The following are the details of syllabus and types of examinations for the Non-Faculty positions advertised vide advt. No IIITDMKL/R/2/2018 dated 19th September 2018.

- For the position of Junior Engineer (Civil/Electrical), the institute is conducting the following three different types of Tests. Out of these, Test 1 is used for short-listing the candidates to appear for further tests based on their Test 1 performance.

- Performance of Test 2 and Test 3 will be considered for preparing the merit list by the committee.

Date and Venue for Junior Engineer Post(s):

Venue	Date	Time	Name of the examination
Seminar Hall IIITDM, Kurnool	19th July 2019	Reporting Time: 9.00am	Test 1: 19th July 2019 (10.00 – 12.00)
	20th July 2019	Reporting Time for shortlisted candidates based on Test 1: 9.00am	Test 2: 20th July 2019 (10.00-12.00)
			Test 3: 20th July 2019 (2.00pm-3.30pm)

Test 1: General Aptitude Test – 120 minutes
Test 2: Subject Knowledge (Theory) Test (PART- A and PART- B) – 120 minutes
Test 3: Subject Knowledge Practical Test related to Civil/Electrical – 90 minutes

Test 1: Syllabus of General Aptitude Test – Part A Common to Junior Engineer Civil/Electrical

Aptitude: Averages, Number Systems, Profit and Loss, Time and Work, Problems on Trains, Compound Interest, Decimal Fractions, Calendar, Area, Problems on Numbers, Square Root and Cube Root, Boats and Streams, Probability, Interest, Percentage, Ratio, Time and Distance, Problems on Ages, Partnership, Clock, Simplifications, Volume and Surface, Problems on H.C.F And L.C.M, Logarithm, Chain Rule, Pipes and Cistern, Odd Man Out and Series, Height and Distance.
Reasoning: Number Series Compilation, Missing Number Finding, Continuous Pattern Series, Direction Sense Test, Puzzle, Verbal Classification, Matching Definitions, Logical Deduction, Series Compilations, Classification, Missing Character Finding, Odd Man Out, Blood Relations, Analogy, Coding And Decoding, Truth Verification Of The Statement, Syllogisms, Analogies, Verbal Reasoning, Statement And Conclusions, Letter And Symbol Series, Logical Problems, Logical Sequence Of Words, Arithmetic Reasoning, Data Sufficiency.
General English: Antonyms, Synonyms, Spelling Check, Change of Voice, Spotting Errors, Sentence Improvement, One Word Substitute, Selecting Words, Sentence Corrections, Idioms and Phrases, Communication Skills, Common Error Detection, Sentence Compilation, Ordering

of Words, Ordering of Sentences, Verbal Analogies, Sentence Formation, Completing Statements, Change of Speech.

Data Interpretation: Pie Chart, Bar Chart, Line Chart, Table Chart and their interpretations.

General Knowledge: Indian History, Indian Economy, Indian Culture, Environmental Science, Awards And Honors, Famous Places In India, World Organization, Sports, Books And Authors, Famous Personalities, Days And Years, World Geography, Basic General Knowledge, Physics, Biology, Indian Politics, Indian Geography, General Science, Chemistry, Technology, Inventions, Current Affairs.

Computer Fundamentals: Components of computer, Input and output devices, Operating Systems, Word processing software, data representations and conversions.

Test 2: Syllabus of Subject Knowledge (Theory) – Part A Common to Junior Engineer Civil/Electrical

Units and Measurement	Definition • Classifications: Fundamental and Derived units • Systems of units: FPS, CGS, MKS • Units of physical quantities, symbols • Conversion factors • Measurement of mechanical quantities, electrical quantities • Related problems
Mass Weight and Density	Definition • Comparison between mass and weight • Comparison between density and relative density/specific gravity • Volume of different geometries (Cube, Cylinder, Cone, Sphere etc.) • Related problems
Occupational Safety, Health	Safety & Health: Introduction and Importance of Occupational Safety and Health • Occupational Hazards: Basic Hazards, Chemical Hazards, Vibroacoustic Hazards, Mechanical Hazards, Electrical Hazards, Thermal Hazards. Occupational health, Occupational hygienic, Occupational Diseases/ Disorders & its prevention • Accident & safety: Basic principles for protective equipment, Accident Prevention techniques – control of accidents and safety measures • First Aid: Care of injured & Sick at the workplaces, First-Aid & Transportation of sick person • Basic Provisions: Idea of basic provision of safety, health, welfare under legislation of India Environment Education Ecosystem: Introduction to Environment, Relationship between Society and Environment, Ecosystem and Factors causing imbalance • Pollution: Pollution and pollutants including liquid, gaseous, solid and hazardous waste • Energy Conservation: Conservation of Energy, re-use and recycle • Global warming: Global warming, climate change and Ozone layer depletion • Ground Water: Hydrological cycle, ground and surface water, Conservation and Harvesting of water • Environment: Right attitude towards environment, Maintenance of in-house environment
I.T. Literacy	Computer: Introduction, Computer and its applications, Hardware and peripherals, switching on and shutting down of computer • WINDOWS: Basics of Operating System, WINDOWS, Create, Copy, Move and delete Files and Folders, Use of External memory like pen drive, CD, DVD etc. • MS office: Basic operations of Word Processing (Cut /Copy /Paste/ Formatting), Basics of Excel worksheet (Commands/simple formulas and functions) • INTERNET: Computer Networks (LAN/WAN), Applications of Internet (Browsing, Searching, Emailing, Social Networking) • WEB Browser: World Wide Web (WWW), Web Browsing, Information Security and antivirus tools, Awareness of IT – ACT, Importance of information security and IT act, types of cyber crimes.

Test 2: Syllabus of Subject Knowledge (Theory) (Part B) for Junior Engineer (Civil):

Building Materials	Physical and Chemical properties, classification, standard tests, uses and manufacture/quarrying of materials e.g. building stones, silicate based materials, cement (Portland),asbestos products, timber and wood based products, laminates, bituminous materials, paints,varnishes.
Estimating, Costing and Valuation	estimate, glossary of technical terms, analysis of rates, methodsand unit of measurement, Items of work – earthwork, Brick work (Modular & Traditional bricks),RCC work, Shuttering, Timber work, Painting, Flooring, Plastering. Boundary wall, Brick building,Water Tank, Septic tank, Bar bending schedule, Centre line method, Mid-section formula, Trapezodial formula, Simpson's rule. Cost estimate of Septic tank, flexible pavements, Tube well,isolates and combined footings, Steel Truss, Piles and pile-caps. Valuation – Value and cost, scrapvalue, salvage value, assessed value, sinking fund, depreciation and obsolescence, methods ofvaluation.
Surveying	Principles of surveying, measurement of distance, chain surveying, working of prismaticcompass, compass traversing, bearings, local attraction, plane table surveying, theodolite traversing,adjustment of theodolite, Levelling, Definition of terms used in levelling, contouring, curvature andrefraction corrections, temporary and permanent adjustments of dumpy level, methods of contouring,uses of contour map, tachometric survey, curve setting, earth work calculation, advanced surveyingequipment.
Soil Mechanics	Origin of soil, phase diagram, Definitions-void ratio, porosity, degree of saturation,water content, specific gravity of soil grains, unit weights, density index and interrelationship ofdifferent parameters, Grain size distribution curves and their uses. Index properties of soils,Atterberg's limits, ISI soil classification and plasticity chart. Permeability of soil, coefficient ofpermeability, determination of coefficient of permeability, Unconfined and confined aquifers,effective stress, quick sand, consolidation of soils, Principles of consolidation, degree ofconsolidation, pre-consolidation pressure, normally consolidated soil, e-log p curve, computation ofultimate settlement. Shear strength of soils, direct shear test, Vane shear test, Triaxial test. Soilcompaction, Laboratory compaction test, Maximum dry density and optimum moisture content, earthpressure theories, active and passive earth pressures, Bearing capacity of soils, plate load test,standard penetration test.
Hydraulics	Fluid properties, hydrostatics, measurements of flow, Bernoulli's theorem and itsapplication, flow through pipes, flow in open channels, weirs, flumes, spillways, pumps and turbines
Irrigation Engineering	Definition, necessity, benefits, 2II effects of irrigation, types and methods ofirrigation, Hydrology – Measurement of rainfall, run off coefficient, rain gauge, losses fromprecipitation – evaporation, infiltration, etc. Water requirement of crops, duty, delta and base period,Kharif and Rabi Crops, Command area, Time factor, Crop ratio, Overlap allowance, Irrigation Efficiencies. Different type of canals, types of canal irrigation, loss of water in canals. Canal lining –types and advantages. Shallow and deep to wells, yield

	from a well. Weir and barrage, Failure ofweirs and permeable foundation, Slit and Scour, Kennedy's theory of critical velocity. Lacey's theoryof uniform flow. Definition of flood, causes and effects, methods of flood control, water logging,preventive measure. Land reclamation, Characteristics of affecting fertility of soils, purposes,methods, description of land and reclamation processes. Major irrigation projects in India.
Transportation Engineering	Highway Engineering – cross sectional elements, geometric design, types of pavements, pavement materials – aggregates and bitumen, different tests, Design of flexible andrigid pavements – Water Bound Macadam (WBM) and Wet Mix Macadam (WMM), Gravel Road,Bituminous construction, Rigid pavement joint, pavement maintenance, Highway drainage, RailwayEngineering- Components of permanent way – sleepers, ballast, fixtures and fastening, trackgeometry, points and crossings, track junction, stations and yards. Traffic Engineering – Differenttraffic survey, speed-flow-density and their interrelationships, intersections and interchanges, trafficsignals, traffic operation, traffic signs and markings, road safety.
Theory of structures	Theory of structures**:** Elasticity constants, types of beams – determinate and indeterminate, bendingmoment and shear force diagrams of simply supported, cantilever and over hanging beams. Momentof area and moment of inertia for rectangular & circular sections, bending moment and shear stress fortee, channel and compound sections, chimneys, dams and retaining walls, eccentric loads, slopedeflection of simply supported and cantilever beams, critical load and columns, Torsion of circularsection.
Concrete Technology	Properties, Advantages and uses of concrete, cement aggregates, importance of water quality, water cement ratio, workability, mix design, storage, batching, mixing, placement,compaction, finishing and curing of concrete, quality control of concrete, hot weather and coldweather concreting, repair and maintenance of concrete structures.
RCC Design	RCC beams-flexural strength, shear strength, bond strength, design of singly reinforcedand double reinforced beams, cantilever beams. T-beams, lintels. One way and two way slabs,isolated footings. Reinforced brick works, columns, staircases, retaining wall, water tanks (RCCdesign questions may be based on both Limit State and Working Stress methods).
Steel Design	Steel design and construction of steel columns, beams roof trusses plate girders.

Test 2: Syllabus of Subject Knowledge (Theory) – Part B for Junior Engineer (Electrical)

Basic concepts	Concepts of resistance, inductance, capacitance, and various factors affecting them.Concepts of current, voltage, power, energy and their units.
Circuit law	Kirchhoff's law, Simple Circuit solution using network theorems
Magnetic Circuit	Concepts of flux, mmf, reluctance, Different kinds of magnetic materials, Magneticcalculations for conductors of different configuration e.g. straight, circular, solenoidal, etc.Electromagnetic induction, self and mutual induction
AC Fundamentals	Instantaneous, peak, R.M.S. and average values of alternating waves, Representation of sinusoidal wave form, simple series and parallel AC Circuits consisting of R.L. andC, Resonance, Tank Circuit. Poly Phase system – star and delta connection, 3 phase power, DC and sinusoidal response of R-Land R-C circuit.
Measurement and measuring instruments	Measurement of power (1 phase and 3 phase, both activeand re-active) and energy, 2 wattmeter method of 3 phase powermeasurement. Measurement offrequency and phase angle. Ammeter and voltmeter (both moving oil and moving iron type),extension of range wattmeter, Multimeters, Megger, Energy meter AC Bridges. Use of CRO, SignalGenerator, CT, PT and their uses. Earth Fault detection.
Electrical Machines	(a) D.C. Machine – Construction, Basic Principles of D.C. motors andgenerators, their characteristics, speed control and starting of D.C. Motors. Method of braking motor,Losses and efficiency of D.C. Machines. (b) 1 phase and 3 phase transformers – Construction,Principles of operation, equivalent circuit, voltage regulation, O.C. and S.C. Tests, Losses andefficiency. Effect of voltage, frequency and wave form on losses. Parallel operation of 1 phase / 3phase transformers. Auto transformers. (c) 3 phase induction motors, rotating magnetic field,principle of operation, equivalent circuit, torque-speed characteristics, starting and speed control of 3phase induction motors. Methods of braking, effect of voltage and frequency variation on torquespeed characteristics.
Fractional Kilowatt Motors and Single Phase Induction Motors	Characteristics and applications
Synchronous Machines	Generation of 3-phase e.m.f. armature reaction, voltage regulation, paralleloperation of two alternators, synchronizing, control of active and reactive power. Starting andapplications of synchronous motors.
Generation, Transmission and Distribution	Different types of power stations, Load factor, diversityfactor, demand factor, cost of generation, inter-connection of power stations. Power factorimprovement, various types of tariffs, types of faults, short circuit current for symmetrical faults.Switchgears – rating of circuit breakers, Principles of arc extinction by oil and air, H.R.C. Fuses,Protection against earth leakage / over current, etc. Buchholtz relay, Merz-Price system of protectionof generators & transformers, protection of feeders and bus bars. Lightning arresters, varioustransmission and distribution system, comparison of conductor materials, efficiency of differentsystem. Cable – Different type of cables, cable

	rating and derating factor.
Estimation and costing	Estimation of lighting scheme, electric installation of machines and relevantIE rules. Earthing practices and IE Rules.
Utilization of Electrical Energy	Illumination, Electric heating, Electric welding, Electroplating, Electric drives and motors.
Basic Electronics	Working of various electronic devices e.g. P N Junction diodes, Transistors (NPNand PNP type), BJT, JFET, MOSFET and Op-Amp. Simple circuits using these devices
Power Electronics	Working of various power electronic devices, Different types of Converters, Inverters and UPS.

Test 3: Syllabus for Test 3 is same as Test 2 (Part B) listed above for respective discipline.