Maharshi Dayanand University
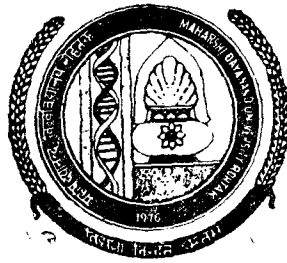# Rohtak

Ordinances, Syllabus and Courses of Reading for
Economics M. A. (Previous) Examination

Session—1997-98

ORDINANCE--MASTER OF ARTS EXAMINATION FOR--1997--98

1. The Master of Arts Examination shall be held in two Parts, Part-I examination shall be held at the end of the first year and Part-II examination at the end of the second year.

2. The examination in Part-I and Part-II shall be held once a year ordinarily in the month of April/May, on such dates as may be fixed by the Vice-Chancellor.

   A supplementary examination in Part-II of M.A. will be held in December or on such dates as may be fixed by the Vice-Chancellor for those candidates who have passed all the Papers of Part-I exam, but have got 're-appear' or have failed or want to improve their score in Paper(s) of Part-II examination. However, total number of chances will not exceed as given in the Ordinance.

3. The last date for the receipt of admission form and fee without late fee as fixed by the Vice-Chancellor, shall be notified to the Heads of the University Teaching Departments. P.G. Regional Centre Rewari and the colleges concerned.

4. A candidate's admission form and fee may be accepted after the last date on payment of late fee of Rs 105/- upto the date notified by the University.

Note: No late fee shall be charged if the admission form and fee are received within three working days of grace after the last date for the receipt of the same without late fee.

5. A person who has passed one of the following Examinations, shall be eligible to join the first year (Part-I) class of Master of Arts course: (except Master of Physical Education).

   i) B.A./B.Sc./B.Com. (Hons.) Examination in the subject of Post-graduate Course.

   ii) B.A./B.Sc./B.Com. (Hons.) in a subject other than the subject of Post-graduate Course with atleast 50% marks in the aggregate.

   iii) Ist Bachelor's degree with atleast 50% marks in aggregate or 45% marks in the subject of P.G. Course in which the candidate wishes to seek admission.

   iv) Shastri Examination (New scheme) of this University in the manner prescribed in (i) and (ii) above.

   v) Master's degree examination in another subject.

   vi) An examination of any other University recognised by this University as equivalent to (i) or (ii) or (iii) or (iv) or (v) above.

Provided that :

a) A candidate who has passed B.Com. Examination with atleast 45% marks in the subject(s)/paper(s) related to Economics including Statistics shall also be eligible to take up M.A. Economics course.

b) A candidate who has passed B.Sc. (Agri.) with Agricultural Economics as one of the paper/subjects shall also be eligible to join M.A. Economics course.

c) A candidates who has passed B.A. examination with atleast 45% marks in Public Administration or Sociology shall be eligible to take up M.A. Political Science.

d) A candidate getting atleast 55% marks in Hindi (Compulsory) subject may also be considered eligible for admission to M.A. Hindi.

e) A candidate who has passed B.A. (Hons.) in Sanskrit with atleast 45% marks or B.A. Examination with atleast 45% in Sanskrit (Elective) may also be considered eligible to take up M.A. (Hindi), if the candidates who have passed B A.(Hons.) Hindi or B.A. with Hindi (Elective) obtaining 45% marks are not available.

f) A candidate who has passed Bachelors Degree Examination in Music (B.Mus.) from any Indian University shall be eligible for admission to M A. course without any condition of minimum percentage of marks but no one who did not take up Music as one of his subject for the B A. Examination shall be eligible to take up M.A. Music provided he is working as a teacher of Music in a college admitted to the privileges of this University or in a recognised Higher Secondary School within the jurisdiction of the University or in addition to passing B.A./B.Sc. he has passed one of the following examination :

Sangeet Visharad :   From   Bhatkhande Sangeet Vidyapeeth
                        Lucknow or from Gandharva Mahavidyalaya,
                        Bambay.

Sangeet Prabhakar :   From Prayag Sangeet Smiti, Allahabad or from
                        Rajasthan Sangeet Sansthan, Jaipur.

Sangeet Visharad   From Prachin Kala Kender Chandigarh.

g) A candidate who has passed B A. Examination with Sociology
   or an allied subject such as Psychology, Political Science,
   Economics, History and Geography as one of the subjects with
   45% marks in aggregate and 45% marks in Sociology or Allied
   subject mentioned above shall be eligible to take up M.A.
   Sociology.

h) A candidate who has passed B.A. Examination with History or
   in any other subject listed in the Faculty of Social Sciences (i.e.
   Political Science, Sociology, Public Administration, Geography,
   Psychology etc.) obtaining atleast 45% marks in the subject shall
   be eligible to take up M.A. History.

i) A candidate who has not passed B.A./B Sc. (Pass or Hons.) with
   Mathematics as one of the subjects shall not bc eligible to join
   M.A. Mathematics Course.

) A candidate who has studied the subject of Sanskrit at B.A.
   level, whether elective or compulsory, for a full span of three
   years shall be eligible to seek admission to M.A. Sanskrit
   Course.   The minimum percentage of marks for those who have
   studied Sanskrit Compulsory should be 55% in the subject.

k) For admission to M.A. (Rural Development) a candidate must
   have passed B.Sc. (Agriculture) with Agricultural Economics as
   one of the papers/ subjects obtaining 50% marks in aggregate
   or B.A. with 45% marks in any subject of Social Sciences.

FOR M.A. PHYSICAL EDUCATION

Eligibility condition for admission to M.A. Physical Education:—

NOTE: – A person who has passed one of the following examinations
        shall be eligible to join the Ist year (Part-I) of the Master of
        Arts (Physical Education) course :—

A i) A Bachelors's Degree examination in Humanities of the M.D. University, Rohtak or an examination recognised as equivalent thereto with atleast 45% marks in the aggregate with English as one of the subjects at the under-graduate level or B.Com./B Sc./ B.Sc. (Home Science) B.Sc. (Agri.) with 45% marks.

ii) B.P. Ed./D.P. Ed. one year course after graduation with atleast 50% marks.

Iii) B. A./B. Sc. with Health and Physical Education as one of the subjects in three years degree course with atleast 50% marks.

iv) Bachelor of Physical Education (B.P.E.) three year degree course with atleast 50% marks.

v) B.S.H. and P.E. five years course with atleast 50% marks.

AND

B) The candidate has taken part in the Inter-University or Inter state or National Tournament in the games and sports recognised by the Inter-University Sports Board. Provided that the candidate qualified in the standard efficiency test at the time of Examination to the first year course.

6 A candidate who has failed in one or more paper(s) or fails to appear in M.A. Examination shall be allowed two additional subsequent chances only to pass the M.A. examination. This is however, subjects to the provision in Clause-8 below.

7 A candidate who fails to pass the M.A. Examination within a period of four years of his admission to the course shall be deemed to be unfit for Post-graduate Studies in the subject concerned.

8 A person who has passed the following Examinations shall be eligible to join the M.A. Part-II :-

a) M.A. Part-I Examination from M.D. University, in the subject concerned. This is however, subject to Clause-7. However, the candidates who have passed atleast two theory papers out of four or five theory papers or atleast three theory papers out of six or seven theory papers of Part-I exam. of the University will be promoted to Part-II class, provisionally

OR

b) M.A. Part-I Examination of the subject offered from the Kurukshetra University or Panjab University or Punjabi University, or Guru Nanak Dev University or Himachal Pradesh University, provided that the Head of the University Departments/Principal of the college concerned is satisfied that the contents of papers already passed by him are almost the same as in the M.A. Part-I Examination of this University; in this case the marks obtained in M.A. Part-I of the course at any of these Universities shall be counted towards division of successful candidates by increasing or reducing the marks obtained in accordance with maximum marks prescribed for M.A. Part-I Examination of this University.

9. The M.A. Examination in Part-I/Part-II shall be open to a student who:—

   a) has passed the requisite qualifying Exam. or is covered under Clause-5 and 9 and

   b) has his name submitted to the Controller of Examinations by the Head of the University Teaching Dept./Principal of the college he has most recently attended and produces the following certificates, signed by him:-

   i) of possessing good character

   ii) of having remained on the rolls of Department/College during the year preceding the Examination and of having attended not less than 65% of the full course of lectures and tutorials separately and 75% of practicals (the courses to be counted upto the last day when the classes break up for the preparatory holidays).

10. Every candidate shall be examined according to the scheme of examination and syllabus as approved by the Academic Council from time to time.

11. The amount of Examination fee to be paid by a candidate for each year shall be as follows:-

Regular	Ex-Student
Rs. 100/-	Rs. 125/-
(Plus Rs. 20/- per practical subject)	

12. A candidate who re-appears in one or more paper(s)/practical(s) for the purpose of passing/improvement of score of marks/result shall pay fee as for the whole Examination.

   i) The medium of instruction shall be :—

      a) Hindi in case of Hindi and English in case of English

      b) English or Hindi or Sanskrit in case of Sanskrit and

      c) English/Hindi in case of other subjects.

   ii) The question papers will be set :—

      a) in Hindi in case of Hindi, Sanskrit and Music and

      b) in English and Hindi in case of other subjects.

   iii) The candidate shall write their answer as under :—

      a) in Hindi in case of Hindi;

      b) in English or Hindi or Sanskrit in case of Sanskrit

      c) in English in case of English and Mathematics and

      d) in English/Hindi in case of other subjects,

13.1 The minimum number of marks required to pass the Examination shall be as under :

   A) In all subjects except Physical Education

      i) 33% in each paper (written and practical separately);

      ii) 40% in each practical in the case of Music;

      iii) 40% in Dissertation/Viva-Voce, where prescribed;

      iv) 40% in aggregate.

   B) In Physical Education

      i) 35% in each theory paper;

      ii) 40% in practical; and

      iii) 40% in aggregate

13.2 A candidate who has completed the prescribed course of instructions in College/University Teaching Department for previous/final examination but has not appeared in it or having appeared fails may be allowed on the recommendation of the Principal of the College/Head of University Teaching Department concerned to appear in the subsequent year in the examination paper(s) as the case may be without attending a fresh course of Instruction. While reappearing in the examinations the candidate shall be exempted from reapearing in paper(s) and/or practical(s) in which he has obtained atleast 40% marks.

14.1 A candidate who has passed M.A. Part-I Examination obtaining at least 55% marks in aggregate may offer dissertation wherever prescribed in the Scheme of Examination for the course. The subject of the dissertation shall be approved

by the Head of the Department concerned A candidate shall submit to the Head of the Department an application for the approval of the topic for the dissertation alongwith a synopsis within one month of his admission to M.A. Part-II.

15.2 Every candidate who offers dissertation shall be required to submit three copies of his dissertation alongwith a brief abstract of the same giving an account of the investigation/ research conducted and its main findings (which will not exceed 500 words), The dissertation shall be examined by one external Examiner only.

15.3 The last date for receipt of the dissertation in the office of the Controller of Exams shall be one month before the commencement of the Theory Examination, provided that in exceptional cases, Vice-Chancellor shall have the power, to extend, on the recommendation of the Head of the Department, the last date for receipt of the dissertation upto three months. If a candidate fails to submit his dissertation even during the extended period he will be considered to have absented in the dissertation paper and his result shall be declared accordingly.

15.4 A candidate who has submitted a dissertation as a part of the Examination may withdraw the same before it has been examined but once it is examined and candidate obtains the minimum pass marks he shall not be permitted to withdraw it or submit another dissertation in lieu thereof. The marks obtained by him for the dissertation shall be taken in to account when he appears in any future examination for the purpose of passing therein or for improving the score of marks/result.

16. As soon as possible, after the termination of the examination the Registrar/Controller of Examinations shall publish the result of candidates and issue detailed Marks Card.

17. The result of candidates who have passed the M.A. examination shall be classified into division as under, the division obtained by the candidate will be stated in his degree :—

a) Those who obtain 60 percent or more marks   First Division

b) Those who obtain 50 percent or more but less than 60 percent marks   Second Division

c) All below 50 percent   Third Division

18. A candidate who has already passed the Master of Arts Examination from this University, in a subject in which different optional papers are permitted, may appear in one or more other optional papers of that subject, at any subsequent examination when held, without attending a regular course of study on payment of fee as prescribed for the whole exam. Provided that if there is any corresponding Practical work involved he must attend the prescribed number of practicals etc. in the Department. Such a candidate shall, in order to pass, be required to obtain atleast 40 percent marks in each paper.

19. A candidate who has passed Part-I of M.A. Examination of this University, will be allowed to appear for improvement of his result as an ex-student in one or more theory papers of M.A. Part-I Examination once within a period of three years of his passing the Part-I Examination. A candidate who has passed Part-II of M.A. Examination of this University will be allowed to appear for improvement of his result as an ex-student in one or more theory paper(s) of the M.A. Part-II Examination once within a period of two years of his passing the Part-II Examination.

The candidates may however, appear for improvement of Part-I Examination simultaneously with Part-II Examination while appearing in Part-II Examination for passing or for Improvement.

The result of such a candidate shall be declared only if he improves his score of marks by taking into account the marks obtained by him in the paper(s) in which he reappeared and the marks obtained by him earlier in the remaining paper(s) etc. The fact that the candidate has improved shall be mentioned in the Detailed-Marks Card.

Provided further that the candidate will take the Examination according to syllabus in force for the regular student for that examination.

20. Notwithstanding the integrated nature of this course which is spread over more than one academic year, the Ordinance in force at the time a student joins the course shall hold good only for the examination held during or at the end of the academic year and nothing in this Ordinance shall be deemed to debar the University from amending the ordinance and the amended Ordinance, if any shall apply to all students, whether old or new.

M.A. (Previous) Economics 1997-98

Outlines of Test

Paper	Nomenclature	Max. Marks	Time
I	Economic Theory-I	100	3 Hrs.
II	Economic Theory-II	100	3 Hrs.
III	Indian Economy	100	3 Hrs.
IV	Quantitative Methods	100	3 Hrs.

Syllabus & Courses of Reading

PAPER-I ECONOMIC THEORY-I   Max. Marks : 100
                                                                    Time : 3 Hours

Unit-I Basic Concepts

Value judgements in economics-Role and significance of assumptions in economic analysis-Economic models. The role of time in various models- The concept of equilibrium.

Theory of Demand

Consumer Preferences-Demand curves-Utility analysis of demand-The cardinal utility theory-The indifference curves theory violation of the premises about in difference curves: Satiation and lexicographical orderings; Income and Substitution effects; The Slutsky theorem. Compensated demand curves. The revealed preference theory-A pragmatic approach to demand analysis and linear expenditure systems (LES).

Unit-II Theory of Production

The concept of production-Laws of production-Laws of returns to scale-The law of variable proportions-Internal and external economies-The production function-Substitution between inputs. Elasticity of substitution-The Cob-Douglas production function-The CES production function-The - translog production function. Technical Progress and the production function-Disembo died and embodied technical progress-Equilibrium of the firm-Choice of optimal combination of factors of production-Single decision of the firm-Derivation of cost functions from production functions-The production possibility curve of the firm-The isorevenue curve of the multiproduct firm- Equilibrium of the multiproduct firm.

Market Structures

Perfect competition; Short-run and long-run equilibrium of the firm and industry-Market demand and industry equilibrium-Monopoly: Definition-Demand and Revenue-Short-run and long-run equilibrium of the monopolist-Bilateral monopoly discriminating Monopoly-Monopolistic competition: Assumptions-Costs-Product

differentiation and the demand curve-The concepts of the "Industry" and the "group" Equilibrium of the firm-Non Price competition; Non-collusive oligopoly: The duopoly models of Cournot, Betrand and Stackelberg-Chammberlin's oligopoly model-The 'Kinked-demand' curve model-collusive Oligopoly; Price leadership models-The models of the low-cost and dominant firm price leader-Barometric price leadership-Concept of joint-profit maximization and market-sharing cartels.

Unit-III Theories of recent developments in the Theories of the firm and pricing

Baumol's sales maximization hypothesis static and dynamic models-Maximum rate of growth and profits hypothesis of Marris-The managerial discretion model of Williamson-The behavioural model of Cyert and March-Goals of the firm- Satisfying behaviour.

The basic assumptions of the neoclassical theory of pricing-The Hall and Hitch report and the "Full Cost" pricing principle-The attack on marginalism-price determination-The mark up rule-critique of average cost pricing-Bain's limit pricing theory-Recent developments in the theory of limit pricing-Models of Cylos-Labini and Francmodigliani-Public sector pricing- Marginal cost pricing and problems of its applicability to public utilities.

Unit-IV Distribution

Classical approach : Ricardo's theory of distribution-Marxian theory of distribution-"Degree of monopoly" theory of Kelecki-Neo-Keynesian model of Kaldor-Technical progress and distribution-Neo-classical Approach: Marginal productivity theory-factor prices and factor shares-The "adding-up problem Euler's theorem-Relations between capital per head real wage rate and the rate of profit-Technical progress and factor shares-Neutral and baised technical progress-Hicks an Harrod-a comparison with respect to their effects on factor shares-limitations of the marginal productivity theory.

Unit-V General Equilibrium

Meaning of general equilibrium-Partial equilibrium versus general equilibrium approach-Walrasian general equilibrium model-Tatonnement. Existence, uniqueness and stability of equilibrium-A graphical treatment of the 2-factor, 2-commodity, 2-consumer general equilibrium system (2X2X2 model).

Welfare Economics

Criteria of social welfare-Value judgements in welfare economics-Utility and Welfare-Community indifference curves-Basic theorem of new Welfare Economics-Pareto optimality and the necessary conditions to achieve it-Market forms and Welfare-Theory of the second best welfare frontier and the social optimum-Problem of Welfare maximization-Compensation principles-Social Welfare function-Arrow's impossibility theorem.

Note : Ten questions will be set in all, atleast two questions from each Unit. candidates shall be required to attempt five questions in all, selecting atleast one from each Unit.

REFERENCES

Backhouse, R. (1985), *A History of Modern Economic Analysis,* Basil Blackwell, Oxford.

Baumol, W.J. (1982), *Economic Theory and Operations Analysis,* 4e, Prentice-Hall of India, New Delhi.

Friedman, M.(1953), Essays in Positive Economics, Chicago University Press, Chicago.

Koutsoyiannis, A., (1979), *Modern Micro economics,* 2e, Macmillan London.

Deaton, A.S.and J.Muellbarer (1980), *Economics, and Consumer, Behaviour,* Cambridge University Press, Cambridge.

Varian, H. (1978), *Micro economic Analysis,* W.W. Norton, New York.

da Costa, G.C. (1980), *Production, Prices and Distribution,* Tata McGraw-Hill, New Delhi.

Ferguson, C.E. (1968), *Microeconomic Theory,* Cambridge University Press, London.

Kamerschen, D.R., Ed. (1969), *Readings in Microeconomics,* John Wiley and Sons, New York.

Kogiku, K.C. (1971), *Microeconomic Models,* Harper and Row, New York.

American Economic Association (1950), *Readings in Price-Theory,* George Allen and Unwin, London.

Bronfrenorenner, M.(1971), *Income Distribution Theory,* Macmillan, London.

Arrow, K.J. and F. Hahn (1971), *General Competitive Analysis,* North-Horrend, Amsterdam.

Hansen, B. (1970), *A Survey of General Equilibrium Systems,* McGraw-Hill, New York.

Weinteraub, E.R. (1974), *General Equilibrium Theory*, Macmillan, London.

Mishan, E.J. (1969), *Welfare Economics: An Assessment*, North-Holland, Amsterdam.

Paper-II ECONOMIC Max. Marks : 100
  THEORY-II Time : 3 Hours

Unit-1: National Income Determination : The Static Equilibrium Model

Nature of microfoundations for macroeconomics-Interrelation between different concepts of National Income-The basic classical model-The basic Keynesian model-Equilibrium in the Product and money markets-Fiscal Policy effects on demand-Taxes as automatic stabilisers-The balanced budget theorem- Full employment budget surplus-Monetary Policy effects on demand-The liquidity trap-The Policy mix.

Unit-2: Sectoral Demand Functions

Consumption demand : The consumption function puzzle-The relative income Hypothesis-The life cycle hypothesis-The wealth effect-Investment Demand: Keynesian approach-The present value criterian for investment-The q-theory of investment-investment demand and output growth-lags in investment demand-The financial theory of investment.

Unit-3 : The Demand and Supply of Money

The demand for money: the Classical and Keynesian approach-Friedman's Contribution-Boumoli Theory of the demand for money-Tobin's theory of the demand for money-The definitions of money supply-The money multiplier-High powered money-The instruments of monetary control-Interest rate determination: Classical and Keynesian approach-The modern theory of interest rate determination.

Unit-4: Growth Models-Macrodynamics

A neoclassical growth model with and without money-Keynes-Wichsell monetary growth model-The non-neutrality of money-Disequilibrium and inflation- The comparison of the neoclassical and Keynes-Wichsell monetary growth models- The Harrod-Domer conditions for equilibrium growth-Growth model of Solow.

Unit-5 : Problems of stabilization policy and the open Economy

Rational expectation-The Phillips curve-Expectations and short-run Phillips curve-The Friedman-Phelps arguement-The long-run Phillips curve-The trade off between inflaton and unemployment-The natural rate of unemployment- Okun's Law-The laffer curve. ISIM analysis of an

open economy: The foreign trade multiplier-The concepts of Balance of payments equilibrium and disequilibrium-Policy dilemma with a trade deficit-Expenditure switching and expenditure reducing policies-Simultaneous attainment of internal and external balance.

Note : *Ten questions will be set in all, atleast two questions from each unit. Candidates shall be required to attempt five questions in all, selecting atleast one from each Unit.*

REFERENCES

Lawrence, A. Boland , *Foundations of Economic Method,* London: George Allen & Unwin Boston Sydney.

William H. Branson, Macroeconomics Theory and Practice, Harper and Row 3 rd ed. Publishers, Singapore.

Edward Shapiro, *Macroeconomic Analysis,* Published by Suneel Galgotra for Galgotra publication (P) Ltd., S-Ansari Road Daryaganj, New Delhi.

Laurence Harris, *Monetary Theory,* Economic Hand Book series McGraw-Hill Book Company.

B.N.Ghosh, Rama Ghosh, *Fundamentals of Monetary Economics,* Himalya Publishing House, Delhi.

Jons, H.G., *An Introduction to Modern Theories of Economic Growth,* McGraw-Hill Kogakusha, Tokyo.

Thirlwall, A.P. *Growth and Develpopment,* Mac Millars, London.

Dornbusch, K. and S. Fischer, *Macroeconomics,* McGraw-Hill Kogakusha, Tokyo.

Turnovsky, S.J. *Macroeconomic Analysis and Stabilization* Policy, Cambridge University, Press, Combridge.

PAPER-(III) INDIAN ECONOMY
Max. Marks : 100
Time : 3 Hours

Unit-I

Salient characteristics and problems of the economy on the eve of Independence (Especially relating to the agricultural, industrial and foreign trade sectors).

Macro economic growth strategies under five year plans-shift under new economic policies, Objectives, technique-resource mobilisation and financing, plan performance and its evaluation.

Estimation of National Income in India, Pattern of change in growth, structure and distribution of National Income. Parallel economy and its implications. Determinants of employment in India, Nature and dimentions of unemployment problem; Policy on employment.

Unit-II

Money supply-trends and structure; Money supply and Inflation Banking structure of India; Role, Performance and problems of Public Sector banks; Monetary Policy in the context of growth and stability.

Analysis of major budgetary trends; Issues relating to deficit financing; Issues relating to Fiscal federalism; Appraisal of the latest Finance Commission Report.

Unit-III

Review of policy of agricultural development, Green Revolution and Institutional structure, Farm-size productivity debate, terms of trade between agriculture and industry, agricultural price policy and its impact on farm production and income.

Review and critique of industrial policy, pattern and processes of industrialisation, debate on industrial stagnation, problems of capacity utilisation and concentration, spatial dimension of industrialisation; Structure of tertiary sector, its pattern of growth and implications for development.

Unit-IV

Analysis of trends in the volume, structure and direction of foreign trade; appraisal of balance of payments Policy. the problem of external indebtedness. Analysis of trend and compositon of foreign capital, benefits and costs of foreign capital in relation to developmental objectives.

Unit-V

Poverty-concept, measurement and extent; review and critique of anti-poverty programmes. Pattern of Population growth; Population-development interaction. Economic Issues and Policy relating to health, eduction, urbanisation and environment

Note : Ten questions will be set in all, atleast two questions from each Unit. Candidates shall be required to attempt five questions, selecting atleast one from each unit.

REFERENCES

Bhagwati, Jagdish (1994), *India in Transition: Freeing the economy.* Oxford University Press, Delhi.

Brahmananda, P.R. and V.R. Panchmukhi (eds.), (1987), *The Development Process of the Indian Economy.* Himalaya Publishing House,Bombay.

Chakravarty S. (1987), *Development Planning : The Indian experience.* Clarrnden Press Oxford.

Chaudhuri, Pramit ( ) *Indian Economy* : Poverty and development.

Kapila, Uma (ed.) ( ) *Indian Economy:*

Nayyar, Deepak (1994) *Industrial Growth and Stagnation: the debate in India.* Oxford University Press, Bombay.

Rao, V.K.R.V. (1983) *India's National Income : 1950-80.* Sage Publications, New Delhi.

Official Publications Government of India, Census of India, reports (various series)

Govt. of India Central Statistical Organisation, Sarvekhasana (various issues).

Govt. of India Ministry of Agriculture, *Agricultural situation in India* (various issues).

Govt. of India, Ministry of Finance, Economic Division Economic Survey (latest).

Govt. of India, Ministry of Industries, *Annual Survey* of Industries (latest).

Note :The above are some general readings. A specific Reading list for each unit will be provided in the classes.

PAPER-IV QUANTITATIVE METHODS   Max. Marks : 100
Time : 3 Hours

Unit-I

Sets and set operations, closed and open set, convex set, function, limit and continuity of functions, derivative of a function, rules of differentiation, total and partial differentiation, homogeneous functions, Euler's theorem increasing and decreasing functions, convexity of curves, first and second order conditions for extreme values, Lagrange Multiplier method.

Unit-II

Idea of integration, integration as inverse of differentiation, techniques of integration, indefinite and definite integrals, Difference and differential equations (first and second order) and their economic application.

Unit-III

Vector and Matrices-Linear dependence of vectors, concept of a basis, Types of Matrices, Transpose inverse and rank of a matrix, properties of a determinant. Linear Programming-Basic concepts, basic theorem and simplex method, the dual problem and its economic interpretation, Basic concepts of game theory and static Input-output analysis and their economic applications.

Unit-IV

Basic concepts of probability, Standard probability distributions-normal, binomial and poisson (properties) Law of large numbers and central Limit Theorem (without proof). Standard sampling distributions-X^2 t and F (definitions and properties only). Mathematical expectation, concepts of linearty, unbiasedness, minimum variance and consistency, Hypothesis testing-simple and composite hypothesis, type I and type II errors.

Unit-V

Concepts and measures of correlation and Co-variance, Linear Regression model upto two explanatory variables-Least Squares and Maximum likelihood estimators, their properties, hypothesis testing and interpretation.

Note : 1. Rigorous mathematical proofs are not required and emphasis will be on economic applications.

2. Ten questions will be set in all, atleast two questions from each unit. Candidates shall be required to attempt five questions in all, selecting atleast one from each unit.