



**ACE**<sup>®</sup>  
**Engineering Academy**  
Leading Institute for ESE/GATE/PSUs

# GATE-2022

## *Online* Test Series

### Production and Industrial Engineering - Schedule

**No.of Tests : 53 + 44 *free* practice tests of GATE-2021 Online Test Series**

	GATE - 2022 Test Series	Practice Tests GATE - 2021 Test Series
Topic wise Tests	19	18
Grand Tests (Subject Wise Tests + Multi-Subject Wise Tests)	22	14
Full Length Mock Tests	12	12
<b>Total Tests - 97</b>		

All tests will be Active upto GATE -2022 Examination.

## Topic wise Tests

(No. of Questions: 15, Time duration: 45 Minutes and Marks: 25 M)

Test No	Name of the Topic	Date of Activation
Test-01	<b>Engineering Mathematics-1:</b> Linear Algebra: Matrix algebra, Systems of linear equations, Eigen values and Eigen vectors. Calculus: Functions of single variable, Limit, continuity and differentiability, Mean value theorems, Evaluation of definite and improper integrals, Partial derivatives, Total derivative, Maxima and minima, Gradient, Divergence and Curl, Vector identities, Directional derivatives; Line, Surface and Volume integrals; Stokes, Gauss and Green's theorems. Differential Equations: First order equations (linear and nonlinear), Higher order linear differential equations with constant coefficients, Cauchy's and Euler's equations, Initial and boundary value problems, Laplace transforms.	03-05-2021
Test-02	<b>Engineering Mathematics-2:</b> Complex Variables: Analytic functions, Cauchy's integral theorem, Taylor series. Probability and Statistics: Definitions of probability and sampling theorems, Conditional probability, Mean, median, mode and standard deviation, Linear regression, Random variables, Poisson, normal, binomial and exponential distributions. Numerical Methods: Numerical solutions of linear and nonlinear algebraic equations, Integration by trapezoidal and Simpson's rules, Single and multi-step methods for differential equations.	
Test-03	<b>Engineering Mechanics:</b> Applied Mechanics: Engineering mechanics – equivalent force systems, free body concepts, equations of equilibrium; trusses.	
Test-04	<b>Heat Transfer:</b> Heat transfer – basic applications of conduction, convection and radiation.	12-05-2021
Test-05	<b>Theory of Machines and Vibrations:</b> Analysis of planar mechanisms, cams and followers; governors and fly wheels.	
Test-06	<b>Thermodynamics:</b> Thermodynamics – zeroth, first and second law of thermodynamics, thermodynamic system and processes, calculation of work and heat for systems and control volumes; air standard cycles.	19-05-2021
Test-07	<b>Strength of Materials-1:</b> Strength of materials – stress, strain and their relationship; failure theories, Mohr's circle(stress). Torsion	
Test-08	<b>Strength of Materials-2:</b> Deflection of beams, bending and shear stress, Euler's theory of columns. Thick and thin cylinders;	
Test-09	<b>Fluid Mechanics:</b> Fluid mechanics – fluid statics, Bernoulli's equation, flow through pipes, equations of continuity and momentum, capillary action, laminar and turbulent flows, Dimensional analysis;	26-05-2021
Test-10	<b>Machine Design:</b> Design of bolted, riveted and welded joints; interference/shrink fit joints; design of shafts, keys, spur gears, belt drives, brakes and clutches; pressure vessels. Friction and lubrication, couplings	
Test-11	<b>Production-1:</b> <i> Casting:</i> Types of casting processes and applications; Sand casting: patterns – types, materials and allowances; molds and cores–materials, making, and testing; design of gating system and riser; casting techniques of cast iron, steels, and nonferrous metals and alloys; analysis of solidification and microstructure development; Other casting techniques: Pressure die casting, Centrifugal casting, Investment casting, Shell mold casting; Casting defects and their inspection by non-destructive testing. <i> Metal Forming :</i> Stress-strain relations in elastic and plastic deformation; von Mises and Tresca yield criteria, Concept of flow stress; Hot, warm and cold working; Bulk forming processes - forging, rolling, extrusion and wire drawing; Sheet metal working processes – blanking, punching, bending, stretch forming, spinning and deep drawing; Ideal work and slab analysis; Defects in metal working and their causes. <i> Joining of Materials:</i> Classification of joining processes; Principles of fusion welding processes using different heat sources (flame, arc, resistance, laser, electron beam), Heat transfer and associated losses; Arc welding processes - SMAW, GMAW, GTAW, plasma arc, submerged arc welding processes; Principles of solid state welding processes - friction welding, friction stir welding, ultrasonic welding; Welding defects - causes and inspection; Principles of adhesive joining, brazing and soldering processes.	02-06-2021
Test-12	<b>Production-2:</b> <i> Machining:</i> Orthogonal and oblique machining, Single point cutting tool and tool signature, Chip formation, cutting forces, Merchant's analysis, Specific cutting energy and power; Machining parameters and material removal rate; tool materials, Tool wear and tool life; Thermal aspects of machining, cutting fluids, machinability; Economics of machining; Machining processes - turning, taper turning, thread cutting, drilling, boring, milling, gear cutting, thread production; Finishing processes – grinding, honing, lapping and super-finishing. <i> Machine Tools:</i> Lathe, milling, drilling and shaping machines – construction and kinematics; Jigs and fixtures – principles, applications, and design. <i> Advanced Manufacturing:</i> Principles and applications of USM, AJM, WJM, AWJM, EDM and Wire EDM, LBM, EBM, PAM, CHM, ECM; Effect of process parameters on material removal rate, surface roughness and power consumption; <i> Additive manufacturing techniques.</i> <i> Computer Integrated Manufacturing:</i> Basic concepts of CAD and CAM, Geometric modeling, CNC; Automation in Manufacturing; Industrial Robots – configurations, drives and controls; Cellular manufacturing and FMS - Group Technology, CAPP.	

Test No	Name of the Topic	Date of Activation
Test-13	<p><b>Production-3:</b>  <i>Engineering Materials:</i> Structure, physical and mechanical properties, and applications of common engineering materials (metals and alloys, semiconductors, ceramics, polymers, and composites – metal, polymer and ceramic based); Iron-carbon equilibrium phase diagram; Heat treatment of metals and alloys and its influence on mechanical properties; Stress-strain behavior of metals and alloys.  <i>Powder Processing:</i> Production of metal/ceramic powders, compaction and sintering of metals and ceramic powders, Cold and hot isostatic pressing.  <i>Polymers and Composites:</i> Polymer processing – injection, compression and blow molding, extrusion, calendaring and thermoforming; Molding of composites.  <i>Metrology and Inspection:</i> Accuracy and precision; Types of errors; Limits, fits and tolerances; Gauge design, Interchangeability, Selective assembly; Linear, angular, and form measurements (straightness, flatness, roundness, runout and cylindricity) by mechanical and optical methods; Inspection of screw threads and gears; Surface roughness measurement by contact and non-contact methods.</p>	
Test-14	<p><b>Industrial Management and Operational Research-1:</b>  Engineering Economy and Costing: Elementary cost accounting and methods of depreciation; Break-even analysis; Techniques for evaluation of capital investments; Financial statements; Activity based costing.  Production control: Forecasting techniques – causal and time series models, moving average, exponential smoothing, trend and seasonality; Aggregate production planning; Master production scheduling; MRP, MRP-II and ERP; Routing, scheduling and priority dispatching; Push and pull production systems, concepts of Lean and JIT manufacturing systems; Logistics, distribution, and supply chain management; Inventory – functions, costs, classifications, deterministic inventory models, quantity discount; Perpetual and periodic inventory control systems.</p>	02-06-2021
Test-15	<p><b>Industrial Management and Operational Research-2:</b>  <i>Work System Design:</i> Taylor’s scientific management, Gilbreth’s contributions; Productivity – concepts and measurements; Method study, Micro-motion study, Principles of motion economy; Work measurement – time study, Work sampling, Standard data, PMTS; Ergonomics; Job evaluation and merit rating.  <i>Facility Design:</i> Facility location factors and evaluation of alternate locations; Types of plant layout and their evaluation; Computer aided layout design techniques; Assembly line balancing; Materials handling systems.  <i>Operation Research:</i> Linear programming – problem formulation, simplex method, duality and sensitivity analysis; Transportation and assignment models; Integer programming; Constrained and unconstrained nonlinear optimization; Markovian queuing models; Simulation – manufacturing applications.  Project management: Scheduling techniques – Gantt chart, CPM, PERT and GERT.</p>	
Test-16	<p><b>Industrial Management and Operational Research-3:</b>  <i>Quality Management:</i> Quality – concept and costs; Statistical quality control – process capability analysis, control charts for variables and attributes and acceptance sampling; Six sigma; Total quality management; Quality assurance and certification - ISO 9000, ISO14000.  <i>Reliability and Maintenance:</i> Reliability, availability and maintainability; Distribution of failure and repair times; Determination of MTBF and MTTR, Reliability models; Determination of system reliability; Preventive and predictive maintenance and replacement, Total productive maintenance.  <i>Product Design and Development:</i> Principles of product design, tolerance design; Quality and cost considerations; Product life cycle; Standardization, simplification, diversification; Value engineering and analysis; Concurrent engineering; Design for “X”.</p>	
Test-17	<p><b>Verbal Ability:</b>  Basic English grammar: tenses, articles, adjectives, prepositions, conjunctions, verb-noun agreement, and other parts of speech.  Basic vocabulary: words, idioms, and phrases in context.  Reading and comprehension.  Narrative sequencing.</p>	
Test-18	<p><b>Quantitative Aptitude:</b>  Data interpretation: data graphs (bar graphs, pie charts, and other graphs representing data), 2- and 3-dimensional plots, maps, and tables.  Numerical computation and estimation: ratios, percentages, powers, exponents and logarithms, permutations and combinations, and series  Mensuration and geometry.  Elementary statistics and probability.</p>	09-06-2021
Test-19	<p><b>Analytical Aptitude:</b>  Logic: deduction and induction, Analogy, Numerical relations and reasoning  <b>Spatial Aptitude:</b>  Transformation of shapes: translation, rotation, scaling, mirroring, assembling, and grouping  Paper folding, cutting, and patterns in 2 and 3 dimensions</p>	

**Subject Wise Grand Tests - 1<sup>st</sup> Series***(No. of Questions: 30, Time duration: 90 Minutes and Marks: 50 M)*

Test No	Name of the Subject	Date of Activation
Test-20	Engineering Mathematics	23-06-2021
Test-21	Thermodynamics	
Test-22	Fluid Mechanics & Heat Transfer	30-06-2021
Test-23	Engineering Mechanics & Strength of Materials	14-07-2021
Test-24	Theory of Machines and Vibrations & Machine Design	21-07-2021
Test-25	Production	28-07-2021
Test-26	Industrial Management and Operational Research	
Test-27	General Aptitude	04-08-2021

**Full Length Mock Test - 1<sup>st</sup> Series***(No. of Questions: 65, Time duration: 180 Minutes and Marks: 100 M)*

Test No	Name of the Mock	Date of Activation
Test-28	Full Length Mock Test-1	11-08-2021
Test-29	Full Length Mock Test-2	18-08-2021
Test-30	Full Length Mock Test-3	25-08-2021

**Subject Wise Grand Tests - 2<sup>nd</sup> Series***(No. of Questions: 30, Time duration: 90 Minutes and Marks: 50 M)*

Test No	Name of the Subject	Date of Activation
Test-31	Engineering Mathematics	01-09-2021
Test-32	Thermodynamics	
Test-33	Fluid Mechanics & Heat Transfer	08-09-2021
Test-34	Engineering Mechanics & Strength of Materials	15-09-2021
Test-35	Theory of Machines and Vibrations & Machine Design	22-09-2021
Test-36	Production	29-09-2021
Test-37	Industrial Management and Operational Research	
Test-38	General Aptitude	06-10-2021

**Full Length Mock Test - 2<sup>nd</sup> Series***(No. of Questions: 65, Time duration: 180 Minutes and Marks: 100 M)*

Test No	Name of the Mock	Date of Activation
Test-39	Full Length Mock Test-4	20-10-2021
Test-40	Full Length Mock Test-5	27-10-2021
Test-41	Full Length Mock Test-6	03-11-2021

**Multi-Subject Wise Grand Tests***(No. of Questions: 30, Time duration: 90 Minutes and Marks: 50 M)*

Test No	Name of the Subject	Date of Activation
Test-42	Engineering Mechanics & Strength of Materials	17-11-2021
Test-43	Fluid Mechanics, Heat Transfer & Thermodynamics	24-11-2021
Test-44	Theory of Machines and vibrations & Machine Design	
Test-45	Production	01-12-2021
Test-46	Industrial Management and Operational Research	
Test-47	Engineering Mathematics & General Aptitude	

**Full Length Mock Test - 3<sup>rd</sup> Series***(No. of Questions: 65, Time duration: 180 Minutes and Marks: 100 M)*

Test No	Name of the Mock	Date of Activation
Test-48	Full Length Mock Test-7	22-12-2021
Test-49	Full Length Mock Test-8	29-12-2021
Test-50	Full Length Mock Test-9	05-01-2022
Test-51	Full Length Mock Test-10	12-01-2022
Test-52	Full Length Mock Test-11	19-01-2022
Test-53	Full Length Mock Test-12	26-01-2022

**Note:** The Syllabus considered as per Previous year Notification of GATE. ACE Engineering Academy does not take any responsibility for deviations in syllabus in the final exam.

The Dates of above Tests may Change according to the GATE-2022 Exam schedule.

Tests will be activated at 02:00 pm on the scheduled day.

## Free Practice Tests of GATE-2021 Online Test Series

### Topic wise Tests

(No. of Questions: 15, Time duration: 45 Minutes and Marks: 25 M)

Test No	Name of the Topic	Date of Activation
PI_P-01	<b>Engineering Mathematics-1:</b> Linear Algebra, Calculus, Differential Equations	<b>15-04-2021</b>
PI_P-02	<b>Engineering Mathematics-2:</b> Complex Variables, Numerical Methods and Probability and Statistics.	
PI_P-03	<b>Engineering Mechanics:</b> Applied Mechanics: Engineering mechanics – equivalent force systems, free body concepts, equations of equilibrium; trusses.	
PI_P-04	<b>Heat Transfer:</b> Heat transfer – basic applications of conduction, convection and radiation.	
PI_P-05	<b>Theory of Machines and Vibrations:</b> Analysis of planar mechanisms, cams and followers; governors and fly wheels.	
PI_P-06	<b>Thermodynamics:</b> Thermodynamics – zeroth, first and second law of thermodynamics, thermodynamic system and processes, calculation of work and heat for systems and control volumes; air standard cycles.	
PI_P-07	<b>Strength of Materials-1:</b> Strength of materials – stress, strain and their relationship; failure theories, Mohr's circle(stress). Torsion	
PI_P-08	<b>Strength of Materials-2:</b> Deflection of beams, bending and shear stress, Euler's theory of columns. Thick and thin cylinders;	
PI_P-09	<b>Fluid Mechanics:</b> Fluid mechanics – fluid statics, Bernoulli's equation, flow through pipes, equations of continuity and momentum, capillary action, laminar and turbulent flows, Dimensional analysis;	
PI_P-10	<b>Machine Design:</b> Design of bolted, riveted and welded joints; interference/shrink fit joints; design of shafts, keys, spur gears, belt drives, brakes and clutches; pressure vessels. Friction and lubrication, couplings	
PI_P-11	<b>Production-1:</b> <i> Casting:</i> Types of casting processes and applications; Sand casting: patterns – types, materials and allowances; molds and cores–materials, making, and testing; design of gating system and riser; casting techniques of cast iron, steels, and nonferrous metals and alloys; analysis of solidification and microstructure development; Other casting techniques: Pressure die casting, Centrifugal casting, Investment casting, Shell mold casting; Casting defects and their inspection by non-destructive testing. <i> Metal Forming :</i> Stress-strain relations in elastic and plastic deformation; von Mises and Tresca yield criteria, Concept of flow stress; Hot, warm and cold working; Bulk forming processes - forging, rolling, extrusion and wire drawing; Sheet metal working processes – blanking, punching, bending, stretch forming, spinning and deep drawing; Ideal work and slab analysis; Defects in metal working and their causes. <i> Joining of Materials:</i> Classification of joining processes; Principles of fusion welding processes using different heat sources (flame, arc, resistance, laser, electron beam), Heat transfer and associated losses; Arc welding processes - SMAW, GMAW, GTAW, plasma arc, submerged arc welding processes; Principles of solid state welding processes - friction welding, friction stir welding, ultrasonic welding; Welding defects - causes and inspection; Principles of adhesive joining, brazing and soldering processes.	
PI_P-12	<b>Production-2:</b> <i> Machining:</i> Orthogonal and oblique machining, Single point cutting tool and tool signature, Chip formation, cutting forces, Merchant's analysis, Specific cutting energy and power; Machining parameters and material removal rate; tool materials, Tool wear and tool life; Thermal aspects of machining, cutting fluids, machinability; Economics of machining; Machining processes - turning, taper turning, thread cutting, drilling, boring, milling, gear cutting, thread production; Finishing processes – grinding, honing, lapping and super-finishing. <i> Machine Tools:</i> Lathe, milling, drilling and shaping machines – construction and kinematics; Jigs and fixtures – principles, applications, and design. <i> Advanced Manufacturing:</i> Principles and applications of USM, AJM, WJM, AWJM, EDM and Wire EDM, LBM, EBM, PAM, CHM, ECM; Effect of process parameters on material removal rate, surface roughness and power consumption; <i> Additive manufacturing techniques.</i> <i> Computer Integrated Manufacturing:</i> Basic concepts of CAD and CAM, Geometric modeling, CNC; Automation in Manufacturing; Industrial Robots – configurations, drives and controls; Cellular manufacturing and FMS - Group Technology, CAPP.	
PI_P-13	<b>Production-3:</b> <i> Engineering Materials:</i> Structure, physical and mechanical properties, and applications of common engineering materials (metals and alloys, semiconductors, ceramics, polymers, and composites – metal, polymer and ceramic based); Iron-carbon equilibrium phase diagram; Heat treatment of metals and alloys and its influence on mechanical properties; Stress-strain behavior of metals and alloys. <i> Powder Processing:</i> Production of metal/ceramic powders, compaction and sintering of metals and ceramic powders, Cold and hot isostatic pressing. <i> Polymers and Composites:</i> Polymer processing – injection, compression and blow molding, extrusion, calendaring and thermoforming; Molding of composites. <i> Metrology and Inspection:</i> Accuracy and precision; Types of errors; Limits, fits and tolerances; Gauge design, Interchangeability, Selective assembly; Linear, angular, and form measurements (straightness, flatness, roundness, runout and cylindricity) by mechanical and optical methods; Inspection of screw threads and gears; Surface roughness measurement by contact and non-contact methods.	

Test No	Name of the Topic	Date of Activation
PI_P-14	<b>Industrial Management and Operational Research-1:</b> Engineering Economy and Costing: Elementary cost accounting and methods of depreciation; Break-even analysis; Techniques for evaluation of capital investments; Financial statements; Activity based costing. Production control: Forecasting techniques – causal and time series models, moving average, exponential smoothing, trend and seasonality; Aggregate production planning; Master production scheduling; MRP, MRP-II and ERP; Routing, scheduling and priority dispatching; Push and pull production systems, concepts of Lean and JIT manufacturing systems; Logistics, distribution, and supply chain management; Inventory – functions, costs, classifications, deterministic inventory models, quantity discount; Perpetual and periodic inventory control systems.	<b>15-04-2021</b>
PI_P-15	<b>Industrial Management and Operational Research-2:</b> <i>Work System Design: Taylor's scientific management, Gilbreth's contributions; Productivity – concepts and measurements; Method study, Micro-motion study, Principles of motion economy; Work measurement – time study, Work sampling, Standard data, PMTS; Ergonomics; Job evaluation and merit rating.</i> <i>Facility Design: Facility location factors and evaluation of alternate locations; Types of plant layout and their evaluation; Computer aided layout design techniques; Assembly line balancing; Materials handling systems.</i> <i>Operation Research: Linear programming – problem formulation, simplex method, duality and sensitivity analysis; Transportation and assignment models; Integer programming; Constrained and unconstrained nonlinear optimization; Markovian queuing models; Simulation – manufacturing applications.</i> Project management: Scheduling techniques – Gantt chart, CPM, PERT and GERT.	
PI_P-16	<b>Industrial Management and Operational Research-3:</b> <i>Quality Management: Quality – concept and costs; Statistical quality control – process capability analysis, control charts for variables and attributes and acceptance sampling; Six sigma; Total quality management; Quality assurance and certification - ISO 9000, ISO14000.</i> <i>Reliability and Maintenance: Reliability, availability and maintainability; Distribution of failure and repair times; Determination of MTBF and MTTR, Reliability models; Determination of system reliability; Preventive and predictive maintenance and replacement, Total productive maintenance.</i> <i>Product Design and Development: Principles of product design, tolerance design; Quality and cost considerations; Product life cycle; Standardization, simplification, diversification; Value engineering and analysis; Concurrent engineering; Design for "X".</i>	
PI_P-17	<b>Verbal Ability:</b> Basic English grammar: tenses, articles, adjectives, prepositions, conjunctions, verb-noun agreement, and other parts of speech Basic vocabulary: words, idioms, and phrases in context Reading and comprehension Narrative sequencing	
PI_P-18	<b>Numerical Ability:</b> Quantitative Aptitude: Data interpretation: data graphs (bar graphs, pie charts, and other graphs representing data), 2- and 3-dimensional plots, maps, and tables Numerical computation and estimation: ratios, percentages, powers, exponents and logarithms, permutations and combinations, and series Mensuration and geometry Elementary statistics and probability. <b>Analytical Aptitude:</b> Logic: deduction and induction Analogy Numerical relations and reasoning <b>Spatial Aptitude:</b> Transformation of shapes: translation, rotation, scaling, mirroring, assembling, and grouping Paper folding, cutting, and patterns in 2 and 3 dimensions.	

### Subject Wise Grand Tests

(No. of Questions: 30, Time duration: 90 Minutes and Marks: 50 M)

Test No	Name of the Subject	Date of Activation
PI_P-19	Engineering Mathematics	<b>20-04-2021</b>
PI_P-20	Thermodynamics	
PI_P-21	Fluid Mechanics & Heat Transfer	
PI_P-22	Engineering Mechanics & Strength of Materials	
PI_P-23	Theory of Machines and Vibrations & Machine Design	
PI_P-24	Production	
PI_P-25	Industrial Management and Operational Research	
PI_P-26	General Aptitude	

### Multi-Subject Wise Grand Tests

(No. of Questions: 30, Time duration: 90 Minutes and Marks: 50 M)

Test No	Name of the Subject	Date of Activation
PI_P-27	Engineering Mechanics & Strength of Materials	<b>20-04-2021</b>
PI_P-28	Fluid Mechanics, Heat Transfer & Thermodynamics	
PI_P-29	Theory of Machines and vibrations & Machine Design	
PI_P-30	Production	
PI_P-31	Industrial Management and Operational Research	
PI_P-32	Engineering Mathematics & General Aptitude	

**Full Length Mock Test - 3<sup>rd</sup> Series***(No. of Questions: 65, Time duration: 180 Minutes and Marks: 100 M)*

Test No	Name of the Mock	Date of Activation
PI_P-33	Full Length Mock Test-1	<b>30-04-2021</b>
PI_P-34	Full Length Mock Test-2	
PI_P-35	Full Length Mock Test-3	
PI_P-36	Full Length Mock Test-4	
PI_P-37	Full Length Mock Test-5	
PI_P-38	Full Length Mock Test-6	
PI_P-39	Full Length Mock Test-7	
PI_P-40	Full Length Mock Test-8	
PI_P-41	Full Length Mock Test-9	
PI_P-42	Full Length Mock Test-10	
PI_P-43	Full Length Mock Test-11	
PI_P-44	Full Length Mock Test-12	