Paper – VII
STATISTICS

Unit-I

Central Tendency and Dispersion: Measures of Central Tendency: Arithmetic Mean, Median, Mode, Geometric Mean and Harmonic Mean. Measures of dispersion: Range, Mean Deviation, Standard Deviation, Coefficient of Variation, Quartile deviation, Lorenz Curve, Skewness and Kurtosis.

Unit-II

Correlation and Regression: Correlation: Scattered diagram; Coefficients of correlation: Karl Pearson and Rank Correlation; Simple Linear Regression: Least Squares method, Interpretation of regression coefficients (two variables only).

Unit-III

Time Series and Index Numbers: Time series analysis: Concept and Components: determination of regular trend; Index numbers: Concept, price relative, quantity relative, value relative; Laspeyer's, Paasche's and Fisher's indices; Problems in the construction and limitations of index numbers; Tests for ideal index number.

Unit-IV

Probability and Sampling: Probability: Concept, Rules of Probability (Addition and Multiplication); Random variables, Mathematical expectations, Theoretical distributions: Binomial, Poisson and Normal-their properties and uses, Sampling: Simple, Random, Stratified, Systematic and Cluster Sampling; Sampling Distribution: Distribution of sample mean and variance- t-distribution; Test of Hypothesis; Types of hypothesis, Types of errors, Application of t-test.

Suggested Readings:

1. Croxton, F.E., D.J. Cowden and S. Klein (1988), *Applied General Statistics*, Pitman.
2. Goon, A.M., M.K. Gupta and B. Dasgupta (2005), *Fundamentals of Statistics*, Vol. I & II, The World Press Ltd., Kolkata.
3. Gupta, S.C. and V.K. Kapoor (1993), *Fundamentals of Applied Statistics*, S. Chand and Sons, New Delhi.
4. Kendall, M.G. and Stuart, Alan (1994), *The Advanced Theory of Statistics*, Vol.I, II, III, Griffin (latest edition).
5. Medhi, J. (2006), *Statistical Methods: An Introductory Text* (2e), New Age International, New Delhi.
6. Nagar, A.L. and R.K. Das (1997), *Basic Statistics (2e)*, Oxford University Press, New Delhi.
7. Speigal, M.R. (1992), *Theory and Problems of Statistics*, McGraw Hill Book, London.

Basic concepts of development economics and that of environmental economics are merged in this paper. Students will learn some development models, international aspects of economic development and issues related to economy environment interactions, control of environmental damage etc.

Paper-II *Paper VIII*.

DEVELOPMENT AND ENVIRONMENTAL ECONOMICS

Unit-I
Concepts and Measurement: Economic growth and development — Factors affecting economic growth — Capital, Labour and Technology; Measurement of Development: Physical Quality of Life Index, Human Development Index; Gender Related Development Index; Population and Economic Development; Structural Change and Economic Development- Case Study: The Economy of India.

Unit-II
Theories of Economic Growth and Development: Classical theory of economic growth in General- Marx's Theory of Economic Development, Harrod and Domar Models of Growth, Lewis Theory of Unlimited Supply of Labour, Theory of Unbalanced Growth, Critical Minimum Effort Theory.

Unit-III
International Aspect of Economic Development: International trade as an engine of growth; Static and dynamic gains from trade; Myrdal theses vs. free trade; International financial institutions and economic development –WTO, IMF and World Bank (Roles and Functions); Case Study of Post Reform India and China.

Unit-IV
Environment and Ecology: Environment and Ecology linkage; Environment as a Necessity and Luxury; Population, Poverty and Environment ·linkage; Development & Environment Trade Off, Sustainable Development and Its Indicators; Environmental Use and Environmental Disruption as an Allocation Problem.

Unit-V
Market Failure and Environment: Market Failure for Environmental Goods; Pollution as an Externality, Non-excludability and Commons (Diagrammatic Presentation); Environment as a Public Good; Pollution Control: Prevention, Control and Abatement of Pollution.

Suggested Readings:
Bhattacharya, R.N. (ed) (2004), *Environmental Economics: An India Perspective*, OUP, New Delhi.

Kolstad, C.D. (1999), Environmental Economics, Oxford University Press, New Delhi.

Muthukrishnan, S. (2010), *Economics of Environment*, PHI Learning Pvt. Ltd, EEE edn., New Delhi.

Pugel, Thomas (2008), International Economics, Tata Mcgraw-Hill, New Delhi.

Ray, Debraj (2012), Development Economics, Oxford University Press, New Delhi.

Shankar, U. (ed.) (2001), Environmental Economics, OUP, New Delhi

Sodersten, Bo. (2003), International Economics, Macmillan Press Ltd., London.

Thirwall, A.P. (2007), Growth and Development (6e), Mcmillan, U.K.

Todaro, MP and SC Smith. (2009), Economic Development, Pearson, India.

UNDP, Human Development Reports for various years.

De, U.K. (2006): "Population, Poverty and the Problem of Natural Resource Management", Proceedings of International Conference on Human and Economic Resources, Izmir University of Economics, pp. 85-100.

Basu, K. (1984), Less Developed Economy, Blackwell.

Mohanty, SK (2014), *India China Bilateral Trade Relationship*, Research & Information System for Developing Countries, A RBI Study. http://ris.org.in/sites/default/files/pdf/India%20china%20report.pdf

Bhat, TP, Atulan Guha and Mahua Paul (2006), *INDIA AND CHINA IN WTO Building Complementarities and Competitiveness In the External Trade Sector*, Institute for Studies In Industrial Development. Available at planningcommission.nic.in/reports/sereport/ser/stdy_indch.pdf