

**ANNEXURE I**  
**MATHEMATICS (Common Syllabus)**  
**FOR DIPLOMA HOLDERS**

**Unit-I Matrices:**

Matrices of 3rd order: Types of matrices-Algebra of matrices-Transpose of a matrix-Symmetric, skew symmetric matrices-Minor, cofactor of an element-Determinant of a square matrix-Properties-Laplace's expansion-singular and non singular matrices-Adjoint and multiplicative inverse of a square matrix-System of linear equations in 3 variables-Solutions by Cramer's rule, Matrix inversion method,-Gauss-Jordan methods.

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

**Unit –II:**

**Trigonometry:** Properties of Trigonometric functions – Ratios of Compound angles, multiple angles, sub multiple angles – Transformations of Products into sum or difference and vice versa – Simple trigonometric equations – Properties of triangles – Inverse Trigonometric functions.

**Complex Numbers:** Modulus and conjugate, arithmetic operations on complex number— Modulus-Amplitude form (Polar form)-Euler form (exponential form)-Properties- De Moivre'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

$dy/dx + Py = Q$ , 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)**

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

**ANNEXURE III**  
**FOR DIPLOMA HOLDERS**  
**MODEL QUESTIONS FOR MATHEMATICS**

- The maximum value of  $5+8\cos\theta +6\sin\theta$  is  
 1) 25      2) 19      3) 15      4) 5
- The value of  $\cos 10^\circ \cos 50^\circ \cos 70^\circ$  is  
 1)  $\frac{\sqrt{3}}{4}$       2)  $\frac{\sqrt{3}}{2}$       3)  $\frac{\sqrt{3}}{6}$       4)  $\frac{\sqrt{3}}{8}$
- 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)  $2n\pi \pm \frac{\pi}{6}$
- 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)  $\frac{1}{2}$
- $\int_0^1 \frac{xe^x}{(1+x)^2} dx =$   
 1)  $\frac{e-2}{2}$       2) e-2      3)  $\frac{e-1}{2}$       4) e-1