

**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  $\infty$  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. </a>`

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 \\
\vdots \quad \vdots \quad \ddots \quad \vdots \quad \& \& \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  $\text{AX} = \text{b}$ . 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:

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

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



## Black Goose Bistro

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

# Volume of a Sphere

Myself  
University of Delhi



Myself Volume of a Sphere

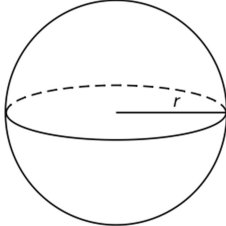
Slide-2

## 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.



The diagram shows a sphere with a horizontal line representing the radius  $r$  from the center to the right edge. A dashed line represents the back part of the sphere's equator.




Myself Volume of a 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  $4\pi$
- Divide by 3



Myself Volume of a Sphere

Slide-4

Thank You!

