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

GATE - 2018
ONLINE TEST SERIES

INSTRUMENTATION ENGINEERING (IN)

No. of Tests : 62

Chapter / Topic wise Tests	20
Subject Wise / Multi Subject Grand Tests	30
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
Electrical Circuits **Subject code:GEC**	GEC -1	Voltage and current sources: independent, dependent, ideal and practical; v-i relationships of resistor, inductor, mutual inductor and capacitor; transient analysis of RLC circuits with dc excitation. Kirchoff's laws, mesh and nodal analysis, superposition, Thevenin, Norton, maximum power transfer and reciprocity theorems.
	GEC-2	Peak-, average- and rms values of ac quantities; apparent-, active- and reactive powers; phasor analysis, impedance and admittance; 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.
Signals & Systems **Subject code:GSS**	GSS-1	Periodic, aperiodic and impulse signals; Fourier transform. transfer function, frequency response of first and second order linear time invariant systems, impulse response of systems; convolution, correlation.
	GSS-2	Laplace,and z-transforms; Discrete time system: impulse response, frequency response, pulse transfer function; DFT and FFT; basics of IIR and FIR filters.
Control Systems **Subject code: GCS**	GCS-1	Feedback principles, signal flow graphs, transient response, steady-state-errors, Routh criteria, root loci.
	GCS-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; mechanical, hydraulic and pneumatic system components, synchro pair, servo and stepper motors, servo valves; on-off, P, P-I, P-I-D, cascade, feed forward, and ratio controllers.
Digital Electronics **Subject code: GDE**	GDE-1	Combinational logic circuits, minimization of Boolean functions.. Arithmetic circuits, comparators, Schmitt trigger, multi-vibrators, sequential circuits, flip- flops, basics of number systems, , shift registers, timers and counters;
	GDE-2	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); basics of number systems, 8-bit microprocessor and microcontroller: applications, memory and input-output interfacing; basics of data acquisition systems. IC families: TTL and CMOS.

Subject & Code	Topic Code	Topic/Chapter
Sensors &Industrial instrumentation **Subject code: GSI**	GSI-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, pressure (including low pressure).
	GSI-2	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.
Analog ElectronicsTest code: GAE	GAE-1	Characteristics and applications of diode, Zener diode, BJT and MOSFET; small signal analysis of transistor circuits, feedback amplifiers.
	GAE-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.
Communication&Optical instrumentation **Subject code: GCO**	GCO-1	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.
	GCO-2	optical sources and detectors: LED, laser, photo-diode, light dependent resistor and their characteristics; interferometer: applications in metrology; basics of fiber optic sensing.
Measurements **Subject code:GME**	GME-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; bridges for measurement of R, L and C, Q-meter.
	GME-2	Measurement of voltage, current and power in single and three phase circuits; ac and dc current probes; true rms meters, voltage and current scaling, instrument transformers, timer/counter, time, phase and frequency measurements, digital voltmeter, digital multimeter; oscilloscope, shielding and grounding.

Subject & Code	Topic Code	Topic/Chapter
Engineering Mathematics **Subject code:GEM**	GEM-1	Linear Algebra: Vector space, basis, linear dependence and independence, matrix algebra, eigen values and eigen vectors, rank, solution of linear equations – existence and uniqueness. Calculus: Mean value theorems, theorems of integral calculus, evaluation of definite and improper integrals, partial derivatives, maxima and minima, multiple integrals, line, surface and volume integrals, Taylor series. Vector Analysis: Vectors in plane and space, vector operations, gradient, divergence and curl, Gauss's, Green's and Stoke's theorems. Differential Equations: First order equations (linear and nonlinear), higher order linear differential equations, Cauchy's and Euler's equations, methods of solution using variation of parameters, complementary function and particular integral, partial differential equations, variable separable method, initial and boundary value problems.
	GEM-2	Complex Analysis: Analytic functions, Cauchy's integral theorem, Cauchy's integral formula; Taylor's and Laurent's series, residue theorem. Numerical Methods: Solution of nonlinear equations, single and multi-step methods for differential equations, convergence criteria. Probability and Statistics: Mean, median, mode and standard deviation; combinatorial probability, probability distribution functions - binomial, Poisson, exponential and normal; Joint and conditional probability; Correlation and regression analysis.
General Aptitude **Subject code: GGA**	GVA	English grammar, sentence completion, verbal analogies, word groups, instructions, critical reasoning and verbal deduction.
	GNA	Numerical computation, numerical estimation, numerical reasoning and data interpretation.

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
IN-01	GEC – 1	10.06.2017
IN-02	GEC – 2	13.06.2017
IN-03	GSS – 1	16.06.2017
IN-04	GSS – 2	19.06.2017
IN-05	GCS-1	22.06.2017
IN-06	GCS-2	25.06.2017
IN-07	GDE– 1	28.06.2017
IN-08	GDE – 2	01.07.2017
IN-09	GSI – 1	04.07.2017
IN- 10	GSI – 2	07.07.2017
IN-11	GAE-1	11.07.2017
IN-12	GAE-2	14.07.2017
IN-13	GCO – 1	17.07.2017
IN-14	GCO– 2	20.07.2017
IN-15	GME – 1	23.07.2017
IN-16	GME – 2	26.07.2017
IN- 17	GEM – 1	29.07.2017
IN-18	GEM – 2	01.08.2017
IN-19	GVA	04.08.2017
IN-20	GNA	07.08.2017

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 10th August, 2017 onwards, the detailed test schedule is as follows:

Test No	Subject codes	Date of Activation
IN-21	GEC	10.08.2017
IN-22	GSS	13.08.2017
IN-23	GCS	17.08.2017
IN-24	GDE	20.08.2017
IN-25	GSI	23.08.2017
IN-26	GAE	27.08.2017
IN-27	GCO	30.08.2017
IN-28	GME	02.09.2017
IN-29	GEM	06.09.2017
IN- 30	GGA	09.09.2017

Full Length Mock GATE -1st Series

As per GATE Pattern

Each test carries 100 marks and 3 hours duration.

Commences from 13th September, 2017 onwards, the detailed test schedule is as follows:

Test No	Mock GATE codes	Date of Activation
IN-31	Mock – 1	13.09.2017
IN-32	Mock – 2	16.09.2017
IN-33	Mock – 3	19.09.2017

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 22nd September, 2017 onwards, the detailed test schedule is as follows:

Test No	Subject codes	Date of Activation
IN-34	GEC	22.09.2017
IN-35	GSS	25.09.2017
IN-36	GCS	02.10.2017
IN-37	GDE	05.10.2017
IN-38	GSI	08.10.2017
IN-39	GAE	11.10.2017
IN-40	GCO	14.10.2017
IN-41	GME	17.10.2017
IN-42	GEM	21.10.2017
IN-43	GGA	24.10.2017

Full Length Mock GATE -2nd Series

As per GATE Pattern

Each test carries 100 marks and 3 hours duration.

Commences from 29th October, 2017 onwards, the detailed test schedule is as follows:

Test No	Mock GATE codes	Date of Activation
IN-44	Mock – 4	29.10.2017
IN-45	Mock – 5	06.11.2017
IN-46	Mock – 6	13.11.2017

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 18th November , 2017 onwards, the detailed test schedule is as follows:

Test No	Subjects Codes	Date of Activation
IN-47	GEC, GSI	18.11.2017
IN-48	GCS, GSS	21.11.2017
IN-49	GME,GAC	24.11.2017
IN-50	GSI, GDC	27.11.2017
IN-51	GEM,GGA	30.11.2017
IN-52	GSS, GCS	03.12.2017
IN-53	GDC, GAC	06.12.2017
IN-54	GCO, GEC	09.12.2017
IN-55	GCO, GME	12.12.2017
IN-56	GEM,GGA	15.12.2017

Full Length Mock GATE -3rd Series

As per GATE Pattern

Each test carries 100 marks and 3 hours duration.

Commences from 18th December, 2017 onwards, the detailed test schedule is as follows:

Test No	Mock GATE codes	Date of Activation
IN-57	Mock – 7	18.12.2017
IN-58	Mock – 8	25.12.2017
IN-59	Mock – 9	01.01.2018
IN-60	Mock – 10	09.01.2018
IN-61	Mock – 11	17.01.2018
IN-62	Mock – 12	24.01.2018

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