



# GATE 2022

## Online Test Series

# CH

## CHEMICAL ENGINEERING

### Topicwise Tests

Test No.	Test Syllabus	No. of Ques.	Marks	Time	Activation Date
1	<b>Heat Transfer-1:</b> Equation of energy, steady and unsteady heat conduction, convection.	17	25	45 min	10-04-2021
2	<b>Heat Transfer-2:</b> Radiation, thermal boundary layer and heat transfer coefficients, boiling, condensation and evaporation; types of heat exchangers and evaporators and their process calculations; design of double pipe, shell and tube heat exchangers, and single and multiple effect evaporators.	17	25	45 min	
3	<b>Chemical Reaction Engineering-1:</b> Theories of reaction rates; kinetics of homogeneous reactions, interpretation of kinetic data, single and multiple reactions in ideal reactors.	17	25	45 min	
4	<b>Chemical Reaction Engineering-2:</b> Non-ideal reactors; residence time distribution, single parameter model; non-isothermal reactors.	17	25	45 min	
5	<b>Chemical Reaction Engineering-3:</b> Kinetics of enzyme reactions (Michaelis-Menten and Monod models); kinetics of heterogeneous catalytic reactions; diffusion effects in catalysis; rate and performance equations for catalyst deactivation.	17	25	45 min	
6	<b>Fluid Mechanics-1:</b> Fluid statics, surface tension, Newtonian and non-Newtonian fluids, transport properties, shell-balances including differential form of Bernoulli equation and energy balance, equation of continuity, equation of motion, equation of mechanical energy, Macroscopic friction factors, dimensional analysis and similitude.	17	25	45 min	
7	<b>Fluid Mechanics-2:</b> Flow through pipeline systems, velocity profiles, flow meters, pumps and compressors, elementary boundary layer theory, flow past immersed bodies including packed and fluidized beds, Turbulent flow: fluctuating velocity, universal velocity profile and pressure drop.	17	25	45 min	
8	<b>Mechanical Operations-3:</b> Particle size and shape, particle size distribution, size reduction and classification of solid particles; free and hindered settling; centrifuge and cyclones; thickening and classification, filtration, agitation and mixing; conveying of solids.	17	25	45 min	
9	<b>Engineering mathematics-1:</b> Linear Algebra, Calculus, Probability and Statistics.	17	25	45 min	
10	<b>Engineering mathematics-2:</b> Differential Equations, Complex Analysis, Numerical Methods.	17	25	45 min	
11	<b>General Aptitude (Part-1):</b> Numerical Ability, Numerical computation, numerical estimation, and data interpretation.	17	25	45 min	
12	<b>General Aptitude (Part-2):</b> Verbal Ability: English grammar, sentence completion, verbal analogies, word groups, instructions, critical reasoning, numerical reasoning, verbal deduction and spatial aptitude.	17	25	45 min	
13	<b>Plant Design and Economics-1:</b> Principles of process economics and cost estimation including depreciation and total annualized cost, cost indices, rate of return, payback period.	17	25	45 min	
14	<b>Plant Design and Economics-2:</b> Discounted cash flow, optimization in process design and sizing of chemical engineering equipments such as heat exchangers and multistage contactors.	17	25	45 min	
15	<b>Instrumentation and Process Control-1:</b> Measurement of process variables; sensors and transducers; P & ID equipment symbols; process modeling and linearization, transfer functions and dynamic responses of various systems, systems with inverse response.	17	25	45 min	
16	<b>Instrumentation and Process Control-2:</b> Process reaction curve, controller modes (P, PI, and PID); control valves; transducer dynamics; analysis of closed loop systems including stability, frequency response, controller tuning, cascade and feed forward control.	17	25	45 min	
17	<b>Thermodynamics and Process Calculations-1:</b> Steady and unsteady state mass and energy balances including multiphase, multi-component, reacting and non-reacting systems. Use of tie components; recycle, bypass and purge calculations; Gibb's phase rule and degree of freedom analysis.	17	25	45 min	
18	<b>Thermodynamics and Process Calculations-2:</b> First and Second laws of thermodynamics. Applications of first law to close and open systems. Second law and Entropy. Thermodynamic properties of pure substances.	17	25	45 min	
19	<b>Thermodynamics and Process Calculations-3:</b> Equation of State and residual properties, properties of mixtures: partial molar properties, fugacity, excess properties and activity coefficients; phase equilibria: predicting VLE of systems; chemical reaction equilibrium.	17	25	45 min	
20	<b>Chemical Technology-1:</b> Inorganic chemical industries (sulfuric acid, phosphoric acid, chlor-alkali industry), fertilizers (Ammonia, Urea, SSP and TSP); natural products industries (Pulp and Paper, Sugar, Oil, and Fats).	17	25	45 min	
21	<b>Chemical Technology-2:</b> Petroleum refining and petrochemicals; polymerization industries (polyethylene, polypropylene, PVC and polyester synthetic fibers).	17	25	45 min	
22	<b>Mass Transfer-1:</b> Fick's laws, molecular diffusion in fluids, mass transfer coefficients, film, penetration and surface renewal theories; momentum, heat and mass transfer analogies.	17	25	45 min	
23	<b>Mass Transfer-2:</b> Stage-wise and continuous contacting and stage efficiencies; HTU & NTU concepts; design and operation of equipment for distillation, absorption.	17	25	45 min	
24	<b>Mass Transfer-3:</b> Leaching, liquid-liquid extraction, drying, humidification, dehumidification and adsorption, membrane separations(micro-filtration, ultra-filtration, nano-filtration and reverse osmosis).	17	25	45 min	



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### Single Subject Tests

Test No.	Test Syllabus	No. of Ques.	Marks	Duration	Activation Date
25	Thermodynamics	33	50	90 min	10-06-2021
26	Heat Transfer	33	50	90 min	
27	Chemical Reaction Engineering	33	50	90 min	
28	Process Calculation and Mechanical Operation	33	50	90 min	
29	Engineering Mathematics	33	50	90 min	
30	General Aptitude	33	50	90 min	
31	Instrumentation and Process Control	33	50	90 min	10-07-2021
32	Fluid Mechanics	33	50	90 min	
33	Mass Transfer	33	50	90 min	
34	Instrument and Process Control	33	50	90 min	
35	Plant Design and Economics	33	50	90 min	
36	Chemical Technology	33	50	90 min	

### Multiple Subject Tests

37	Thermodynamics + Process Control	33	50	90 min	10-08-2021
38	Chemical Reaction Engineering + Plant Design and Economics	33	50	90 min	
39	Mass Transfer + Chemical Technology	33	50	90 min	
40	Heat Transfer + Mechanical Operations	33	50	90 min	
41	Instrumentation Process Control + Fluid Mechanics	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	10-09-2021
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	30-09-2021
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	

**Candidate has to upload GATE-2022 Admit Card to access below mentioned tests**

51	GATE Mock Test 1	65	100	180 min	
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	