ANNEXURE - I ENGINEERING MATHEMATICS

(Common for all branches of Diploma in Engineering)

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 Crammer's rule, Matrix inversion method.

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 differenceand 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 Movire's Theorem and its applications.

<u>Unit – III : Analytical Geometry</u>

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.

<u>Unit – IV</u>: 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.

<u>Unit – V:</u> Integration and Its Applications

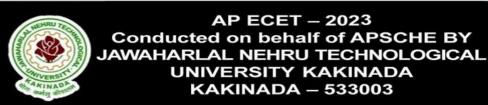
Indefinite Integral – Standard forms – Integration by decomposition of the integrand of trigonometric, algebraic, exponential, logarithmic and Hyperbolic functions – Integration by substitution – Integration of reducible and irreducible quadratic factors – Integration by parts – Definite Integrals and 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.



<u>Unit – VI:</u> 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
I	Matrices	05
	Partial Fractions	02
п	Trigonometry	10
	Complex numbers	02
III	Analytical geometry	06
IV	Differentiation and its applications	10
V	Integration and its applications	08
VI	Differential equations	07
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 $Cos10^{0}Cos50^{0}Cos70^{0}$ is
 - $1) \qquad \frac{\sqrt{3}}{4}$
 - $2) \qquad \frac{\sqrt{3}}{2}$
 - $3) \qquad \frac{\sqrt{3}}{6}$
 - $4) \qquad \frac{\sqrt{3}}{8}$
- 3. If $Sec2\theta = \frac{-2}{\sqrt{3}}$ then the general solution θ is
 - $1) \quad 2n\pi \pm \frac{5\pi}{6}$
 - $2) \quad n\pi \pm \frac{5\pi}{6}$
 - $3) \quad n\pi \pm \frac{5\pi}{12}$
 - $4) \quad 2n\pi \pm \frac{\pi}{6}$
- 4. The eccentricity of the ellipse $3x^2 + 2y^2 = 6$ is
 - 1) $\frac{1}{3}$
 - $2) \qquad \frac{1}{\sqrt{3}}$
 - 3) $\frac{1}{4}$
 - 4) $\frac{1}{2}$
- 5. $\int_0^1 \frac{x e^x}{(1+x)^2} dx =$
 - $1) \quad \frac{e-2}{2}$
 - 2) e-2
 - $3) \quad \frac{e-1}{2}$
 - 4) e-1