North Gauhati College

Department of Mathematics

Sessional Examination 2021

LaTeX and HTML (MAT-SE-4024)

QUIZ #1

Full Marks: 30 Time Duration: $1\frac{1}{2}$ hour

INSTRUCTIONS TO CANDIDATES

1. This question paper contains **Four (4)** questions and comprises **Two (2)** printed pages.
2. Answer all the questions.
3. Write your **Name**, **GU Roll No.**, and **Registration Number** .
4. Submit the solutions as a single **PDF** file through the online portal of our college website under section "**Assignments**".

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1. Answer the following as directed. [1×5]
   (a) What is TeX ?
   (b) Who designed the LaTeX ?
   (c) Give example of a LaTeX editor.
   (d) What is wrong with the following LATEX input? What is the correct way to do it?

   ```
   If m=1 and n=2, then m+n=3.
   ```

   (e) What is wrong with the following input? What is the right way to do it?

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   If $theta = pi$, then $sin theta = 0$.
   ```

2. Answer the following as directed. [2×5]
   (a) Write the matrix

$$\begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix}$$

(b) Write the equation

$$(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$$

(c) Typeset the sentence
The quadratic equation $ax^2 + bx + c = 0$ has roots

$$r_1, r_2 = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

(d) Typeset the equation

$$\frac{d}{dx}\left(\frac{x}{x+1}\right) = \frac{1}{(x+1)^2}$$

(e) Write the LaTeX code for the equation

$$\lim_{n\to\infty}\left(1 + \frac{1}{n}\right)^n = e$$

3. Make the following multi-line equation. [5]

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

4. Write a LaTeX code to produce the following output: [10]

Define

$$V_n = \begin{bmatrix} 1 & 1 & 1 & \dots & 1 \\ x_1 & x_2 & x_3 & \dots & x_n \\ x_1^2 & x_2^2 & x_3^2 & \dots & x_n^2 \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ x_1^{n-1} & x_2^{n-1} & x_3^{n-1} & \dots & x_n^{n-1} \end{bmatrix}.$$

We call V_n the *Vandermonde matrix* of order n. Claim:

$$\det V_n = \prod_{1 \le i < j \le n} (x_j - x_i).$$

END OF PAPER