ANNEXURE I
FOR DIPLOMA HOLDERS in ENGINEERING
MATHEMATICS (Common Syllabus)

Unit-I Matrices:

Partial Fractions: Resolving a given rational function into partial fractions.

Unit –II:

Complex Numbers: Modulus and conjugate, arithmetic operations on complex number—Modulus-Amplitude form (Polar form)-Euler form (exponential form)-Properties- De Movire’s Theorem and its applications.

Unit – III : Analytical Geometry
Circles-Equation given center and radius-given ends of diameter-General equation-finding center and radius. Standard forms of equations of Parabola, Ellipse and Hyperbola – simple properties.

Unit – IV : Differentiation and its Applications
Functions and limits – Standard limits – Differentiation from the First Principles – Differentiation of sum, product, quotient of functions, function of function, trigonometric, inverse trigonometric, exponential, logarithmic, Hyperbolic functions, implicit, explicit and parametric functions – Derivative of a function with respect to another function-Second order derivatives –Geometrical applications of the derivative (angle between curves, tangent and normal) – Increasing and decreasing functions – Maxima and Minima (single variable functions) using second order derivative only – Derivative as rate measure -Errors and approximations - Partial Differentiation – Partial derivatives up to second order – Euler’s theorem.

Unit – V : Integration and Its Applications
Indefinite Integral – Standard forms – Integration by decomposition of the integrand of trigonometric, algebraic, exponential, logarithmic and Hyperbolic functions – Integration by substitution – Integration of reducible and irreducible quadratic factors – Integration by parts – Definite Integrals and properties, Definite Integral as the limit of a sum – Application of Integration to find areas under plane curves and volumes of Solids of revolution – Mean and RMS value.

Unit – VI: Differential Equations
Definition of a differential equation-order and degree of a differential equation- formation of differential equations-solution of differential equation of the type first order, first degree, variable-separable, homogeneous equations, exact, linear differential equation of the form \( \frac{dy}{dx} + Py = Q \), Bernoulli’s equation, nth order linear differential equation with constant
coefficients both homogeneous and non homogeneous and finding the Particular Integrals for the functions $e^{ax}$, $x^m$, $\sin ax$, $\cos ax$.

ANNEXURE II
FOR DIPLOMA HOLDERS
MATHEMATICS (Common Syllabus)

Number of Questions to be Set Unit Wise (TOTAL 50)

<table>
<thead>
<tr>
<th>UNIT NO</th>
<th>TOPICS</th>
<th>MARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Matrices</td>
<td>05</td>
</tr>
<tr>
<td></td>
<td>Partial Fractions</td>
<td>02</td>
</tr>
<tr>
<td>II</td>
<td>Trigonometry</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Complex numbers</td>
<td>02</td>
</tr>
<tr>
<td>III</td>
<td>Analytical geometry</td>
<td>06</td>
</tr>
<tr>
<td>IV</td>
<td>Differentiation and its</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>applications</td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>Integration and its</td>
<td>08</td>
</tr>
<tr>
<td></td>
<td>applications</td>
<td></td>
</tr>
<tr>
<td>VI</td>
<td>Differential equations</td>
<td>07</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>50</td>
</tr>
</tbody>
</table>

ANNEXURE III
FOR DIPLOMA HOLDERS
MODEL QUESTIONS FOR MATHEMATICS

1. The maximum value of $5 + 8\cos\theta + 6\sin\theta$ is

1) 25 
2) 19 
3) 15 
4) 5

2. The value of $\cos10^0\cos50^0\cos70^0$ is

1) $\frac{\sqrt{3}}{4}$
2) $\frac{\sqrt{3}}{2}$
3) $\frac{\sqrt{3}}{6}$
4) $\frac{\sqrt{3}}{8}$
3. If \( \sec 2\theta = \frac{-2}{\sqrt{3}} \) then the general solution \( \theta \) is

1) \( 2n\pi \pm \frac{5\pi}{6} \)

2) \( n\pi \pm \frac{5\pi}{6} \)

3) \( n\pi \pm \frac{5\pi}{12} \)

4) \( 2n\pi \pm \frac{\pi}{6} \)

4. The eccentricity of the ellipse \( 3x^2 + 2y^2 = 6 \) is

1) \( \frac{1}{3} \)

2) \( \frac{1}{\sqrt{3}} \)

3) \( \frac{1}{4} \)

4) \( \frac{1}{2} \)

5. \( \int_0^1 \frac{xe^x}{(1+x)^2} \, dx = \)

1) \( \frac{e-2}{2} \)

2) \( e-2 \)

3) \( \frac{e-1}{2} \)

4) \( e-1 \)