

COURSES OF STUDIES

FOR
M. PHIL EXAMINATION - 2007
M.Sc. PART - I EXAMINATION - 2007
PART - II EXAMINATION - 2008

PHYSICS



RAVENSHAW COLLEGE
(AUTONOMOUS)
CUTTACK

COURSES OF STUDIES

FOR

M.PHIL. EXAMINATION - 2003

RAVENSHAW COLLEGE,

(Autonomous),

Cuttack.

[PHYSICS]

PAPER. I MARKS		SUBJECT
(A)	Solid state Physics	100
(B)	Nuclear Physics	
PAPER. II		100
(A)	Quantum Field Theory	
(B)	Gravitation and Cosmology	
PAPER. III		100
	Practical	
PAPER. IV		100
	Dissertation	

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PHYSICS**(PAPER - I)**

100 Marks

(A)

Solid state Physics : Double time temperature dependent Green's function, spectral representation. Perfect quantum gases, Application to theory of superconductivity, Ferromagnetism, Electrostatic interaction in a metal.

Text : D.N. Zubarav : Soviet Physics : Uspekhi 3.320(1969)

A.L. Fetter & J.D. Walecks : Quantum Theory of Many particle System.

(B)

Nuclear Physics : Definition of the Nuclear Potential from Meson Theory, derivation of the one pion exchange & scalarmeson exchange potentials.

Hartree & Hartree - Fock theories, Hartree Fock ground state & excited state, Koppmanns theorem. Compound nucleus theory of nuclear reaction, Breit- Wigner formula, optical model, Kapur- Peierl's dispersion formula, Theory of stripping & pick-up reactions.

COURSES OF STUDIES

Text : M.A.Preston & R.K. Bhandari : Structure of the Nucleus.

J. M. Eisenberg & W. Griner : Microscopic Theory of the Nucleus.

R.R. Roy & B.P. Nigam : Nucleus Physics

(PAPER - II)

100 Marks
(Divided into two parts)

(PAPER - II A)

Quantum Field Theory : Lagrangian formulation, Noether's Theorem, Quantisation of free electromagnetic & Dirac fields, Electromagnetic interaction & gauge invariance, The S- matrix expansion, Wick's Theorem, Feynmann diagrams, Lowest order matrix elements for Compton scattering. Calculation of differential cross- section of Compton scattering only in detail.

Text : F. Mandai & G. Shaw : Quantum Field Theory

(PAPER - II B)

Gravitation & Cosmology : Statement of the Principle of Equivalence, Gravitational forces and the Newtonian limit, Principle of general covariance, Covariant differentiation, Derivation of Einstein field equation, classic tests of Einstein's Theory - General Static 'Isotropic Metric, Schwarzschild Solution, General Equation of motion, Deflection of light by sun, Precession of Perihelia.

Differential equation for stellar structure, stability, Newtonian stars, Neutron stars, Stars of uniform density.

Text : Gravitation & Cosmology by Steven Weinberg.

[PAPER-ID]

(PRACTICAL)

100 Marks

- 1: Microwave Measurements.
- 2: Plasma Measurements.
- 3: Setting up & study of a radio receiver.
- 4: Measurement of energy gap in semiconductor.
- 5: Hall Effect
- 6: Magnetic Resonance Studies
- 7: Ultrasonics.
- 8: Gama - ray spectrometer.
- 9: Raman Effect
- 10: Zeeman Effect
- 11: Musbauer Effect
- 12: X- Ray diffraction.

Note: One experiment will be performed in six hours.

(PAPER - IV)

[DISSERTATION]

100 Marks

