PHYL102

Applied Exam-1

Duration: 40 minutes

Total: 6 points

Name & Surname:

Student ID:

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Lab section:

Table #:

Date:

Signature of the student

As the instructor of this Lab Section I confirm that the student has participated in and completed the applied exam on time.

Stamp of the PHYS Labs and signature of the instructor

This page serves as proof of the fact that the student participated in and completed the applied exam, only if it is submitted in time and accepted by the Lab instructor. The student and the instructor shall sign it along with the stamp of the Physics Laboratories.

Complete this examination YOURSELF! Be careful about units, significant figures. You shall show all your formulae & calculations explicitly and express your final answers clearly.

AE.1: Empirical Equations – Part 2

DATA-TAKING

Q-1) You have **3 rings** with different diameters. For each of them measure the inner and the outer diameter. Then hang them on the wall and let them oscillate. Use stopwatch to measure the time for **5** oscillations! (1.2 p)

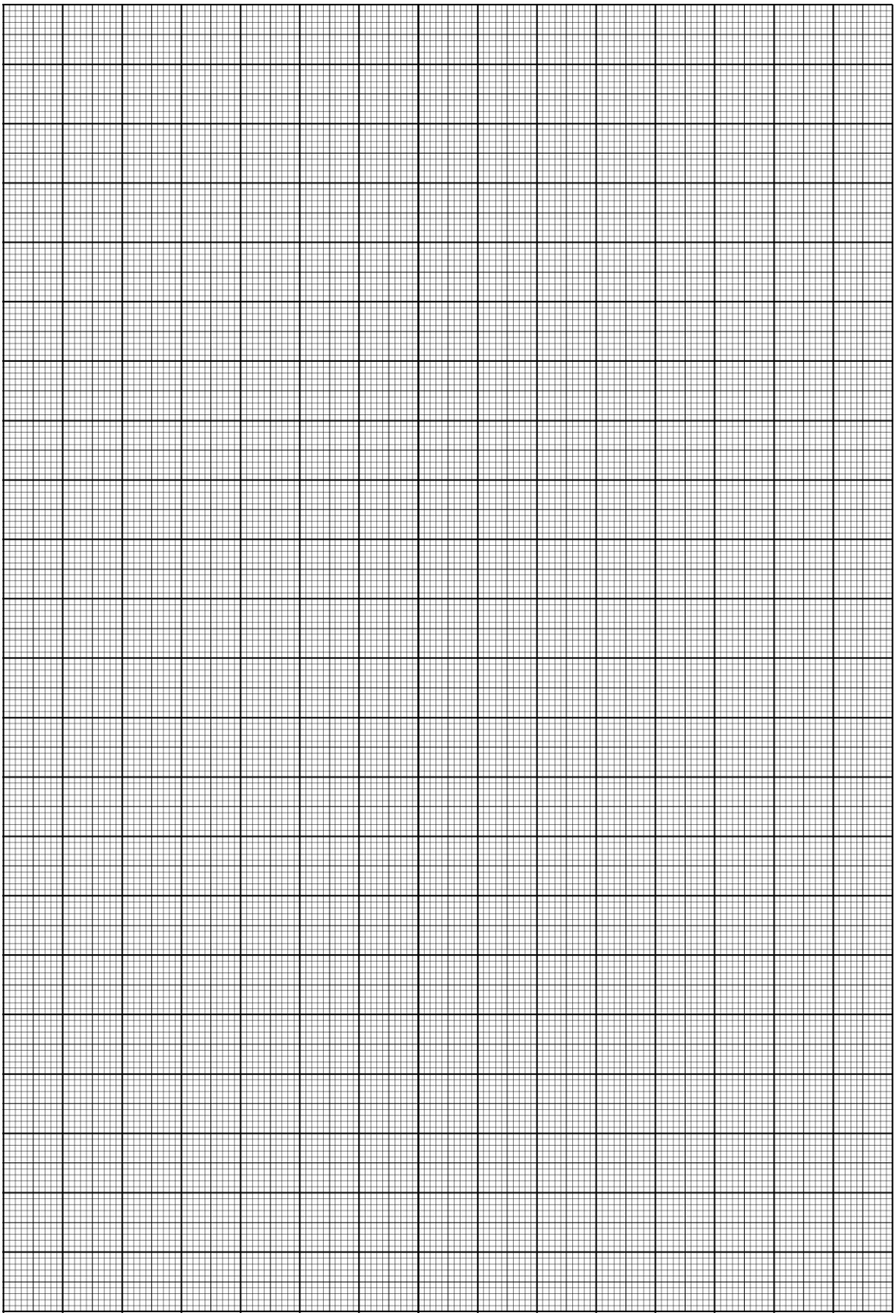
Description	**Symbol (unit)**	**RING NUMBER**		
		- 1 -	**- 2 -**	**- 3 -**
Inner Diameter	D_i ( )			
Outer Diameter	D_o ( )			
5 Periods	t ( )			

CALCULATIONS

Q-2) Calculate average diameter (using inner and the outer) and one period. Then take the logarithm of both so as to plot **Log T** vs **Log D** on a regular graph paper. (1.4 p)

Description	**Symbol (unit)**	**RING NUMBER**		
		- 1 -	**- 2 -**	**- 3 -**
Average Diameter	D_{ave} ( )			
One Period	T ( )			
Logarithm of D_{ave}	Log D_{ave}			
Logarithm of T	Log T			

Q-3) Plot **Log T** vs **Log D** on the regular graph paper. Make sure that you **label title and axis** correctly; show the **axis scales** in a proper way and place data points precisely. Plot **a best line**, choose **two slope points** other than data points and show them on the best line. Show the **y-intercept** on graph. **Note that y-axis should start with a negative number!** (0.7 p)



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AE.1: Empirical Equations – Part 2

Q-4) Give **coordinates** of the two SLOPE POINTS chosen on the graph, below. (0.4 p)

SP_1 : (;)

SP_2 : (;)

Q-5) Read the ***y-intercept*** of the line from the graph (0.2 p)

y-intercept =

Q-6) Linearize the equation $T = AD^n$ (Show your algebra inside the big box below). Express the constants **"*n*"** and **"*A*"** (in terms of slope, i.e. SP_1 and SP_2 and ***y-intercept.)*** ***NO NUMERICAL CALCULATION IN THIS QUESTION! ONLY DERIVATION AND RESULTS!*** (0.6 p)

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n =

A =

AE.1: Empirical Equations – Part 2

ON THIS PAGE ONLY NUMERICAL CALCULATIONS AND RESULTS SHOULD BE GIVEN! NO DERIVATION!

Q-7) **Calculate** ***n*** and ***A.*** Give their **dimensions**! Accuracy of ***n*** is important. (1 p)

n =

dimension of n=

A =

5

dimension of A =

Q-8) **Calculate** D for T=1.0 seconds. (0.5 p)

$D_{\text{(for T=1.0 sec)}}$ =