

# DHANAMANJURI UNIVERSITY

## DECEMBER-2022

**Name of Programme** : B.Sc. Mathematics  
**Semester** : 3<sup>rd</sup>  
**Paper Type** : SEC-I  
**Paper Code** : SMA-006  
**Paper Title** : LaTeX and HTML

**Full Marks** : 75

**Pass Marks** : 30

**Duration** : 3 Hours

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

*Answer all the questions:*

**1. Write very short answer for each of the following:** **1 x 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 Reimann Integral

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

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

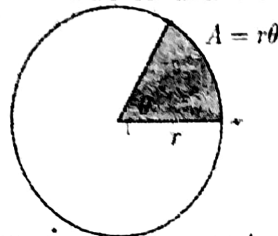
$$f(x) = \begin{cases} x, & \text{if } x \geq 0 \\ -x, & \text{if } x < 0 \end{cases}$$

- 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 x 10 = 30

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



- 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
- What are blocks in Beamer? Discuss the various blocks available in Beamer by giving example?
- Write the HTML codes for creating a simple web page by appropriately giving it a title and putting some text in the body.
- Write HTML code to add an image and a hyperlink in a web page?
- Write the contents of a folder structure of a basic website.

**3. Answer any one:**

- 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 x 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:

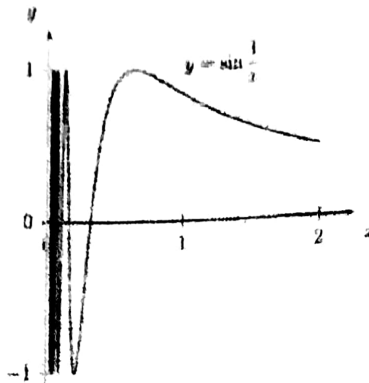
Number System		Number
1	Decimal	1984
2	Hexadecimal	7C0
3	Octal	3700
4	Binary	11111000000

5. Answer any two:

2 x 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 x 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?

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