Practical no. : 2

Objective : Design a webpage to display the contents of Applied Mathematics paper using HTML tags .

MathJax : It is a tool in JavaScript library that enables us to display complex mathematical equations and formulas on web pages in a clear and visually appealing manner.

Some MathJax command which we are using for creating web page :--

- **Fractions :** \(\frac{numerator} {denominator} \)
- **Subscripts and Superscripts :** \(_, ^ \)
- **Geek letters :** \alpha , \theta etc
- **Integrals :** \(\int \)
- **Square root :** \(\sqrt{ } \)

PROGRAM

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Math Paper</title>
  <script src="https://cdn.jsdelivr.net/npm/mathjax@3/es5/tex-mml-chtml.js"></script>
  <style>
    .container{
      padding: 150px;
      padding-top: 10px;
    }
    .bold{
      font-weight: bold;
    }
    .right{
      float: right;
      margin-bottom: 40px;
    }
    .center{
```

```
      display: grid;
      justify-items: center;
      line-height: 0px;
    }
    .end{
      display: flex;
      justify-content: space-between;
    }
    .question ol{
      line-height: 30px;
    }
  </style>
</head>
<body>
  <div class="container">
    <p class="bold right">Roll No.: .....</p><br><br><br><br>
    <div class="center bold">
    <p>Diploma in Mechanical/Computer/Electronics Engineering</p>
    <p>Second Semester Examination, 2023</p>
    <p>Subject: Applied Mathematics-II,</p>
    <p>Paper Code: DMEM-201/DCOM-201/DELM-201</p>
  </div>
  <div class="end bold">
    <p>Time: 3:00 Hours</p>
    <p>Maximum Marks: 60</p>
  </div>
  <p><b>Note:</b> Write your roll number on top immediately on receipt of this question paper. Attempt all questions. All questions carry equal marks. Solve any three parts from each question.</p>
  <hr>
```

```
<div class="question">
  <ol>
    <li>
      <ol type="a">
        <li> Find <i>dy/dx</i> of <i>y</i> = cosec <i>x</i> using first principle. </li>
        <li>Find <i>dy/dx</i> of <i>y</i> = log sin(<i>e<sup>x</sup>)</i> with respect to <i>x</i>.</li>
        <li>If <i>x<sup>y</sup> + y<sup>x</sup></i> = 10, find <i>dy/dx.</i></li>
        <li>If <i>x<sup> 3</sup> + y <sup>3</sup></i> = 3<i>axy</i>, show that \( \frac{d^2y}{dx^2} = \frac{2a^2xy}{(ax-y^2)^2} \)</li>
      </ol>
      <li>
        <ol type="a">
          <li>Evaluate: \( \int\frac{sin(2+3 logx)}{x} dx.\)</li>
          <li>Evaluate: \(\int x^2cosx dx.\)</li>
          <li>Evaluate: \(\int \frac{x^2-3x+4}{(x-2)(x+2)(x+4)}dx. \)</li>
          <li>Evaluate: \(\int \frac{cosx}{(1+sinx)^2(2+sinx)}dx. \)</li>
        </ol>
      </li>
      <li>
        <ol type="a">
          <li>Find the equations of the tangent and noraml to curve <i> x</i><sup>2/3</sup> + <i>y</i><sup>2/3</sup> = 4 at the point (\( 2\sqrt{2},2\sqrt{2}\))</li>
          <li>Find the maxima and minima of the function <i>y</i> = <i>x</i><sup>5</sup> - 5<i>x</i><sup>4</sup> + 5<i>x</i><sup>3</sup> - 1. Also, find the maximum and minimum values.</li>
          <li>Prove that\(\int^ \pi _0 log(sinx)\; dx = \frac{-x}{2}log \;2. \) </li>
          <li>Find the area bounded by the curve \(x^2 + y^2 = a^2\) about x-axis.</li>
        </ol>
      </li>
      <li>
```

```
        <ol type="a">
          <li>Solve the differential equation : <i>y(x + y)dx + x<sup>2</sup>dy = 0.</i></li>
          <li>Solve the differential equation : \(x \frac{dy}{dx} - 3y = x^2.\)</li>
          <li>Solve the differential equation \(\frac{d^2y}{dx^2} - 2\frac{dy}{dx}\) <i> = x<sup>2</sup> + 4e<sup>3x</sup>.</i> </li>
          <li>Solve the differential equation \(\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + 6y  = sin2x . \)</li>
        </ol>
      </li>
      <li>
        <ol type="a">
          <li>Write the complex number \(\frac{2+i6 \sqrt{3}}{5+i\sqrt{3}}\) in the polar form.</li>
          <li>Simplify \((\frac{sin3\theta+icos\theta}{cos5\theta+isin5\theta})^4\) by using Demoiver's Theorem.</li>
          <li>Prove that \((-1 + i\sqrt{3})^{3n} + (-1-i\sqrt{3})^{3n} = 2^{3n+1}\)</li>
          <li>Find the cube roots of the complex numbers z = 1 + <i>i</i>.</li>
        </ol>
      </li>
    </li>
  </ol>
 </div>
 </div>
</body>
</html>
```

Output : --

Roll No.: .....

Diploma in Mechanical/Computer/Electronics Engineering

Second Semester Examination, 2023

Subject: Applied Mathematics-II,

Paper Code: DMEM-201/DCOM-201/DELM-201

Time: 3:00 Hours **Maximum Marks: 60**

Note: Write your roll number on top immediately on receipt of this question paper. Attempt all questions. All questions carry equal marks. Solve any three parts from each question.

---

1. a. Find dy/dx of y = cosec x using first principle.

   b. Find dy/dx of $y = \log \sin(e^x)$ with respect to x.

   c. If $x^y + y^x = 10$, find dy/dx.

   d. If $x^3 + y^3 = 3axy$, show that $\frac{d^2y}{dx^2} = \frac{2a^2xy}{(ax-y^2)^2}$

2. a. Evaluate: $\int \frac{sin(2+3logx)}{x} dx$.

   b. Evaluate: $\int x^2 cosx dx$.

   c. Evaluate: $\int \frac{x^2-3x+4}{(x-2)(x+2)(x+4)} dx$.

   d. Evaluate: $\int \frac{cosx}{(1+sinx)^2(2+sinx)} dx$.

3. a. Find the equations of the tangent and noraml to curve $x^{2/3} + y^{2/3} = 4$ at the point $(2\sqrt{2}, 2\sqrt{2})$

   b. Find the maxima and minima of the function $y = x^5 - 5x^4 + 5x^3 - 1$. Also, find the maximum and minimum values.

   c. Prove that $\int_0^{\pi} log(sinx)\, dx = \frac{-x}{2} log\, 2$.

   d. Find the area bounded by the curve $x^2 + y^2 = a^2$ about x-axis.

4. a. Solve the differential equation : $y(x + y)dx + x^2dy = 0$.

   b. Solve the differential equation : $x\frac{dy}{dx} - 3y = x^2$.

   c. Solve the differential equation $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} = x^2 + 4e^{3x}$.

   d. Solve the differential equation $\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + 6y = sin2x$.

5. a. Write the complex number $\frac{2+i6\sqrt{3}}{5+i\sqrt{3}}$ in the polar form.

   b. Simplify $(\frac{sin3\theta+icos\theta}{cos5\theta+isin5\theta})^4$ by using Demoiver's Theorem.

   c. Prove that $(-1+i\sqrt{3})^{3n} + (-1-i\sqrt{3})^{3n} = 2^{3n+1}$

   d. Find the cube roots of the complex numbers z = 1 + i.