ENGINEERING MATHEMATICS

(Common for all branches of Diploma in Engineering)

Unit-I:

Partial Fractions:

Resolve rational fractions (proper fractions) into partial fractions covering the types mentioned below.

(i) $\dfrac{f(x)}{(ax+b)(cx+d)}$ (ii) $\dfrac{f(x)}{(ax+b)^2(cx+d)}$

Matrices:

Definition of a matrix, types of matrices - Algebra of matrices, equality of two matrices, sum, difference, scalar multiplication and product of matrices. Transpose of a matrix, Symmetric, skew-symmetric matrices-Determinant of a square matrix, minor and cofactor of an element, Laplace's expansion, properties of determinants - 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 and Matrix inversion method.

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–Inverse Trigonometric functions.

Complex Numbers:

Definition of a complex number, modulus, conjugate and amplitude of a complex number – Arithmetic operations on complex numbers - Modulus-Amplitude (polar) form, Exponential form (Euler form) of a complex number.

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

Definition and Properties of Limits and Standard Limits - Differentiation from the First Principles– Derivatives of standard algebraic, logarithmic, Exponential, trigonometric, inverse trigonometric, hyperbolic and inverse hyperbolic functions - Derivatives of sum, difference, scalar multiplication, product, quotient of functions - Chain rule, derivatives of parametric functions, derivatives of implicit functions, logarithmic differentiation - Second order derivatives - Functions of several variables, first and second order partial derivatives.

Geometrical applications of the derivative (equations of tangent and normal to a curve at any point)

Physical applications of derivatives – Velocity, acceleration, derivative as a rate measurer Applications of the derivative to find the extreme values – Increasing and decreasing functions, maxima and minima for quadratic and cubic polynomials

Absolute, relative and percentage errors - Approximate values due to errors in measurements.

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.

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, linear differential equation of the form $\frac{dy}{dx}$+py=Q)

ANNEXURE- II
FORDIPLOMAHOLDERS
MATHEMATICS(CommonSyllabus)

NumberofQuestionsto be SetUnit Wise(Total50)

UNITNO	TOPICS	MARKS
I	**Matrices**	**05**
	Partial Fractions	**02**
	Trigonometry	**10**
II	**Complex numbers**	**02**
	Analytical geometry	**06**
III	**Differentiation and its applications**	**10**
IV	**Integration and its applications**	**08**
V	**Differential equations**	**07**
Total		**50**

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 $\cos 10^0 \cos 50^0 \cos 70^0$
   is 1) $\dfrac{\sqrt{3}}{4}$
   2) $\dfrac{\sqrt{3}}{2}$
   3) $\dfrac{\sqrt{3}}{6}$
   4) $\dfrac{\sqrt{3}}{8}$

3. If $\sec 2\theta = \dfrac{-2}{\sqrt{3}}$ then the general solution θ is
   1) $2n\pi \pm \dfrac{5\pi}{6}$
   2) $n\pi \pm \dfrac{5\pi}{6}$
   3) $n\pi \pm \dfrac{5\pi}{12}$
   4) $2n\pi \pm \dfrac{\pi}{6}$

4. The eccentricity of the ellipse $3x^2 +2y^2=6$ is
   1) $\dfrac{1}{3}$
   2) $\dfrac{1}{\sqrt{3}}$
   3) $\dfrac{1}{4}$
   4) $\dfrac{1}{2}$

5. $\int_0^1 \dfrac{xe^x}{(1+x)^2} dx =$
   1) $\dfrac{e-2}{2}$
   2) $e-2$
   3) $\dfrac{e-1}{2}$
   4) $e-1$