PI

Detailed Schedule

GATE 2024: Online Test Series
PRODUCTION & INDUSTRIAL ENGG.

MADE EASY

Topicwise Tests

Test No.	Test Syllabus	No. of Ques.	Marks	Time	Activation Date
1	**TOM & Machine Design-1:** Analysis of planar mechanisms, cams and followers; governors and fly wheels.	17	25	45 min	Active
2	**TOM & Machine Design-2:** design of bolted, riveted and welded joints; interference/shrink fit joints; design of shafts, keys, spur gears, belt drives, brakes and clutches; pressure vessels.	17	25	45 min	
3	**Fluid Mechanics:** Fluid statics, Bernoulli's equation, flow through pipes, equations of continuity and momentum, capillary action, contact angle and wetting.	17	25	45 min	
4	**Thermodynamics:** Zeroth, first and second law of thermodynamics, thermodynamic system and processes, calculation of work and heat for systems and control volumes.	17	25	45 min	
5	**Applied Mechanics-1:** Equivalent force systems, free body concepts, equations of equilibrium; trusses.	17	25	45 min	
6	**Applied Mechanics-2:** Stress, strain and their relationship; failure theories, Mohr's circle(stress), deflection of beams, bending and shear stress, Euler's theory of columns.	17	25	45 min	
7	**Manufacturing Process 1:** 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. 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.	17	25	45 min	
8	**Manufacturing Process- 2:** 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.	17	25	45 min	
9	**Engineering mathematics-1:** Linear Algebra, Calculus, Vector Analysis, Probability and Statistics.	17	25	45 min	
10	**Engineering mathematics-2:** Differential Equations, Complex Analysis, Numerical Methods.	17	25	45 min	
11	**General Aptitude-1:** Numerical Ability: Numerical computation, numerical estimation, numerical reasoning and data interpretation.	17	25	45 min	
12	**General Aptitude-2:** Verbal Ability: English grammar, sentence completion, verbal analogies, word groups, instructions, critical reasoning and verbal deduction.	17	25	45 min	
13	**IC Engine:** Air standard cycles, Basics of internal combustion engines and steam turbines.	17	25	45 min	Active
14	**Heat Transfer:** Basic applications of conduction, convection and radiation.	17	25	45 min	
15	**Material Science-1:** Structure and properties correlation; engineering materials (metals, ceramics, polymers and composites) – properties and applications; stress-strain behavior of metals and alloys;	17	25	45 min	
16	**Material Science-2:** Iron-carbon phase diagram, heat treatment of metals and alloys, its influence on mechanical properties.	17	25	45 min	
17	**Manufacturing Process- 3:** 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	17	25	45 min	
18	**Manufacturing Process- 4:** Production of metal/ceramic powders, compaction and sintering of metals and ceramic powders. Polymers and Composites: Plastic processing – injection, compression and blow molding, extrusion, calendaring and thermoforming; molding of composites.	17	25	45 min	

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19	**Manufacturing Process- 5:** Jigs and fixtures – principles, applications, and design 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.	17	25	45 min	Active
20	**Manufacturing Process- 6:** 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. 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.	17	25	45 min	
21	**Industrial Engineering-1:** Industrial Engineering Operations Research and Operations Management 1 **Industrial Engineering :** **Work system design:** Taylor's scientific management, Gilbreths'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., **Operations Research and Operations Management 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 levelling. Inventory – functions, costs, classifications, deterministic inventory models, quantity discount; perpetual and periodic inventory control systems.	17	25	45 min	
22	**Industrial Engineering Operations Research and Operations Management 2** **Industrial Engineering** **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. **Operations Research and Operations Management** **Project Management** PERT/CPM	17	25	45 min	
23	**Operations Research and Operations Management Quality and reliability** **Operations Research and Operations Management** **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. **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. Quality Management, Reliability and Maintenance	17	25	45 min	
24	**Industrial Engineering Operations Research and Operations Management 3** **Operations Research and Operations Management** **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; **Industrial Engineering** **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.	17	25	45 min	

Test No.	Test Syllabus	No. of Ques.	Marks	Time	Activation Date
Single Subject Tests					
25	TOM & Machine Design	33	50	90 min	Active
26	Fluid Mechanics	33	50	90 min	
27	Thermodynamics	33	50	90 min	
28	Applied Mechanics	33	50	90 min	
29	Engineering Mathematics	33	50	90 min	
30	General Aptitude	33	50	90 min	
31	Manufacturing Process-I (1+2+4)	33	50	90 min	Active
32	Manufacturing Process-II (3+5+6)	33	50	90 min	
33	IC Engine + Heat Transfer	33	50	90 min	
34	Material Science	33	50	90 min	
35	Industrial Engineering + Quality Management + Reliability & Maintenance	33	50	90 min	
36	Operation Research	33	50	90 min	
Multiple Subject Tests					
37	Engineering Materials + Applied Mechanics	33	50	90 min	Active
38	TOM + Machine Design	33	50	90 min	
39	Thermodynamics + Fluid Mechanics & Hydraulic Machines + HMT + IC Engine	33	50	90 min	
40	Manufacturing (1+2+3) + Industrial Engineering	33	50	90 min	
41	Manufacturing (4+5+6) + Operation Research	33	50	90 min	
42	Engineering Mathematics + General Aptitude	33	50	90 min	
Full Syllabus Tests					
43	Full Syllabus Test-1 (Basic Level)	65	100	180 min	Active
44	Full Syllabus Test-2 (Basic Level)	65	100	180 min	
45	Full Syllabus Test-3 (Basic Level)	65	100	180 min	
46	Full Syllabus Test-4 (Basic Level)	65	100	180 min	
47	Full Syllabus Test-5 (Advance Level)	65	100	180 min	Active
48	Full Syllabus Test-6 (Advance Level)	65	100	180 min	
49	Full Syllabus Test-7 (Advance Level)	65	100	180 min	
50	Full Syllabus Test-8 (Advance Level)	65	100	180 min	
Mock Tests					
51	GATE Mock Test 1	65	100	180 min	Active
52	GATE Mock Test 2	65	100	180 min	
53	GATE Mock Test 3	65	100	180 min	
54	GATE Mock Test 4	65	100	180 min	