

# DHANAMANJURI UNIVERSITY

**DECEMBER - 2022**

<b>Name of Programme</b>	<b>: B.Sc Mathematics</b>
<b>Semester</b>	<b>: III</b>
<b>Paper Type</b>	<b>: SEC-I</b>
<b>Paper Code</b>	<b>: SMA-006</b>
<b>Paper Title</b>	<b>: LaTeX and HTML</b>
<b>Full Marks</b>	<b>: 75</b>
<b>Pass Marks</b>	<b>: 30</b>
<b>Duration</b>	<b>: 3 Hours</b>

*The figures in the margin indicate full marks for the questions.*

*Answer all the questions:*

**1. Answer all the questions:**

**$1 \times 10 = 10$**

- a) What is the difference between TeX and LaTeX?
- b) What does a minimal LaTeX file consist of?
- c) What is the difference between `verb` command and `verbatim` environment?
- d) Write LaTeX code for producing the following derivative formula:

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x + h) - f(x)}{h}$$

- e) Write LaTeX code for producing the following Riemann Integral Formula:

$$\int_a^b f(x) dx = \lim_{n \rightarrow \infty} \sum_{i=0}^{n-1} f(x_i) \Delta x$$

- f) Write LaTeX code for producing the following modulus function:

$$f(x) = \begin{cases} x, & \text{if } x \geq 0 \\ -x, & \text{if } x < 0 \end{cases}$$

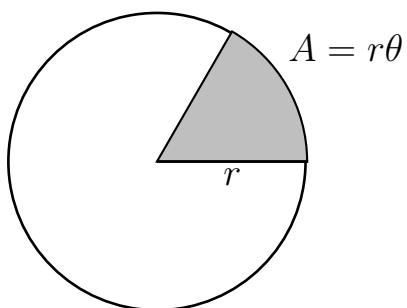
- g) What is PSTricks?

- h) What is the difference between a frame and a slide in Beamer?
- i) Draw a diagram of a Document Object Model (DOM).
- j) What are three parts of a well-formed document in HTML?

**2. Write short answer for each of the following:**

**$3 \times 10 = 30$**

- a) Distinguish between LaTeX commands and LaTeX environments by giving their general format and example.
- b) What are the environments available for text alignment in LaTeX? Give their general format and explain their differences by giving example.
- c) Discuss the various environments for displayed material available in LaTeX by giving their general format and citing their differences.
- d) What is a delimiter in LaTeX? Give some examples of delimiter. How can you produce right-sized delimiters?
- e) Write PSTricks code to draw the following picture:



- f) Which package is necessary to include a picture in a beamer document? Name some file formats that can be imported as picture in beamer slides? Write LaTeX code to include a picture in a frame of a beamer document with the following details:

Frame Name = Picture of a Triangle,

Picture Name = Triangle.jpg

Width = 3 inches,

Height = 2 inches,

Alignment = Center

- g) What are blocks in Beamer? Discuss the various blocks available in Beamer by giving example?

- h) Write the HTML codes for creating a simple web page by appropriately giving it a title and putting some text in the body.
- i) Write HTML code to add an image and a hyper link in a web page?
- j) Write the contents of a folder structure of a basic website.

**3. Answer any one:** **1 × 5 = 5**

- a) What is a list environment in LaTeX? How many list environments are there in LaTeX? Give their general format and explain their differences by giving example.
- b) What is a sectioning command in LaTeX? Discuss the various sectioning commands available in article, report and book class.

**4. Answer any two:** **2 × 5 = 10**

- a) What are the various math environments available in LaTeX? Which environment is used to write multiline formulas? Write LaTeX code for producing the following multiline formula:

$$\begin{aligned}
 (a + b)^2 &= (a + b)(a + b) \\
 &= a(a + b) + b(a + b) \\
 &= a^2 + 2ab + b^2
 \end{aligned}$$

- b) How are arrays produced in LaTeX? What do you need to include in a LaTeX file to use matrix environment? Write LaTeX code for producing the following matrix:

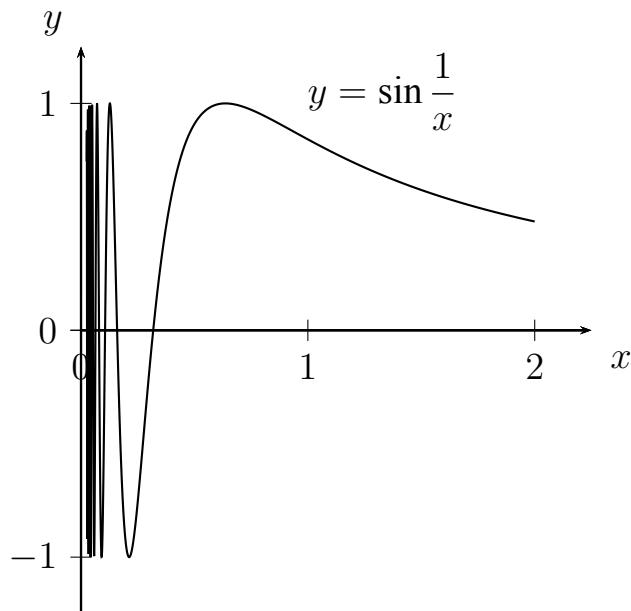
$$M = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}$$

- c) What are float environments available in LaTeX? Why are they called float environments? Write LaTeX code to produce the following table:

Number System	Number
1	Decimal
2	Hexadecimal
3	Octal
4	Binary

**5. Answer any two:** **$2 \times 5 = 10$** 

a) Write PSTricks code to plot the following graph of the function  $y = \sin \left( \frac{1}{x} \right)$ :



b) Write LaTeX code to prepare a simple Beamer document containing at least five frames including title frame, table of contents etc., by appropriately giving a title, author, etc.

c) What is Overlay in Beamer? Explain how you can achieve overlay of bulleted items and blocks by giving examples.

**6. Answer any two:** **$2 \times 5 = 10$** 

a) Discuss the various types of list elements available in HTML by describing their purpose. Write the HTML code to prepare the three list types by appropriately giving examples.

b) What are the various elements available in HTML to create a table? Write HTML code to prepare a simple table given below:

No. of students pursuing B.Sc.(H) Maths				
Sl. No.	Semester	Boys	Girls	Total
1	I	60	62	122
2	III	27	30	57
3	V	19	20	39
Grand Total		106	112	218

c) Give HTML code to include navigational links such as About, Download, Gallery, Contact, etc., in a webpage. Write the steps to create a website and host it on the world wide web.