GATE 2022
Online Test Series

IN
INSTRUMENTATION ENGG.

	Topicwise Tests				
Test No.	**Test Syllabus**	**No. of Ques.**	**Marks**	**Time**	**Activation Date**
1	**Electrical Circuits-1:** Voltage and current sources: independent, dependent, ideal and practical; v-i relationships of resistor, inductor, mutual inductor and capacitor; Kirchhoff's Law, mesh nodal analysis, superposition, Thevenin, Norton, maximum power transfer and reciprocity theorems; Peak-, average - and rms value of ac quantities; apparent active-and reactive powers; phasor analysis, impedance and admittance.	17	25	45 min	10-04-2021
2	**Electrical Circuits-2:** Electrical Circuits-2: Transient analysis of RLC circuits with dc excitation; series and parallel resonance, locus diagram, realization of basic filters with R, L and C elements. One-port and two-port networks, driving point impedance and admittance, open-and short circuit parameters, Transient analysis of RLC circuits with ac excitation.	17	25	45 min	
3	**Electric Machines** -Single Phase Transformer: equivalent circuit, phasor diagram, open circuit and short circuit test, regulation and efficiency; Three Phase Induction Motor: principle of operation, types, performance, torque-speed characteristics, no-load and blocked rotor test, equivalent circuit, starting and speed control; Types of losses and efficiency calculations of electric machines.	17	25	45 min	
4	**Electricity and Magnetism-1:** Coulomb's Law, Electric Field Intensity, Electric Flux Density, Gauss's Law, Divergence, Electric Field and potential due to point, line, plane and spherical charge distributions, Effect of dielectric medium, Capacitance of simple configurations	17	25	45 min	
5	**Electricity and Magnetism-2 :** Biot-Savart's law, Ampere's law, Curl, Faraday's law, Lorentz force, Inductance, Magnetomotive Force, Reluctance, Magnetic Circuits, Self and Mutual inductance of simple configurations.	17	25	45 min	
6	**Control Systems-1:** Feedback principles, signal flow graph, transient response, steady-state-errors, Routh Criteria, root loci, Bode Plot, phase and gain margin, Nyquist criteria.	17	25	45 min	
7	**Control Systems-2:** Design of lead, Lag and Lead-lag compensators, state space representation of systems; time delay systems, Mechanical, hydraulic and pneumatic system components, synchro pair, servo and stepper motors, servo valve; on-off, P, P-I, P-I-D, cascade, feedforward, and ratio controllers, Tuning of PID controllers and sizing of control valve	17	25	45 min	
8	**Sensors and Industrial Instrumentation-1:** Resistive, capacitive, inductive, piezoelectric, Hall effect sensor and associated signal conditioning circuits; transducers for industrial instrumentation: displacement (linear and angular), velocity, acceleration, force, torque, vibration, shock.	17	25	45 min	
9	**Sensors and Industrial Instrumentation-2:** Pressure (including low pressure), flow (differential pressure, variable area, electromagnetic, ultrasonic, turbine and open channel flow meter) temperature (thermocouple, bolometer, RTD (3/4 wire), thermistor, pyrometer and semiconductor); liquid level, pH, conductivity and viscosity measurement,4-20mA two wire transmitter	17	25	45 min	
10	**Engineering Mathematics-1:** Linear Algebra, calculus, Vector Analysis, Probability statistics, Fourier Series.	17	25	45 min	
11	**Engineering Mathematics-2:** Differential Equations, Analysis of complex variables, Numerical Methods.	17	25	45 min	
12	**General Aptitude (Part-1):** Numerical Ability, Numerical computation, numerical estimation, and data interpretation.	17	25	45 min	

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	Topicwise Tests				
Test No.	**Test Syllabus**	**No. of Ques.**	**Marks**	**Time**	**Activation Date**
13	**General Aptitude (Part-2) :** Verbal Ability: English grammar, sentence completion, verbal analogies, word groups, instructions, critical reasoning, numerical reasoning, verbal deduction and spatial aptitude.	17	25	45 min	
14	**Analog Electronics-1:** Characteristics and applications of diode, Zener diode, BJT and MOSFET; small signal analysis of transistor circuits, feedback amplifiers.	17	25	45 min	
15	**Analog Electronics-2:** Characteristics of operational amplifiers; applications of op-amps: difference amplifier, adder, subtractor, integrator, differentiator, instrumentation amplifier, precision rectifier, active filters and other circuits. Oscillators, signal generators, voltage-controlled oscillators and phase locked loop, Sources and effects of noise and interference in electronic circuits.	17	25	45 min	
16	**Digital Electronics-1:** Basics of number systems, Combinational logic circuits, minimization of Boolean functions. IC families: TTL and CMOS. Arithmetic circuits, comparators, Schmitt trigger, multi-vibrators, Sequential circuits, flip flops, shift registers, timers and counters; sample-and-hold circuit, multiplexer.	17	25	45 min	
17	**Digital Electronics-2:** Analog-to digital (successive approximation, integrating, flash and sigma-delta)and digital-to analog converters (weighted R, R-2R ladder and current steering logic). Characteristics of ADC and DAC (resolution, quantization, significant bits, conversion/settling time), Embedded Systems: Microprocessor and microcontroller applications, memory and input output interfacing; basics of data acquisition systems, basics of distributed control systems (DCS) and programmable logic controllers (PLC).	17	25	45 min	
18	**Signals and Systems-1:** Periodic, aperiodic and impulse signals; Laplace, Fourier transform, transfer function, frequency response of first and second order linear time invariant systems, impulse response, convolution, correlation.	17	25	45 min	**10-05-2021**
19	**Signals and Systems-2:** z-transforms; Discrete time system: impulse response, frequency response, pulse transfer function; DFT and FFT; basics of IIR and FIR filters.	17	25	45 min	
20	**Communication:** Amplitude-and frequency modulation and demodulation; Shannon's sampling theorem. Pulse code modulation; frequency and time division multiplexing, amplitude-, phase, frequency, pulse shift keying for digital modulation, Quadrature amplitude modulation.	17	25	45 min	
21	**Measurement-1:** SI units, systematic and random errors in measurement, expression of uncertainty - accuracy and precision index, propagation of errors. PMMC, MI and dynamometer type instruments; dc potentiometer, Measurement of voltage and current., voltage and current scaling.	17	25	45 min	
22	**Measurement-2:** Bridges for measurement of R, L and C, Q-meter. Measurement of Power in single and three phase circuits; ac and dc current probes; true rms meters Instrument transformers, timer/counter, time, phase and frequency measurements, digital voltmeter, digital multimeter, oscilloscope, shielding and grounding.	17	25	45 min	
23	**Optical instrumentation-1:** Basics of fiber optic sensing, interferometer: applications in metrology.	17	25	45 min	
24	**Optical Instrumentation-2:** Optical sources and detectors: LED, laser, photo-diode, light dependent resistor and their characteristics. UV-VIS Spectro photometers, Mass spectrometer.	17	25	45 min	

GATE 2022
Online Test Series

IN
INSTRUMENTATION ENGG.

	Single Subject Tests				
Test No.	Test Syllabus	No. of Ques.	Marks	Duration	Activation Date
25	Electrical Circuits + Electrical Machines	33	50	90 min	10-06-2021
26	Control Systems + Process Control	33	50	90 min	
27	Sensors & Industrial Instrumentation	33	50	90 min	
28	Electricity and Magnetism	33	50	90 min	
29	Engineering Mathematics	33	50	90 min	
30	General Aptitude	33	50	90 min	
31	Signals & Systems	33	50	90 min	10-07-2021
32	Measurements	33	50	90 min	
33	Communications	33	50	90 min	
34	Digital Electronics & Microprocessors	33	50	90 min	
35	Analog Electronics	33	50	90 min	
36	Optical Instrumentation	33	50	90 min	
	Multiple Subject Tests				
37	Electrical Circuits + Electricity and Magnetism + Electrical Machines	33	50	90 min	10-08-2021
38	Analog Electronics + Digital Electronics & Microprocessors	33	50	90 min	
39	Sensors & Industrial Instrumentation + Control Systems + Process Control	33	50	90 min	
40	Signals & Systems + Communications	33	50	90 min	
41	Measurements + Optical Instrumentation	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	

GATE 2021: Online Test Series
INSTRUMENTATION ENGINEERING

Topicwise Tests

Test No.	Test Syllabus	No. of Ques.	Marks	Time	Activation Date
1	**Electrical Circuits-1:** Voltage and current sources: independent, dependent, ideal and practical; v-i relationships of resistor, inductor, mutual inductor and capacitor; Kirchoff's laws, mesh and nodal analysis, superposition, Thevenin, Norton, maximum power transfer and reciprocity theorems; Peak-, average- and rms values of ac quantities; apparent- active- and reactive powers; phasor analysis, impedance and admittance.	17	25	45 min	**Activated**
2	**Electrical Circuits-2:** Electrical Circuits-2: Transient analysis of RLC circuits with dc excitation; series and parallel resonance, locus diagrams, realization of basic filters with R, L and C elements. One-port and two-port networks, driving point impedance and admittance, open-and short circuit parameters.	17	25	45 min	
3	**Control Systems-1:** Feedback principles, signal flow graphs, transient response, steady-state-errors, Routh criteria, root loci.	17	25	45 min	
4	**Control Systems-2:** Control Systems-2: Bode plot, phase and gain margins, Nyquist criteria,design of lead, Lag and Lead-lag compensators, state-space representation of systems; time-delay systems.	17	25	45 min	
5	**Process control:** Mechanical, hydraulic and pneumatic system components, synchro pair, servo and stepper motors, servo valves; on-off, P, P-I, P-I-D, cascade, feedforward, and ratio controllers.	17	25	45 min	
6	**Sensors and Industrial Instrumentation-1:** Resistive, capacitive, inductive, piezoelectric, Hall effect sensors and associated signal conditioning circuits; transducers for industrial instrumentation: displacement (linear and angular), velocity, acceleration, force, torque, vibration, shock.	17	25	45 min	
7	**Sensors and Industrial Instrumentation-2:** Pressure (including low pressure), flow (differential pressure, variable area, electromagnetic, ultrasonic, turbine and open channel flow meters) temperature (thermocouple, bolometer, RTD (3/4 wire), thermistor, pyrometer and semiconductor); liquid level, pH, conductivity and viscosity measurement.	17	25	45 min	
8	**Microprocessors:** 8-bit microprocessor and microcontroller: applications, memory and input-output interfacing; basics of data acquisition systems.	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, Analysis of complex variables, 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, instruction, critical reasoning and verbal deduction.	17	25	45 min	
13	**Analog Electronics-1:** Characteristics and applications of diode, Zener diode, BJT and MOSFET; small signal analysis of transistor circuits, feedback amplifiers.	17	25	45 min	**Activated**
14	**Analog Electronics-2:** Characteristics of operational amplifiers; applications of opamps: difference amplifier, adder, subtractor, integrator, differentiator, instrumentation amplifier, precision rectifier, active filters and other circuits. Oscillators, signal generators, voltage controlled oscillators and phase locked loop.	17	25	45 min	
15	**Digital Electronics-1:** Basics of number systems, Combinational logic circuits, minimization of Boolean functions. IC families: TTL and CMOS. Arithmetic circuits, comparators, Schmitt trigger, multi-vibrators.	17	25	45 min	
16	**Digital Electronics-2:** Sequential circuits, flip-flops, shift registers, timers and counters; sample-and-hold circuit, multiplexer, analog-to digital (successive approximation, integrating, flash and sigma-delta) and digital-to analog converters (weighted R, R-2R ladder and current steering logic). Characteristics of ADC and DAC (resolution, quantization, significant bits, conversion/settling time).	17	25	45 min	
17	**Signals and Systems-1:** Periodic, aperiodic and impulse signals; Laplace, Fourier transform, transfer function, frequency response of first and second order linear time invariant systems, impulse response, convolution, correlation.	17	25	45 min	
18	**Signals and Systems-2:** z-transforms; Discrete time system: impulse response, frequency response, pulse transfer function; DFT and FFT; basics of IIR and FIR filters.	17	25	45 min	
19	**Communication-1:** Amplitude- and frequency modulation and demodulation; Shannon's sampling theorem.	17	25	45 min	
20	**Communication-2:** Pulse code modulation; frequency and time division multiplexing, amplitude-, phase-, frequency-, pulse shift keying for digital modulation.	17	25	45 min	
21	**Measurement-1:** SI units, systematic and random errors in measurement, expression of uncertainty- accuracy and precision index, propagation of errors. PMMC, MI and dynamometer type instruments; dc potentiometer, Measurement of voltage and current., voltage and current scaling.	17	25	45 min	
22	**Measurement-2:** bridges for measurement of R, L and C, Q-meter. Measurement of Power in single and three phase circuits; ac and dc current probes; true rms meters Instrument transformers, timer/counter,time, phase and frequency measurements, digital voltmeter, digital multimeter, oscilloscope, shielding and grounding.	17	25	45 min	
23	**Optical instrumentation-1:** Basics of fibre optic sensing, interferometer: applications in metrology.	17	25	45 min	
24	**Optical Instrumentation-2:** Optical sources and detectors: LED, laser, photo-diode, light dependent resistor and their characteristics.	17	25	45 min	

Topicwise Tests

Test No.	Test Syllabus	No. of Ques.	Marks	Time	Activation Date
25	Electrical Circuits + Electrical Machines	33	50	90 min	Activated
26	Control Systems + Process Control	33	50	90 min	
27	Sensors & Industrial Instrumentation	33	50	90 min	
28	Electricity and Magnetism	33	50	90 min	
29	Engineering Mathematics	33	50	90 min	
30	General Aptitude	33	50	90 min	
31	Signals & Systems	33	50	90 min	Activated
32	Measurements	33	50	90 min	
33	Communications	33	50	90 min	
34	Digital Electronics & Microprocessors	33	50	90 min	
35	Analog Electronics	33	50	90 min	
36	Optical Instrumentation	33	50	90 min	

Multiple Subject Tests

Test No.	Test Syllabus	No. of Ques.	Marks	Time	Activation Date
37	Electrical Circuits + Electricity and Magnetism + Electrical Machines	33	50	90 min	Activated
38	Analog Electronics + Digital Electronics & Microprocessors	33	50	90 min	
39	Sensors & Industrial Instrumentation + Control Systems + Process Control	33	50	90 min	
40	Signals & Systems + Communications	33	50	90 min	
41	Measurements + Optical Instrumentation	33	50	90 min	
42	Engineering Mathematics + General Aptitude	33	50	90 min	

Full Syllabus Tests

Test No.	Test Syllabus	No. of Ques.	Marks	Time	Activation Date
43	Full Syllabus Test-1 (Basic Level)	65	100	180 min	Activated
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	Activated
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

Test No.	Test Syllabus	No. of Ques.	Marks	Time	Activation Date
51	GATE Mock Test 1	65	100	180 min	Activated
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	