**SYLLABUS FOR THE SUBJECT OF MATHEMATICS**

**Paper I**

**Total Marks: 100**

Candidates will be asked to attempt three questions from Section A and two questions

from section B.

**Section A**

Limits, Continuity, Differentiability and its Applications, General theorems (Rolle's

Theorem, Mean value theorem), Asymptotes, Applications of Maxima and Minima.

Definite and Indefinite integrals and their Application, Quadrature, Rectification,

Numerical methods of Integration (Trapezoidal and Simpson rule), Multiple integrals and

their Applications. Areas and Volumes, Centre of Mass, Reimann-Stijles Integral,

Ordinary Differential Equations (O.D.Eqs) and their Applications in Rectilinear motion

and Growth/Decay problems. 2nd Order Differential Equations with Applications (Spring

Mass and Simple Harmonic Oscillator Problems).

**Section B**

Sequences and Series, Convergence tests, Power Series, Radius and Interval of

Convergence. Complex Analysis, Function of Complex Variable, Demoivre's Theorem

and its Application. Analytic Function, Singularities, Cauchy theorem, Cauchy Integral

formula.

Conic Sections in Cartesian coordinates, Plane Polar Coordinates and their use to

represent the straight line and Conic section. Vector equation for plane and space

curves. Tangents and Normals and Binormals, Curvature and torsion, Serre Frenet's

Formula.

**Recommended Books:**

*1. Anton, H, Calculus: A New Horizon, Ed. 6, John Willey, New York, 1999.*

*2. Thomas, G. B. Finney. A. R., Calculus, Ed. 9, John Willey, New York, 2005.*

*3. Yusuf, S.M. Amin. M., Calculus with Analytic Geometry, Ilmi Kitab Khana, Lahore.*

*4. Zill, D. G. , Cullen, M.R., Differential Equations with Boundary Value Problems,*

*Ed. 3. PWS Publishing Co., 1997.*

*5. Abell, Braselton, Modem Differential Equations Ed. 2, Thomas Learning Inc.*

*USA, 2001.*

*6. Curchill, R.V., Brawn J.W., Complex Variables and Applications, Ed. 5, McGraw*

*Hill, New York, 1989.*

*7. Ghori, Q.K., Mechanics. Ilmi Kitab Khan, Lahore.*

*8. Weather burn, C.E., Differential Geometry, The English Languages Book Society*

*and Cambridge Uni. Press. 1964.*

*9. Guggenheinerar, H.W., Differential Geometry, McGraw Hill, 1990.*