Name of the Course	:	**CBCS B.Sc. (H) Mathematics**
Unique Paper Code	:	**32353301**
Name of the Paper	:	**SEC: LaTeX and HTML**
Semester	:	**III**
Duration	:	**3 Hours**
Maximum Marks	:	**38**

Attempt any four questions. All questions carry equal marks.

1. Fill in the blanks:

    (i)   The boldfaced text in LaTeX is produced by .... command.
    (ii)   The output of $ a\times b$ in LaTeX is ……………….……….. .
    (iii)   The symbol ∞ can be produced in LaTeX using the command ………………… .
    (iv)   The string {c c c} is used to define ………………………. and
            …………………………… in the array environment in LaTeX.
    (v)   The combination of symbols \; is used in LaTeX
            to ……………………………… between the words.
    (vi)   ………......….. command is used to create horizontal dots above the line in
            LaTeX.
    (vii)   In PSTricks, PS stands for ……………….. .
    (viii) …………… tag is used in HTML to add the largest heading to a paragraph.
    (ix)   ……………. HTML attribute is used to center align a paragraph.

2. Answer the following:

    (i)   Give the command using PSTricks to draw an elliptic arc having vertical radius 2 cm
            and horizontal radius 5 cm.

    (ii)   Write the input command in LaTeX to produce the following:

    $$f(x) = a_0 + \sum_{n=1}^{\infty} \left(a_n\, cos\, \frac{n\pi x}{L} + b_n\, sin\, \frac{n\pi x}{L} \right)$$

    (iii)   Correct the following input as per LaTeX commands:
            If $x = \alpha$ and $ y = \beta $ then $ frac{\alpha}{\beta} =2 $.

    (iv)   Write the code in LaTeX to plot the curves $y = sin\, 2x$ and $y = cos\, x$ on the same
            coordinate system for $x \in [0,2\pi]$. Show the sine function as a solid curve and cosine
            function as a dashed curve.

    (v)   What is the difference between the following environments in LaTeX?
            (a) \vdots and \ddots
            (b) eqnarray and eqnarray*
            (c) enumerate and itemize

    (vi)   Make the following element into a link that goes to https://www.du.ac.in
            <a ....> This is a link.

3. Find the errors in the following LaTeX commands, write the corrected version and its output.

```
\Documentclass{beamer}
\usetheme{CambridgeUS}
\begin{title}{SYSTEM OF LINEAR EQUATIONS}\end{title}
\author{XYZ}
\begin{document}
\maketitle
\begin{frame}
\frametitle{System of Linear Equations}
        \begin{eqnarray*}
        a_{11}x_1+a_{12}x_2+\cdots + a_{1n}x_n = b_1 \\
        a_{21}x_1+a_{22}x_2+\cdots + a_{2n}x_n = b_2 \newline
        \vdots \vdots  \ddots \vdots & & \vdots \newline
        a_{m1}x_1+a_{m2}x_2+\cdots + a_{mn}x_n = b_m
        \end{ eqnarray*}
In the matrix form it can be written as \textbf{AX = b}. The augmented matrix of the
system is
\begin{equation}
M=[A|b]=\left[\begin{matrix}{cccc|c}
a_{11} &  a_{12} & \cdots &a_{1n} & b_1\\
a_{21} & a_{22} & \cdots &a_{2n} & b_2\\
\vdots & \vdots &\ddots &\vdots & \vdots\\
a_{m1} &  a_{m2} & \cdots & a_{mn} & b_m\\
\end{matrix}\right]\end{equation}
                \end{frame}
\begin{frame}
\frametitle{System of Linear Equations}
The system of linear equations is consistent if rank of  [A|b] is equal to the rank of $A$
otherwise inconsistent.
\end{frame}

\begin{frame}
\start{center}
\Huge{Thank You}
\end{frame}
\end{center}
```

4. Write the code in LaTeX to produce the following output:

$$\begin{aligned}
E[|X|] &= \int_x |x| f_X(x) dx \\
&= \int_{|x|\geq a} |x| f_X(x) dx + \int_{|x|<a} |x| f_X(x) dx \\
&\geq \int_{|x|\geq a} |x| f_X(x) dx \\
&\geq a \int_{|x|\geq a} f_X(x) dx \\
&= a E[|X| \geq a] \\
\therefore E[|X| \geq a] &\leq \frac{E[|X|]}{a}
\end{aligned}$$

5. Write an HTML code to generate the following web page and follow the given instructions while writing the code:
    (a) Font face of the text should be "Calibri".
    (b) Text colour of the main heading should be blue and of the sub-headings should be red.
    (c) The image to be included in the web page should be named as "bgblogo.jpg".

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*Friday and Saturday, **11 am to midnight***

6. Create the following presentation in LaTeX using beamer:
    Slide-1

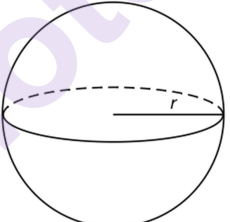**Volume of a Sphere**

Myself

University of Delhi

Slide-2

Equation of a Sphere

The equation of a sphere is given by:

$$x^2 + y^2 + z^2 = r^2,$$

where r is the radius of the sphere.

Slide-3

Volume of a Sphere

Volume of a sphere is given by $V = 4/3(\pi r^3)$.
To calculate the volume of a sphere:

- Cube the radius
- Multiply by 4π
- Divide by 3

Slide-4

Thank You!