M.Sc. Examination
2009 - 10"
Physics

M.Sc. Previous

1. The examination shall be consists of five theory papers and a practical.

2. There shall be a practical course for each group.

The distribution of marks shall be as follows —

Theory papers —

1.	Mathematical Physics.	100 Marks
2.	Electromagnetic Theory & Plasma Physics	100 Marks
3.	Quantum Mechanics	100 Marks
4.	Atomic & Molecular Spectroscopy	100 Marks
5.	Electronics	100 Marks

Practicals

A candidate has to perform two experiments during examination one from each group. Time alloted for each experiments will be four hours. There will be some sessional work also. The distribution of marks will be as follows —

		Regular Candidate	Ex-Student
1.	Experiment — I (Group A)	60	90
2.	Experiment — II (Group B)	60	90
3.	Viva	70	70
4.	Record	30	
5.	Sessional work	30	
		Total = 250	250

Dept of Physics

M.Sc. Physics (Previous)

I Paper
MATHEMATICAL PHYSICS
2009-10

UNIT-I:

Numerical Analysis:—

Interpolation: Finite differences, operators, interpolation with equal and unequal intervals of arguments, Central difference interpolation formula, Inverse inter-polation formula

Numerical Differentiation:—

Derivatives using Newton's forward interpolation formula, Derivative using Newton's Backward inter-polation formula, Derivative using stirling formula.

Numerical Integration:—

General quadrature formula for equidistant ordinates, Trapezoidal rule, Simpson-one third and three one eight rule. Euler- Maclaurin summation formula.

Numerical Solution of ordinary differential equations:—

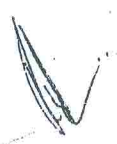By Taylors series method; by Euler's method & by Runge-Kutta method.

~~Solution of Algebric & transcendental equations—~~

~~Newton Raphson or Newton iteration method,~~

~~Regula - Falsi method~~

Integral Transform, Laplace transform; first and second shifting harmonics theorems. Inverse LT by poo-part -tial functions; L.T. of derivative and integral of function; Fourier series; F.S. of arbitrary period; Half wave expansions; Partial sums; fourier integral and transformation; FT of delta functions.

UNIT-II :- COMPLEX VARIABLES;

General function of complex variables Cauchy by — Riemann condition differential eqn. Analytic conformal mapping (translation, rotation, inversion) Cauchy's integral formula, Taylor's & Laurent series, Singularity poles, Residue theorem, Evaluation of definite integral (around unit circle, semicircle using jordan's lemma with poles lying on real axis & integration involving multiple valued function — branch point.)

UNIT- III :—

Introduction to Computer languages fortran constants & variables, arithmatical expression, input - output statements control statements, Do statements subscripted variables, Format specificat -ions logical expressions, function & subroutines Declaration. Common Equivalence and double

precision, Introduction to C language.

Text and Reference Books—

1. Mathematical methods for Physics by Murphy & Morgan

2. Special functions by E.D. Rainville

3. Special functions by W.W. Bell

4. Mathematical for physicists by Mary L Baas

5. Mathematical Physics B.S. Rajput — Pragati Prakashan Meerut.