OPTION (F). INTEGRAL TRANSFORMS WITH APPLICATIONS

(Questions will be set from each unit/section)

Units	Topics
I	The laplace transforms & its inversions: Definition. laplace transform of elementary Sectionally continuous and exponential order function including its existence, some important properties of laplace transforms of derivatives and integrals. Multiplication and division by 't' periodic functions. Initial and final value theorems, laplace transform of Some special function. Definition and Uniqueness theorem of inverse laplace transform. Inversion of some elementary functions, some properties of inverse laplace transform. Inverse laplace transform of derivatives and integrals. Multiplication and division by powers of 's'. The convolution property. Complex inversion formula, Heaviside expansion formula, Evaluation of intergrals. (As given in chapter I & II Murry R. Spiegel, Theory and problems of laplace Transforms. Tata McGraw Hill Co. Ltd. New Delhi).
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).