data and Calculations (24 cells):** Each correct cell = **0.2 pts** (Total: 4.8 pts)
- **Units (3 spaces):** Each correct unit = **0.4 pts** (Total: 1.2 pts)

Given: • m_{ball} = _____ • m_{pend} = _____ • L = _____

PART I) Measurements & Height Calculation

Fire the ball 3 times per compression. Record θ and calculate H.

Compression Level	Trial	θ (degrees)	H ( )
Short	1		
	2		
	3		
Medium	1		
	2		
	3		
Long	1		
	2		
	3		

PART II) Calculating the Initial Velocity

Compute the average height (H_{avg}) and initial velocity ($v_{initial}$) for each compression level.

Compression Level	H_{avg} ( )	$v_{initial}$ ( )
Short		
Medium		
Long		

TOTAL SCORE
/ 6

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EXTRA CALCULATION SHEET

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