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

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

   (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 \url{https://www.du.ac.in}

   <a ................> This is a link. </a>
3. Find the errors in the following LaTeX commands, write the corrected version and its output.

\begin{verbatim}
\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 \\
\vdots \; \vdots \; \ddots \; \vdots & \; & \vdots \; \vdots \\
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}
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 $[A \vert b]$ is equal to the rank of $A$ otherwise inconsistent.
\end{frame}

\begin{frame}
\start{center}
\Huge{Thank You}
\end{frame}
\end{document}
\end{verbatim}

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

\[
E[|X|] = \int_{-\infty}^{\infty} |x|f_X(x)\,dx \\
= \int_{|x|\geq a} |x|f_X(x)\,dx + \int_{|x|<a} |x|f_X(x)\,dx \\
\geq \int_{|x|\geq a} |x|f_X(x)\,dx \\
\geq a \int_{|x|\geq a} f_X(x)\,dx \\
= aE[|X| \geq a] \\
\therefore E[|X| \geq a] \leq \frac{E[|X|]}{a}
\]

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

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**Black Goose Bistro**

**THE RESTAURANT**

The Black Goose Bistro offers lunch and dinner in a good ambience. The menu changes regularly to highlight the freshest ingredients.

**CATERING**

You have FUN...we’ll handle the cooking. Black Goose Catering can handle events from snacks for kitty parties to elegant corporate lunches.

**LOCATION AND HOURS**

*Block K, Connaught Place, New Delhi;*

*Monday through Thursday 11am to 11pm,*

*Friday and Saturday, 11 am to midnight*
Volume of a Sphere

Myself
University of Delhi

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.

Volume of a Sphere

Volume of a sphere is given by $V = \frac{4}{3}(\pi r^3)$.

To calculate the volume of a sphere:

- Cube the radius
- Multiply by $4\pi$
- Divide by 3
Thank You!