SR University,Warangal

PhD Entrance Syllabus

Structure of the PhD Entrance Test (100 Marks)
Section A: Aptitude and Reasoning – Common to all candidates (50 Marks)
Section B: Subject/Domain-Specific (50 Marks)

Section A: APTITUDE & REASONING (Common to ALL)

Unit–1: Verbal Reasoning

Navigating Directions and Mastering Distances, Blood Relations, Logical Puzzles and Problem Solving- Floor Based, Month and Year Based. Seating Arrangements - Circular, Linear, Decoding the Code- Letter Coding, Number Coding, Letter and Number Coding.

Unit-2: Number System

Mastering Quick Calculations, BODMAS Simplified, Exploring Numbers and Division Rule, Unit Digits Decoded, Unlocking Divisibility and Counting Zeroes, "Mastering LCM and HCF: Foundations of Factorization, Uncovering Factors, Exploring Remainders.

Unit-3: Arithmetic Ability-1

Percentages - Fraction, Decimal, Percentage Change, Concept of 'By' and 'To', Product Constancy, All About Averages, Profit & Loss Essentials, Articles, False Weight, and Discount Insights - Discount, Simple Interest: Calculations and Applications, Compound Interest: Calculations and Applications, Relationship between SI and CI.

Unit–4: Arithmetic Ability-2

Ratio, Proportion, Partnership, Problems on Ages, Time and Work - Concept of Efficiency, Smart Work with Time and work, Negative Work, Chain Rule, Pipes and Cisterns, Time, Speed & Distance, Problems based on Trains, Problems based on Boats and Streams.

Unit-5: Critical Reasoning

Analogy and Classification, Sequence and Series Logic, Syllogisms - Types of statements, Venn diagrams using statements, Method to solve problems Two Statements and Two Conclusions, EITHER-OR Conclusions, Four Statements and Two Conclusions.

Department of Mechanical Engineering
School of Engineering
SR University, Warangal

Section: B **Mechanical Syllabus for Ph.D. Admission Eligibility Test** **(any one module)**

Module 1 (Mechanics and Design)

Engineering Mechanics: Free body diagrams and equilibrium, Trusses and frames.

Strength of materials (SOM): Principal Stress and Strain, Stress and Strain, Bending Moment and Shear Force Diagram, Torsion, Riveted and Welded Joint, Spring, Theories of Column, Strain Energy Method, Theories of failure.

Theory of Mechanism (TOM): Mechanism, Linear Vibration Analysis of Mechanical Systems, Gear train, Flywheel (Coefficient of Fluctuation of speed, Coefficient of Fluctuation of energy), Governors, Gyroscope.

Design: Gears, Spur Gear, Rolling Contact Bearings, Load-life Relationship, Sliding contact bearing, Modes of Lubrication, Sommerfeld Number, Fluctuating Load Consideration for Design, Clutch, Brake.

Module 2 (Materials, Manufacturing, and Industrial Engineering)

Engineering Materials: Iron-carbon Equilibrium diagram, TTT diagram, Heat treatment, Crystal structure & crystal defects.

Manufacturing Science: Theory of metal cutting, Forces, Tool life, Rolling calculations, Wire drawing and Extrusion calculations, Sheet metal operations. Lathe, Drilling, Milling, Shaping Cutting time calculations, Grinding and Finishing operation. ECM MRR, EDM theory, Limit, Tolerance, Fit, Welding, V-I Characteristics calculations, Resistance welding calculations, Casting, Allowances, Riser Design, Sprue Design, Pouring time calculations, Special Castings.

Industrial Engineering: EOQ Models, PERT & CPM, Forecasting, Assembly line balancing.

CAD/CAM: FMS, NC/CNC Machines, CIM.

Module 3 (Fluid Mechanics and Thermal Sciences)

Fluid Mechanics: Properties of fluid, Pressure measurement, Manometers, Fluid kinematics, Bernoulli's equation, Flow measuring devices, Boundary layer, Thermal boundary layer, Compressible flow, Hydraulic turbine, Centrifugal pump.

Thermodynamics: Basic concepts, Application of first and second law of thermodynamics, Entropy, Availability, Pure substance, Gases and gas mixture, Thermodynamics relations.

Heat Transfer: Conduction, Critical thickness of insulation, Free and forced convection, Heat exchangers, Radiation, The Stefan-Boltzmann Law, Shape factor algebra, Heat exchange between grey bodies.

Refrigeration and Air Conditioning (RAC): Heat engine, Heat pump, Refrigerator, Vapour compression systems, Psychrometry.

Note:

- *Candidates may attempt questions from only one module of the three listed above, according to their preference for PhD admission. For example, if a candidate wishes to pursue a PhD in Design specialization, they should attempt questions only from Module 1.*
- *Candidates are not allowed to attempt questions from multiple sections.*