OPTION (E). OPERATIONS RESEARCH

(Questions will be set from each unit/section)

Units	Topics
I	Operations Research and its Scope. Linear Programming - Simplex Method. Theory of the Simplex Method. Duality and Sensitivity Analysis.
	Other Algorithms for Linear Programming - Dual Simplex Method. Parametric Linear Programming. Upper Bound Technique. Interior Point Algorithm. Linear Goal Programming.
II	Transportation and Assignment Problems. Network Analysis - Shortest Path Problem. Minimum Spanning Tree Problem. Maximum Flow Problem. Minimum Cost Flow Problem. Network Simplex Method. Project Planning and Control with PERT-CPM.
III	Dynamic Programming - Deterministic and Probabilistic Dyanamic programming. Game Theory - Two-Person, Zero-Sum Games. Games with Mixed Strategies. Graphical Solution. Solution by Linear Programming.
IV	Integer Programming - Branch and Bound Technique, Simulation Replacement Problems, sequencing.
V	Nonlinear Programming - One and Multi-Variable Unconstrained Optimization. Kuhn-Tucker Conditions for Constrained Optimization. Quadratic Programming. Separable Programming. Convex Programming. Non-convex Programming.

II	Application of laplace Transforms. Ordinary differential equations with constant coefficients, ordinary differential equations with variable coefficient. Simultaneous ordinary differential equations. Partial differential equations. Applications to Mechanics, electrical circuits, beams. Application to solution of integral equations - integral equations of convolution type, Abel's integral equation. Integro - differential equation, difference and differential - difference equations. (As given in chapter III & IV, Murray, R. Spiegel, theory and problems of laplace transforms Tata McGraw Hill Co. Ltd. New Delhi).
III	Fourier Series and Integrals: Fouries series, Odd and Even functions, Half range fourier sine and cosine series complex form of fourier series, Rarseval's Identity for founer sencs finite fourier transforms, the fourier integral/at including its complex form, fourier transforms, including sine and cosine transforms convolution theorem, Parseval's identity for Fourier integrals. Relations between Fourier and laplace transforms, Multiple finity fourier transform Solution of simple partial differential equations by means of fourier transforms (As given in chapter VI, Murray R. Splegel, Theory and Problems of Laplace transforms).
IV	Mellin and Hankel Transforms: Elementery properties of the Mellin Transforms, Mellin transforms of derrivatives and Integrals Mellin - Inversion Theorem of Some. * The Solution convolution Theorem integral equations. The distribution of Potential in a wedge. Application to the summation of series. Elementary properties of Hankel transforms Hankel inversion theorem, Hankel transforms of the derivatives of functions and some elementary function, Relations between fourier and Hankel Transform, Parseval Relation for Hankel Transforms, The use of Hankel Transforms in the solution of simple partial differential equations (Page 262-286, Page 298-323, Page 325-333). The use of integral transforms, by I.N. Sneddon, Tata McGraw Hill publishing Co. New Delhi.
V	Application to Boundary value problems: Boundary value problems involving partial differential equations, on dimensional heat conduction equation, one dimensional wave equation, Longitudinal and Transverse Vibration of a beam, Solution of boundary value problems by laplace transform. Simple boundary value problems with applications of fourier transform (As given in Integral transforms by A.R. Vashihtha and A.K. Gupta. Krishna Prakashan Mandir Meerut and Integral Transforms by Goyal & Gupta, Pragati Prakashan Meerut).