

JRF (Quality, Reliability & Operations Research): 2023

INDIAN STATISTICAL INSTITUTE

INSTRUCTIONS

The test is divided into two sessions (i) Forenoon session and (ii) Afternoon session. Each session is for two hours. For the forenoon session question paper, the test code is **MMA** and for the afternoon session question paper, the test code is **QRB**. Candidates appearing for JRF (QROR) should verify and ensure that they are answering the right question paper.

The test **QRB** is of short answer type. It has two groups. A candidate has to answer **two** of the **four** questions from **Group A** and **three** of the **six** questions from **Group B**.

OUTLINE OF THE SYLLABUS FOR QRB

The syllabus for JRF (QROR) will include the following subject groups:

1. Group A

- i) Mathematics
- ii) Probability and Statistics

2. Group B

- i) Operations Research
- ii) Reliability
- iii) Statistical Quality Control

A broad coverage for each of the above subject groups is given below.

- A. **Mathematics:** Algebra, Calculus, Set theory, Vectors and matrices (all at B.Sc. level).
- B. **Statistics:** Probability and distribution theory, Bivariate distributions, Multivariate normal distribution, Estimation, Test of hypothesis, Analysis of variance, Regression and linear models, Design of experiments (block design, full and fractional factorial designs), Markov chain.
- C. **Operations Research:** Linear programming (basic theory, simplex algorithm and its variants, duality theory, transportation and assignment problem), Non-linear programming-basic theory, Game theory (two person zero-sum game), Inventory theory, Queuing theory.
- D. **Reliability:** Coherent systems and system reliability, Hazard function, Failure time distribution, Censoring schemes, Estimation and testing in reliability, Replacement models, Repairable system.
- E. **Statistical Quality Control:** Statistical process control – attribute and variable control charts, Control charts with memory (CUSUM, EWMA, etc.) (univariate only), Process capability analysis, Acceptance sampling (single and double sampling plan).