



ACE
Engineering Academy
(Leading institute for ESE/GATE/PSUs)




GATE - 2018



ONLINE TEST SERIES

PRODUCTION & INDUSTRIAL ENGINEERING (PI)

—≡ No. of Tests : 50 ≡—

	Chapter / Topic wise Tests	16
	Subject Wise / Multi Subject Grand Tests	22
	Full Length Mock Tests	12

TEST SERIES HIGHLIGHTS ≡—

- ★ All India Rank will be given for each test.
- ★ Test wise and overall statistics.
- ★ Comparison with toppers.
- ★ Question wise and test wise time analysis & comparison with toppers on time management.

Division of Subjects into Various Topics

Subject & Code	Topic Code	Topic/Chapter
Engineering Mechanics Subject code: GMC	GMC-1	Applied Mechanics: Engineering mechanics – equivalent force systems, free body concepts, equations of equilibrium; trusses;
Strength of Materials Subject code: GSM	GSM-1	Strength of materials – stress, strain and their relationship; failure theories, Mohr's circle(stress)
	GSM-2	Deflection of beams, bending and shear stress, Euler's theory of columns.
Theory of Machines and vibrations Subject code: GTM	GTM-1	Analysis of planar mechanisms, cams and followers; governors and fly wheels;
Machine Design Subject code: GMD	GMD-1	Design of bolted, riveted and welded joints; interference/shrink fit joints; design of shafts, keys, spur gears, belt drives, brakes and clutches; pressure vessels.
Fluid Mechanics Subject code: GFM	GFM-1	Fluid mechanics – fluid statics, Bernoulli's equation, flow through pipes, equations of continuity and momentum, capillary action, contact angle and wetting;
Heat Transfer Subject code: GHT	GHT-1	Heat transfer – basic applications of conduction, convection and radiation.
Thermodynamics Subject code: GTH	GTH-1	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;

Subject & Code	Topic Code	Topic/Chapter
<p>Production</p> <p>Subject code: GPI</p>	GPI-1	<p>Casting: types of casting processes and applications; patterns – types and materials; allowances; moulds and cores – materials, making, and testing; casting techniques of cast iron, steels and nonferrous metals and alloys; analysis of solidification and microstructure development; design of gating and riser; origin of defects.</p> <p>Metal Forming: Stress-strain relations in elastic and plastic deformation; concept of flow stress; hot and cold working – forging, rolling, extrusion and wire drawing; sheet metal working processes – blanking, bending and deep drawing; ideal work and slab analysis; origin of metal working defects.</p> <p>Joining of materials: Principles of fusion welding processes (manual metal arc, MIG, TIG, plasma arc, submerged arc welding processes) – different heat sources (flame, arc, resistive, laser, electron beam), and heat transfer and associated losses, flux application, feeding of filler rod; Principles of solid state welding processes (friction, explosive welding, ultrasonic welding processes); Principles of adhesive, brazing and soldering processes; Origins of welding defects.</p>
	GPI-2	<p>Machine Tools and Machining: Basic machine tools like centre lathe, milling machine, and drilling machine – construction and kinematics; machining processes - turning, taper turning, thread cutting, drilling, boring, milling, gear cutting, thread production, grinding; geometry of single point cutting tools, chip formation, cutting forces, specific cutting energy and power requirements, Merchant's analysis; basis of selection of machining parameters; tool materials, tool wear and tool life, economics of machining, thermal aspects of machining, cutting fluids, machinability; Jigs and fixtures – principles, applications, and design</p> <p>Non-traditional Manufacturing: Principles, applications, effect of process parameters on MRR and product quality of non-traditional machining processes – USM, AJM, WJM, AWJM, EDM and Wire cut EDM, LBM, EBM, PAM, CHM, ECM.</p> <p>Computer Integrated Manufacturing: Basic concepts of CAD – geometric modeling, CAM – CNC and robotics – configurations, drives and controls, Group Technology and its applications – CAPP, cellular manufacturing and FMS.</p>

Subject & Code	Topic Code	Topic/Chapter
<p>Production Subject code: GPI</p>	<p>GPI-3</p>	<p>Engineering Materials: Structure and properties correlation; engineering materials (metals, ceramics, polymers and composites) – properties and applications; stress-strain behavior of metals and alloys; iron-carbon phase diagram, heat treatment of metals and alloys, its influence on mechanical properties.</p> <p>Powder processing: Production of metal/ceramic powders, compaction and sintering of metals and ceramic powders.</p> <p>Polymers and Composites: Plastic processing – injection, compression and blow molding, extrusion, calendaring and thermoforming; molding of composites.</p> <p>Metrology and Inspection: Limits, fits, and tolerances, gauge design, interchangeability, selective assembly; linear, angular, and form measurements (straightness, squareness, flatness, roundness, and cylindricity) by mechanical and optical methods; inspection of screw threads and gears; surface finish measurement by contact and non-contact methods; tolerance analysis in manufacturing and assembly.</p>

Subject & Code	Topic Code	Topic/Chapter
<p>Industrial Management and Operational Research</p> <p>Subject code: GIM</p>	GIM-1	<p>Quality management: Quality – concept and costs; quality assurance; statistical quality control, acceptance sampling, zero defects, six sigma; total quality management; ISO 9000. 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 maintenance and replacement.</p> <p>Product Design and Development: Principles of good product design, tolerance design; quality and cost considerations; product life cycle; standardization, simplification, diversification, value engineering and analysis, concurrent engineering; comparison of production alternatives.</p>
	GIM-2	<p>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, merit rating, incentive schemes, and wage administration.</p> <p>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.</p> <p>Operation Research: Linear programming – problem formulation, simplex method, duality and sensitivity analysis; transportation and assignment models; network flow models, constrained optimization and Lagrange multipliers; Markovian queuing models; dynamic programming; simulation – manufacturing applications.</p>
	GIM-3	<p>Engineering Economy and Costing: Elementary cost accounting and methods of depreciation; break-even analysis, techniques for evaluation of capital investments, financial statements, time-cost trade-off, resource leveling.</p> <p>Production control: Forecasting techniques – causal and time series models, moving average, exponential smoothing, trend and seasonality; aggregate production planning; master production scheduling; MRP and MRP-II; routing, scheduling and priority dispatching; Push and pull production systems, concept of JIT manufacturing system; Logistics, distribution, and supply chain management; Inventory – functions, costs, classifications, deterministic inventory models, quantity discount; perpetual and periodic inventory control systems.</p> <p>Project management – PERT and CPM</p>

Subject & Code	Topic Code	Topic/Chapter
<p align="center">Engineering Mathematics</p> <p>Subject code:GEM</p>	<p align="center">GEM</p>	<p>Linear Algebra: Matrix algebra, Systems of linear equations, Eigen values and eigen vectors.</p> <p>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.</p> <p>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, Solutions of one dimensional heat and wave equations and Laplace equation.</p> <p>Complex variables: Analytic functions, Cauchy's integral theorem, Taylor series.</p> <p>Probability and Statistics: Definitions of probability and sampling theorems, Conditional probability, Mean, median, mode and standard deviation, Random variables, Poisson, Normal and Binomial distributions.</p> <p>Numerical Methods: Numerical solutions of linear and non-linear algebraic equations Integration by trapezoidal and Simpson's rule, single and multi-step methods for differential equations.</p>
<p align="center">General Aptitude</p> <p>Subject code: GGA</p>	<p align="center">GVA</p>	<p>English grammar, sentence completion, verbal analogies, word groups, instructions, critical reasoning and verbal deduction</p>
	<p align="center">GNA</p>	<p>Numerical computation, numerical estimation, numerical reasoning and data interpretation.</p>

Topic/Chapter-wise Tests

Each test carries 25 marks and 45 minutes duration

Test consists of 5 one mark questions and 10 two marks questions

Commences from 10th June, 2017 onwards, the detailed test schedule is as follows:

Tests will be activated at 2:00 pm on scheduled day

Test No	Topic codes	Date of Activation
PI-01	GMC- 1	10.06.2017
PI-02	GSM – 1	15.06.2017
PI-03	GSM – 2	18.06.2017
PI-04	GFM – 1	27.06.2017
PI-05	GTH – 1	06.07.2017
PI-06	GMD – 1	13.07.2017
PI-07	GHT – 1	19.07.2017
PI-08	GTM – 1	25.07.2017
PI-09	GPI – 1	28.07.2017
PI-10	GPI – 2	31.07.2017
PI-11	GPI – 3	03.08.2017
PI-12	GIM – 1	05.08.2017
PI-13	GIM – 2	06.08.2017
PI-14	GIM – 3	07.08.2017
PI-15	GEM	08.08.2017
PI-16	GVA & GNA	09.08.2017

Subject-wise Grand Tests- 1st Series

Each test carries 50 marks and 90 minutes duration.

Test consists of 10 one mark questions and 20 two marks questions

Commences from 12th August, 2017 onwards, the detailed test schedule is as follows:

Test No	Subject codes	Date of Activation
PI-17	GMC, GSM	12.08.2017
PI-18	GTH	19.08.2017
PI-19	GFM & GHT	26.08.2017
PI-20	GTM & GMD	01.09.2017
PI-21	GPI	05.09.2017
PI-22	GIM	08.09.2017
PI-23	GEM	11.09.2017
PI-24	GGA	12.09.2017

Full Length Mock GATE -1st Series

As per GATE Pattern

Each test carries 100 marks and 3 hours duration.

Commences from 15th September, 2017 onwards, the detailed test schedule is as follows:

Test No	Mock GATE codes	Date of Activation
PI-25	Mock – 1	15.09.2017
PI-26	Mock – 2	18.09.2017
PI-27	Mock – 3	21.09.2017

Subject-wise Grand Tests- 2nd Series

Each test carries 50 marks and 90 minutes duration.

Test consists of 10 one mark questions and 20 two marks questions

Commences from 24th September, 2017 onwards, the detailed test schedule is as follows:

Test No	Subject codes	Date of Activation
PI-28	GMC, GSM	24.09.2017
PI-29	GTH	04.10.2017
PI-30	GFM & GHT	10.10.2017
PI-31	GTM & GMD	16.10.2017
PI-32	GPI	20.10.2017
PI-33	GIM	23.10.2017
PI-34	GEM	26.10.2017
PI-35	GGA	27.10.2017

Full Length Mock GATE -2nd Series

As per GATE Pattern

Each test carries 100 marks and 3 hours duration.

Commences from 31st October, 2017 onwards, the detailed test schedule is as follows:

Test No	Mock GATE codes	Date of Activation
PI-36	Mock – 4	31.10.2017
PI-37	Mock – 5	09.11.2017
PI-38	Mock – 6	16.11.2017

Multi Subject Grand Tests

Each test carries 50 marks and 90 minutes duration.

Test consists of 10 one mark questions and 20 two marks questions

Commences from 20th November , 2017 onwards, the detailed test schedule is as follows:

Test No	Subjects Codes	Date of Activation
PI-39	GSM ,GMC	20.11.2017
PI-40	GFM ,GHT, GTH	25.11.2017
PI-41	GMD , GTM	29.11.2017
PI-42	GIM	04.12.2017
PI-43	GPI	08.12.2017
PI-44	GEM ,GGA	13.12.2017

Full Length Mock GATE -3rd Series

As per GATE Pattern

Each test carries 100 marks and 3 hours duration.

Commences from 22nd December, 2017 onwards, the detailed test schedule is as follows:

Test No	Mock GATE codes	Date of Activation
PI-45	Mock – 7	22.12.2017
PI-46	Mock – 8	29.12.2017
PI-47	Mock – 9	05.01.2018
PI-48	Mock – 10	13.01.2018
PI-49	Mock – 11	21.01.2018
PI-50	Mock – 12	27.01.2018

NOTE: The Dates of above MOCK GATE Exams may Change according to the GATE – 2018 Exam schedule.