PhD Course Work Examination-2021

Course Code: PHD/RM-01
Course Title: Research Methodology
Department of Appearing Students: PHYSICS, PhD Students
Full Marks: 40 **Time**: 2 Hrs

[NOTE: Use Separate Answer scripts for Gr-A and Gr-B]

Group-A

1. Create the document (attached as Annexure-I) using LaTex. Send both the .tex and .PDF file to the concerned teacher via email (as ZIP or RAR file). [10]

Group-B

1. ***Compulsory Question***

a) What are the advantages of using LaTeX over other software packages for writing scientific documents? What could be the possible arguments of the LaTeX command \documentclass[]{} [3+2=5]

b) What are the basic components of a Minor/ Major research project? What do you mean by Novelty of a research project? [3+2=5]

2. ***Answer Any Five Questions*** [5 × 4 =20]

a) What do you understand by 'research', 'research methods' and 'research methodology'?
b) Discuss briefly about characteristics of quantitative and qualitative methods of research with examples. What is applied research?
c) How can you cite an article in 'References' in your Research paper using MLA, APA, Chicago and Harvard styles?
d) Define the terms: copyright agreement, open access journals, subscription journals, indexing of a journal, impact factor, h-index value and DOI of a journal.
e) What is literature review? Write four to five important purposes for literature review. Discuss briefly how one can perform literature survey in his/her PhD course work.
f) Discuss briefly about 'formulation of hypotheses, 'research design' and 'data collection and analysis' in research.
g) What are h-index and i10-index of a researcher? Who is the inventor of h-index and how h-index is calculated? Explain with example. Further, say few about ORCID and Publons iD of a researcher.

Annexure-I

Course work on "Use of LaTeX in typesetting Technical Documents" organised by Department of Physics, Aliah University

Your Name
Your Roll No.
Paper

August 21, 2021

Contents

Chapter 1

Introduction to LaTeX

1.1 Introduction

LaTeX, which is pronounced Lah-tec or Lay-tech (to rhyme with 'blech' or 'Bertolt Brecht'), is a document preparation system for high-quality typesetting. It is most often used for medium-to-large technical or scientific documents but it can be used for almost any form of publishing.

1.2 Typesetting system

LaTeX attempts to follow the design philosophy of separating presentation from content, so that authors can focus on the content of what they are writing without attending simultaneously to its visual appearance. In preparing a LaTeX document, the author specifies the logical structure using simple, familiar concepts such as chapter, section, table, figure, etc., and lets the LaTeX system handle the formatting and layout of these structures. As a result, it encourages the separation of the layout from the content — while still allowing manual typesetting adjustments whenever needed. This concept is similar to the mechanism by which many word processors allow styles to be defined globally for an entire document, or the use of Cascading Style Sheets in styling HTML documents.

1.3 Reasons to use LaTex

In today's technology-driven world, we leave so many things to our electronic gadgets. Surprisingly, many life scientists try manically to control the appearance of their documents by hand with programs like MS Word. LaTeX

takes this task off your hands by providing highly efficient algorithms to properly format your texts. The results are almost always superior to everything you could have done with a "What you see is what you get" (WYSIWYG) editor like MS Word, openOffice, etc.

1.4 Mathematical Equations

We can write mathematical equations accurately

1.4.1 Inserting Equation

Write mathematical equation within a sentence — for example, typing 1+2 = 3

Write mathematical equation within a sentence — for example, typing

$$1 + 2 = 3$$

$$1 + 2 = 3 \tag{1.1}$$

$$\begin{aligned} a &= b + c && (1.2)\\ &= y - z && (1.3) \end{aligned}$$

1.4.2 Linear System of equations

Below are the system of three linear equations

$$\begin{aligned} 3x + 4y + z &= 0\\ x + y - z &= 0\\ 3x - y + z &= 0 \end{aligned} \tag{1.4}$$

Following is another example of system of equations

$$3x + 4y + z = 0 \tag{1.5a}$$
$$x + y - z = 0 \tag{1.5b}$$
$$3x - y + z = 0 \tag{1.5c}$$

What is difference between eqs. (1.5a) to (1.5c)?

1.5 Figure

We can insert figure using the following method:

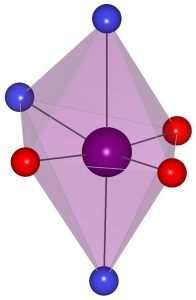

Figure 1.1: Here is my image

Chapter 2

Minipage, Reference and Table

2.1 Second Section

Q1. Use minipage environment and parboxwidth command to get the following output in section 2.1 of the template prepared in Q1.

Albert Einstein, (born March 14, 1879, Ulm, W¨urttemberg, Germany– died April 18, 1955, Princeton, New Jersey, U.S.), German-born physicist who developed the special and general theories of relativity and won the Nobel Prize for Physics in 1921 for his explanation of the photoelectric effect.

Max Planck, in full **Max** Karl Ernst Ludwig **Planck**, (born April 23, 1858, Kiel, Schleswig [Germany]– died October 4, 1947, G˙ottingen, Germany), German theoretical physicist who originated quantum theory, which won him the Nobel Prize for Physics in 1918 for explaining black-body radiations.

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2.2 Table

2.2.1 Example 1

Following is the first simple table. In table 2.1 name of scientists and their

S.No	Scientist	Discovery
1	Einstein	$E = mc^2$
2	Issac Newton	$F = G\frac{m_1 m_2}{r^2}$

Table 2.1: In the table we show the name of scientist and equations

contributions are shown. Note the position of table. Is it appearing as in this assignment. Use necessary optional argument for positioning of table.

2.2.2 Example 2

Table 2.2 is same as table 2.1. Note that vertical lines are removed. Also table 2.2 is at center and caption is at top of table.

Table 2.2: In the table we show the name of scientist and equations

S.No	Scientist	Discovery
1	Einstein	$E = mc^2$
2	Issac Newton	$F = G\frac{m_1 m_2}{r^2}$

2.2.3 Rotating text in cell

In table 2.3 look at content of first row. Create this table.

Name	Mathematics	Physics	Chemistry
Robin	80	68	60
Julie	72	62	66
Robert	75	70	71

Table 2.3: Text in cell rotated