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DEPARTMENT OF MECHANICAL ENGINEERING
UNIVERSITY INSTITUTE OF ENGINEERING AND TECHNOLOGY
(A constituted Autonomous Institute)
KURUKSHETRA UNIVERSITY KURUKSHETRA
(Established By State Legislature Act XII of 1956)
(“A+” Grade, NAAC Accredited)

Syllabus for Ph.D. Entrance Test of MECHANICAL ENGINEERING

Note: The Paper will consist of 100 objective questions of 2 marks each. The questions should be uniformly distributed throughout the syllabus. Use of scientific calculators is permitted.

Part I: Research and Methodology: 15 Objective type questions	30 Marks
Part II: Subject Specific: 85 Objective type questions	170 Marks
Time Allowed: 2 Hours	Max. Marks: 200

Part A: Research and Methodology (15 Questions)

Numerical Methods: Numerical solutions of linear and non-linear algebraic equations; integration by trapezoidal and Simpson’s rules; single and multi-step methods for differential equations.

Probability and Statistics: Definitions of probability, sampling theorems, conditional probability; mean, median, mode and standard deviation; random variables, binomial, Poisson and normal distributions.

Elementary knowledge of MS Office: *MS Word:* Creating, editing, saving and printing text documents, font and paragraph formatting, inserting tables, page breaks, working with images, using spelling and grammar check. *MS Excel:* creating, editing, saving and printing spreadsheets, working with function and formulas, graphically representing data, charts and graphs. *MS Power Point:* opening, viewing, creating and printing slides, applying to auto-layouts, adding custom animation, graphically representing data.

Introduction to Material Characterization Techniques: Basic principles of XRD, SEM, XRF, TEM and FTIR techniques.

Part B: Subject Specific (85 Questions)

Applied Mechanics and Design

Engineering Mechanics: Free-body diagrams and equilibrium; trusses and frames; virtual work; kinematics and dynamics of particles and of rigid bodies in plane motion; impulse and momentum (linear and angular) and energy formulations, collisions.

Mechanics of Materials: Stress and strain, elastic constants, Poisson's ratio; Mohr’s circle for plane stress and plane strain; thin cylinders; shear force and bending moment diagrams; bending and shear stresses; deflection of beams; torsion of circular shafts; Euler’s theory of



