

SEMESTER I - ALLIED MATHEMATICS -I
(FOR PHYSICS/CHEMISTRY/ELECTRONICS MAIN)

(4 Credits)

UNIT -1 (ALGEBRA)

Matrices – Rank of a matrices – Consistency of a system of linear non-homogeneous equations(statement only) – Simple problems – Characteristic roots of a square matrix – Evaluation of Eigen values and Eigen vectors of a square matrix – Cayley Hamilton theorem (statement only) – Simple problems.

UNIT -2 (TRIGONOMETRY)

De Moivre's theorem – Expansions of $\cos(n\theta)$, $\sin(n\theta)$ and $\tan(n\theta)$ – Powers of sines and cosines of θ in terms of functions of multiples of θ . Expansions of $\sin(\theta)$, $\cos(\theta)$ in a series of ascending powers of θ – Limits and approximations.

UNIT-3 (FUNCTIONS OF COMPLEX VARIABLE)

Analytic functions – Cauchy Riemann equations – derivation and simple problems – Harmonic functions

UNIT-4 (VECTOR CALCULUS)

Vector differentiations – Scalar point functions – Vector point functions – Derivatives of a Vector point functions , sum of two vector point functions , product of scalar and Vector point function, Vector product – The vector operator Del, Gradient , Divergence and Curl – Simple application problems involving Cartesians – Laplace Operator.

UNIT – 5 (POLAR CO-ORDINATES)

Angle between radius and vector and tangent – Angle of intersection of two curves – Pedal equations of a curve

Text books:

1. S. Narayanan and T.K. Manicavachagom pillai, Calculus, S. Viswanathan Publishers
2. S. Narayan , Trigonometry, S. Viswanathan Publishers, 2012
3. P. DuraiPandian, Complex Variable, Emerald Publishers, 1979
4. P. DuraiPandian, Vector Calculus, 1984
5. Vittal and Malini , Allied Mathematics, V.Margham Publishers, 1997

Reference Books:

1. George B.Thomas, Maurice D.Weir and Joel Hass, Thomas' Calculus 12th Edition, Pearson Education, 2015
2. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 9th Edition, 2011
3. Gilbert Strang, Linear Algebra and Its Applications, CENGAGE Learning, 2007.

SEMESTER II - ALLIED MATHEMATICS –II
(FOR PHYSICS/CHEMISTRY/ELECTRONICS MAIN)
(4 Credits)

UNIT -1 (INTEGRAL CALCULUS)

Evaluation of $\int e^{ax} \cos(bx) dx$ and $\int e^{ax} \sin(bx) dx$, - Bernoulli's formula for integration by parts – Definite integrals – reduction formulae – Related definite integrals – properties – reduction formula for $\int e^{ax} x^n dx$, $\int \sin^n x dx$ and $\int \cos^n x dx$ (n is a positive integer) - Evaluation of $\int_0^{\infty} e^{-x} x^n dx$, $\int_0^{\pi/2} \sin^n x dx$, $\int_0^{\pi/2} \cos^n x dx$, - Rule of writing down $\int_0^{\pi/2} \sin^m x \cos^n x dx$ and illustrations

UNIT -2 (VECTOR INTEGRATION)

Gauss Divergence theorem and Stokes's theorem (Statement only) – Simple problems

UNIT-3 (FOURIER SERIES)

Definition – Finding Fourier co-efficient for a given period function with period 2π -

Odd and Even functions – Half range series

UNIT-4 (ORDINAR DIFFERENTIAL EQUATIONS)

Equations of the first order but not of the first degree – Equations solvable for dy/dx , - equations solvable for y - Equations Solvable for x - Clairaut's form (simple cases) – Linear equations with constant coefficients – Evaluation of the particular integral of the equation – e^x , $\sin(ax)$, $\cos(ax)$, x^k , $e^{ax}f(x)$

UNIT – 5 (LAPLACE TRANSFORM)

Definitions – Condition for the existence of Laplace transform – Laplace transform of 1, e^{at} , e^{-at} , $\cos(at)$, $\sin(at)$, $\sinh(at)$, $\cosh(at)$ and t^n - Simple problems – Laplace transform of the derivatives – Laplace transform of the integral – first shifting theorem – change of scale of property – Laplace transform of function multiplied by t , divisible by t – inverse Laplace transform – solution of ordinary differential equations using Laplace transforms

Text books:

1. S. Narayanan and T.K. Manicavachagom pillai, Calculus, S. Viswanathan Publishers
2. P. DuraiPandian, Vector Calculus, 1984
3. Vittal and Malini , Allied Mathematics, V.Margham Publishers, 1997

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