Department of Atomic Energy (DAE) – Indira Gandhi Centre for Atomic Research

IGCAR JRF Exam Pattern

Subject Name	Type of the Examination	Time Duration
General Intelligence/ Reasoning	Objective Type Examination	2 hours
General Knowledge		
Quantitative Aptitude		
Concerned Subjects • Physics • Materials Science and Engineering • Chemistry • Radiation Physics • Nuclear Science & Technology		

IGCAR Junior Research Fellowship Syllabus

General Intelligence/ Reasoning

- Number Ranking
- Analogies
- Non-Verbal Series
- Coding-Decoding
- Logical Venn Diagrams
- Figurative Classification

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- Classification
- Venn diagrams
- Number Series
- Figural Pattern
- Cubes and Dice
- Directions
- Number, Ranking & Time Sequence
- Blood Relations
- Arrangements
- Arithmetical Reasoning
- Mathematical Operations

Quantitative Aptitude

- Time and Work Partnership
- Ratio and Proportion
- Boats and Streams
- Simple Interest
- Time and Distance
- Problems on Trains
- Areas
- Averages
- Indices and Surds
- Compound Interest
- Volumes
- Odd Man Out
- Quadratic Equations
- Probability
- https://www.freshersnow.com/syllabus/
- Profit and Loss
- Races and Games
- Numbers and Ages
- Mixtures and Allegations
- Mensuration
- Permutations and Combinations
- Problems on L.C.M and H.C.F
- Pipes and Cisterns
- Percentages

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- Simple Equations
- Problems on Numbers
- Simplification and Approximation

General Knowledge

- Important Days
- Indian History
- Books and Authors
- Awards and Honors
- Capitals of India
- Indian Economy
- Budget and Five Year Plans
- Countries and Capitals
- International and National Organizations
- Indian National Movement
- Sports
- Current Affairs – National and International
- Abbreviations
- General Policy
- Science and Technology
- Science – Inventions & Discoveries

Physical Sciences

- Investigations on the behavior of materials at low temperatures
- High pressures
- Magnetic fields to explore novel properties of materials
- Investigations of defect properties of solids using ion beams and positrons
- Computer simulations of material properties
- Studies on surfaces, coating, and nanomaterials
- Exploration of materials
- Sensors and detectors
- Soft condensed matter

Chemical Sciences

- Chemical thermodynamics

- Solid-state and high-temperature chemistry
- Electrochemistry
- Spectroscopy and laser
- Radiochemistry
- Advanced separation techniques
- Actinide Chemistry
- Trace / ultra-trace analytical techniques synthesis
- Characterization of nano-ceramics and Chemical sensors

Engineering Sciences

- Robotics and Development of Intelligent machines
- Thermal Hydraulics and Structural Mechanics
- Design of critical components
- Modeling studies
- Safety Analysis
- Wireless networking
- Parallel computing
- Embedded and Simulator systems
- Nondestructive Evaluation and Reliability
- Development of new engineering materials
- Experimental and computational studies in
- (i) novel processing and fabrication methods
- (ii) mechanical behavior
- (iii) damage tolerance and crack growth
- (iv) structure and properties

Nuclear Sciences

- Basics of nuclear physics
- Nuclear Reactions
- Fission and Fusion Reactors
- Radioactivity
- Nuclear Spectrometry
- Nuclear Medicine