ANNEXURE I
MATHEMATICS (Common Syllabus)
FOR DIPLOMA HOLDERS

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
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)

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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 $\cos 10^\theta \cos 50^\theta \cos 70^\theta$ 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) $2n\pi \pm 5\pi$  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. $\int_0^1 \frac{x e^x}{(1+x)^2} dx =$
   1) $\frac{e-2}{2}$  2) $e-2$  3) $\frac{e-1}{2}$  4) $e-1$