

MAHARAJA GANGA SINGH UNIVERSITY, BIKANER
Ph. D. COURSE WORK IN PHYSICS

The candidates are required to attempt any two questions out of four questions from Section (A) ; and any two questions out of four questions from any one of the three Optional Sections (B), i.e. B1, B2 & B3. All questions carry equal marks.

Section (A)

Research Methodology, Experimental and Computational Methods

Data Collection, Abstracting using Books and Journals, tabulation.

Synopsis: Abstract and Summary writing, PACS keywords.

Grammatical accuracy of scientific writing and References.

Basic knowledge of Experimental details: XRD, Rietveld Analysis, ESR, Thermal Analysis, Nuclear Spectroscopic Techniques.

Experimental data analysis: curve fitting, regression, Monte Carlo analysis, FFT.

Software tools: presentation on power point, Graphical and data analysis using Origin 7.0 or higher version. Basics of Matlab programming. Documentation using word processors and utilities such as MS-WORD, Equation Editor, LATEX, Postscript, PDF.

Section (B)

(B1): Nonlinear Dynamics and Theoretical Physics:

Iterative Maps, autonomous systems, fixed points, Stability Analysis, Linearization, Phase Plane Analysis, Basic ideas of Chaotic systems

(B2): Condensed Matter Physics:

Pseudopotential Method, TGDTA determination of various thermal parameters.

DMA, TPS, DSC, annealing. Compton Scattering, Electron momentum distribution, Compton profile, Fermi Surfaces, Positron Annihilation, Coincidence spectroscopy.

(B3): Electrodynamics, Atomic, Molecular and Nuclear Physics:

Hartree-Fock approximation, Spectroscopic analysis, Raman and Infrared spectra. Nonlinear Effects in Plasmas.

Nanotechnology: Z-Scan method, Nano Photonics, optical cavity, thin films, Interaction of radiation with matter on nanoscale.