

SVKM's NMIMS University

Mukesh Patel School of Technology Management & Engineering, Mumbai

Department of Mechanical Engineering

Syllabus for PhD Entrance Test

Effective from May, 2026

SECTION- A

Section A will include 25 compulsory objective-type questions, each carrying 2 marks. It will be focused on research aptitude. The section will be general in nature and aims to evaluate the candidate's research aptitude, with emphasis on reasoning ability, data interpretation, and quantitative skills.

SECTION-B

Section B will comprise 25 compulsory objective-type questions, each carrying 2 marks, based on the following syllabus:

UNIT I- Design Engineering

Engineering mechanics fundamentals, Stress–strain relationships, Elastic constants and failure theories, Bending, torsion, and combined loading, Fatigue, creep, and fracture basics, Design of machine elements, Shafts, springs, bearings, Gears, clutches, brakes, Introduction to FEM (conceptual understanding)

UNIT II- Manufacturing Engineering

Casting processes and defects, Metal forming processes, Rolling, forging, extrusion, drawing

Machining processes, Turning, milling, drilling, grinding, Cutting tools and tool wear, Surface finishing processes, Welding and joining processes, CNC machines and automation, Introduction to additive manufacturing, Production planning and process selection.

UNIT III - Thermal Engineering

Basic thermodynamic concepts and laws, Properties of pure substances, Steam and gas power cycles, Rankine, Otto, Diesel, Brayton, Boilers and steam generators, IC engines and performance parameters, Refrigeration and air-conditioning, Combustion fundamentals, Heat transfer basics, Conduction, convection, radiation, Heat exchangers (LMTD, NTU).

UNIT IV- Fluid Mechanics and Fluid Machinery

Fluid properties and statics, Fluid kinematics, Fluid dynamics, Continuity, momentum, energy equations, Laminar and turbulent flow, Boundary layer theory (basic), Flow through pipes and ducts, Dimensional analysis and similitude, Pumps, turbines, and compressors.

Unit V- Industrial Engineering

Work study and method study, Time study and work measurement, Production planning and control, Inventory control models, Operations research basics, Linear programming, Transportation and assignment problems, Quality control, Statistical quality control (SQC), Facility layout and plant design, Ergonomics and human factors, Basics of operations management.