

Junior Research Fellowship in Quantitative Economics (2025)

Test Codes: QEA and QEB (Both are of 'Descriptive' type)

The candidates for Junior Research Fellowship in Quantitative Economics are required to take two descriptive-type tests - QEA in the forenoon session and QEB in the afternoon session. While the questions in QEA are on Mathematics and Statistics, those in QEB are on Economics.

Syllabus for QEA

1. Permutations and combinations.
2. Theory of quadratic and cubic equations; elementary set theory.
3. Matrix algebra, rank and inverse of matrices, linear equations, determinants, and eigen values.
4. Functions of one and two variables: limits, continuity, differentiation, integration; Differential and difference equations.
5. Constrained and unconstrained optimization, convexity of sets, and concavity and convexity of functions.
6. Elements of probability theory, discrete and continuous random variables, expectation and variance, joint conditional and marginal distributions, and distributions of functions of random variables.

Syllabus for QEB

1. Theory of consumer behaviour and choice; Elements of decision under risk; Theory of production; Market structure; Imperfect competition; Elements of strategic behavior and information economics; General equilibrium and welfare economics; International trade and finance; Public economics.
2. Macroeconomic theories of income determination, rational expectations, Phillips Curve, neoclassical growth model, inequality.
3. Game Theory: Normal and extensive forms; Nash and sub-game perfect equilibrium; Bayesian and sequential equilibrium.
4. Multiple Regression Model: Least squares and maximum likelihood methods of estimation, heteroscedasticity, autocorrelation, multicollinearity, specification bias, exogeneity, and instrumental variables.
5. Time Series Analysis: Stationarity, trend, seasonality, unit root tests, and ARMA model.