



VISVESVARAYA NATIONAL INSTITUTE OF TECHNOLOGY (VNIT)

NAGPUR, MAHARASHTRA- 440 010, INDIA

M.Sc. Admissions 2017

(Physics, Chemistry, Mathematics)

Information about Institute Written Test

Institute Written Test is scheduled on **Sunday, 28th May 2017**

1.0 Tentative Schedule:

SN	Events	Dates	Action by Candidates
1	Registration and Submission of online Application Forms for Institute written test	10 th April to 15 th May, 2017 (10.00 AM) 10 th April 2017 to (10.00 AM) 16th May 2017 <i>In order to avoid last minute rush, candidates are advised to apply online early enough.</i>	Registration link will be available on the website www.vnit.ac.in Fill the application and pay the registration fee online. (Rs. 750/- for Open/OBC and Rs. 500/- for SC/ST/PWD)
2	Downloading of Admit Card	18 th May to 27 th May, 2017	Download Admit Card
3	Institute written Test (Venue : Department of Mathematics at VNIT, Nagpur)	28 th May, 2017 (Sunday) Chemistry: 09:00 am to 10:00 am Mathematics: 11:00 am to 12:00 noon Physics: 02:00 pm to 03:00pm	Reach 30 minutes prior to the scheduled time for the Institute written test to the venue with the self attested Admit Card.
4	*Display of merit list of Institute written test on the website www.vnit.ac.in	13 th June, 2017	*See Institute website for merit list of Institute written test on www.vnit.ac.in
5	*Operation of the merit list of Institute written test	Will be displayed later	*Visit Institute website and act accordingly
6	Start of Semester	24 th July, 2017	Start attending the classes (for admitted students)

**The Merit list of the Institute written test will be operated only if any seats remain vacant after CCMN 2017 final round. If all the seats are filled through CCMN-2017, the merit list of Institute written test stands null and void. There cannot be any claim by the merit list candidate of Institute written test for the admission to the M.Sc. programmes in Physics, Chemistry and Mathematics.*

2.0 Eligibility:

The admissions for the M.Sc. Programmes for the Academic Year 2017 will be through Centralized Counseling for M.Sc. Admissions (CCMN-2017) based on the IIT-JAM score.

However, the vacant seats after CCMN-2017 final round, if any, will be filled through the **Institute Written Test** conducted by VNIT on **Sunday, 28th May, 2017**. **This test will be open for all the candidates irrespective of whether they have appeared for JAM or not.** **Registration at CCMN-2017 website is not necessary to apply for the VNIT Institute written test.**

B.Sc./Bachelor degree with minimum 60% marks aggregate or equivalent grade [55% marks aggregate or equivalent grade in case of candidates from SC/ST/PWD category] with Physics/Chemistry/Mathematics as one of the main subject to be eligible for the respective M.Sc. Programme. In addition, the candidate is expected to meet the following eligibility requirement:

Programme	Eligibility Requirement
M.Sc.(Physics)	Candidate should have Physics at B.Sc./Bachelor degree Level in all the three years along with Mathematics as one of the subjects
M.Sc.(Chemistry)	Candidate should have Chemistry at B.Sc./Bachelor degree Level in all the three years with any other combination + Mathematics at 10+2 level is essential
M.Sc.(Mathematics)	Candidate should have Mathematics at B.Sc. /Bachelor degree Level in all the three years with any other combination

Candidate appearing in the final year of B.Sc./Bachelor degree programme may also apply. Such candidate, if selected for admission, should produce an authentication letter from the competent authority stating that his/ her result is awaited. However, the candidate will have to submit the mark sheet of the final year of B.Sc/ Bachelor degree programme by 15th September, 2017 failing which his/ her admission stands cancelled. It is hereby clarified that this facility is not available to candidates who have appeared for supplementary, backlog or any improvement paper.

Eligibility against these requirements is not verified during the online registration for the Institute Written test. Candidates are required to ensure that they fulfill all such requirements before applying for such programmes. Candidate will be solely responsible for checking these requirements; VNIT will not entertain any claims arising out of failure on part of candidate applying without ensuring compliance of their candidature.

The written test will be conducted by VNIT only. **The merit list of the Institute written test will be operated only if any seats remain vacant after CCMN-2017 final round. If all seats are filled through CCMN-2017, the merit list of Institute written tests stands null and void. There cannot be any claim regarding the same.**

3.0 Category Rules

- Reservation is as per Government of India Rules.
- Candidates applying for admission against the seats reserved for OBC/SC/ST should note that, only those candidates who actually belong to the respective castes and communities will be eligible for admission under reserved category.
- Admission committee reserves the right to re-verify the eligibility for admission as per rules stipulated. If candidate is not eligible, the admission will not be offered.
- If a candidate is not able to produce required category certificate (OBC/SC/ST/PWD as applicable) or the certificate is found invalid, his/her admission will be cancelled, fees paid shall be forfeited.
- For Maharashtra candidates, caste validity certificate is essential to claim the category benefits.
- For **OBC** candidates, latest non-creamy layer (NCL) certification is mandatory without which they will not be considered for OBC category.
- For candidates coming under Persons with Disabilities (**PWD**) category, a minimum of 40% disability is required subject to the condition that the candidate is capable of carrying out activities related to theory and practical work as applicable to course. They are required to submit Physical disability certificate signed by three members of Medical Authority duly constituted by the State or Central Government under Persons with Disability Act. One of the doctors in the Medical Authority shall be a specialist in the particular field pertaining to the disability. The name, degree, and specialization of all the doctors, date of issue of the certificate shall be clearly visible in the certificate.

4.0 Institute Written Test :

Merely passing of entrance test does not guarantee the admission to the M.Sc. Programmes, unless candidate satisfies Eligibility criterion.

4.1 Application procedure for Institute written test:

- Register and Fill the Online Application Form for the M.Sc. Programme of your interest at the link available at www.vnit.ac.in
- Separate written test will be conducted for **M.Sc.(Physics), M.Sc. (Chemistry) and M.Sc.(Mathematics)** Programmes.
- **Registration fee is Rs 750/- (for General and OBC) and Rs. 500/- (for SC/ST/ PWD),** which is to be paid online during online Registration for Institute Written Test.

4.2 Salient features of the Institute Written Test:

- Candidate can appear in more than one written test provided he/she has applied for the appropriate program(s) and he/she fulfills the eligibility criteria. However, separate application form will have to be submitted online for each entrance test to M.Sc. (Physics), M.Sc. (Chemistry) and M.Sc. (Mathematics).
- If student has applied in more than one program, he/ she will get different Application ID for each test.
- The syllabus for Institute Written test is also different for different M.Sc. programs.
- The Institute Written test will be of one hour duration.

Date: The Institute Written tests will be conducted on **28th May 2017 (SUNDAY)**

Venue: Department of Mathematics, VNIT Nagpur.

The schedule for the tests is:

Written test for M.Sc. (Chemistry)	: 09:00 am to 10:00 am
Written test for M.Sc. (Mathematics)	: 11:00 am to 12:00 noon
Written test for M.Sc. (Physics)	: 02:00 pm to 03:00 pm

- Candidates are required to report at least 30 minutes prior the commencement of the test. Late reported candidates will not be permitted to appear in the examination.
- No Traveling expenses will be provided for appearing in the Institute written test. Candidates have to make their own arrangement for travel, food etc.

4.3 Syllabus for the Institute written test:

4.3.1 Syllabus for written entrance test : M.Sc.(Physics)

Mathematical Methods: Calculus of single and multiple variables, partial derivatives, Jacobian, imperfect and perfect differentials, Taylor expansion, Fourier series. Vector algebra, Vector Calculus, Multiple integrals, Divergence theorem, Green's theorem, Stokes' theorem. First and linear second order differential equations. Matrices and determinants, Algebra of complex numbers.

Mechanics and General Properties of Matter: Newton's laws of motion and applications, Velocity and acceleration in Cartesian, polar and cylindrical coordinate systems, uniformly rotating frame, centrifugal and Coriolis forces, Motion under a central force, Kepler's laws, Gravitational Law and field, Conservative and non-conservative forces. System of particles, Centre of mass, equation of motion of the CM, conservation of linear and angular momentum, conservation of energy, variable mass systems. Elastic and inelastic collisions. Rigid body motion, fixed axis rotations, rotation and translation, moments of Inertia and products of Inertia. Principal

moments and axes. Elasticity, Hooke's law and elastic constants of isotropic solid, stress energy. Kinematics of moving fluids, equation of continuity, Euler's equation, Bernoulli's theorem, viscous fluids, surface tension and surface energy, capillarity.

Oscillations, Waves and Optics: Differential equation for simple harmonic oscillator and its general solution. Superposition of two or more simple harmonic oscillators. Lissajous figures. Damped and forced oscillators, resonance. Wave equation, traveling and standing waves in one-dimension. Energy density and energy transmission in waves. Group velocity and phase velocity. Sound waves in media. Doppler Effect. Fermat's Principle. General theory of image formation. Thick lens, thin lens and lens combinations. Interference of light, optical path retardation. Fraunhofer diffraction. Rayleigh criterion and resolving power. Diffraction gratings. Polarization: linear, circular and elliptic polarization. Double refraction and optical rotation.

Electricity and Magnetism: Coulomb's law, Gauss's law. Electric field and potential. Electrostatic boundary conditions, Solution of Laplace's equation for simple cases. Conductors, capacitors, dielectrics, dielectric polarization, volume and surface charges, electrostatic energy. Biot-Savart law, Ampere's law, Faraday's law of electromagnetic induction, Self and mutual inductance. Alternating currents. Simple DC and AC circuits with R, L and C components. Displacement current, Maxwell's equations and plane electromagnetic waves, Poynting's theorem, reflection and refraction at a dielectric interface, transmission and reflection coefficients (normal incidence only). Lorentz Force and motion of charged particles in electric and magnetic fields.

Kinetic theory, Thermodynamics: Elements of Kinetic theory of gases. Velocity distribution and Equipartition of energy. Specific heat of Mono-, di- and tri-atomic gases. Ideal gas, van-der-Waals gas and equation of state. Mean free path. Laws of thermodynamics. Zeroth law and concept of thermal equilibrium. First law and its consequences. Isothermal and adiabatic processes. Reversible, irreversible and quasi-static processes. Second law and entropy. Carnot cycle. Maxwell's thermodynamic relations and simple applications. Thermodynamic potentials and their applications. Phase transitions and Clausius-Clapeyron equation.

Modern Physics: Inertial frames and Galilean invariance. Postulates of special relativity. Lorentz transformations. Length contraction, time dilation. Relativistic velocity addition theorem, mass energy equivalence. Blackbody radiation, photoelectric effect, Compton effect, Bohr's atomic model, X-rays. Wave-particle duality, Uncertainty principle, Schrödinger equation and its solution for one, two and three dimensional boxes. Reflection and transmission at a step potential, tunneling through a barrier. Pauli exclusion principle. Distinguishable and indistinguishable particles. Maxwell-Boltzmann, Fermi-Dirac and Bose-Einstein statistics. Structure of atomic nucleus, mass and binding energy. Radioactivity and its applications. Laws of radioactive decay. Fission and fusion.

Solid State Physics, Devices and Electronics: Crystal structure, Bravais lattices and basis. Miller indices. X-ray diffraction and Bragg's law, Einstein and Debye theory of specific heat. Free electron theory of metals. Fermi energy and density of states. Origin of energy bands. Concept of holes and effective mass. Elementary ideas about dia-, para- and ferromagnetism, Langevin's theory of paramagnetism, Curie's law. Intrinsic and extrinsic semiconductors. Fermi level. p-n junctions, transistors. Transistor circuits in CB, CE, CC modes. Amplifier circuits with transistors. Operational amplifiers. OR, AND, NOR and NAND gates.

4.3.2 Syllabus for written entrance test : M.Sc. (Chemistry)

Atomic Structure, Periodic Properties, Pauling's And Mulliken's Scales Of Electronegativity, Covalent Bond: Valence Bond Theory, Various Types Of Hybridization And Shapes Of Inorganic Molecules. MO Theory , S - & P - Block Elements , Interhalogen Compounds And Polyhalides, Chemistry Of Noble Gases, Chemistry Of Transition & Inner Transition Series Elements, Isomerism In Coordination Compounds, Metal Ligand Bonding In Transition Metal Complexes and Electronic Spectra, Magnetic Properties Of Transition Metal Complexes, Various Separation Techniques. Organometallic Chemistry, Bioinorganic Chemistry, Hard and Soft Acids and Bases.

Structure and Bonding, Inductive, Electromeric & Resonance Effect. Hyperconjugation, Mechanism Of Organic Reactions, Reactive Intermediates Carbocations, Carbanions, Free Radicals, Carbenes, Nitrenes. Stereochemistry, Geometrical, Conformational Isomerism, Chemistry Of Aliphatic Hydrocarbons, Arenes, Alkyl Halides , Alcohols , Phenols , Aldehydes and Ketones, Carboxylic Acids and Derivatives Of Carboxylic Acid , Nitrogen Containing Compounds, Ethers And Epoxides , Organometallic Compounds , Chemistry Of 5 & 6 Membered Heterocyclic Compounds, Name Reactions and Reagents, Biomolecules, Synthetic Polymers, Synthetic Dyes , Organo Sulphur Compounds. Quantitative Analysis.

Gaseous State, Solid State, Liquid State, Chemical Kinetics, Thermodynamics: 1st Law, 2nd Law, Enthalpy, Entropy, Free Energy and Thermochemistry. **Electrochemistry:** Conductance and Potential Concepts, Solutions And Colligative Properties, Nernst Distribution Law, Ideal And Real Solutions, **Phase Rule. Quantum Mechanics:** Planck's Quantum Theory. Bohrs Model Of Hydrogen Atom. De Broglie's Hypothesis, HUP, Schrodinger Wave Equation, Quantum Numbers & Their Importance, Molecular Orbital Theory. **Dipole Moment , Magnetic Properties.**

Nuclear Chemistry: Nuclear Reaction, Nuclear Models, Applications Of Radioisotopes.

Spectroscopy: UV, IR NMR. **Raman Spectra** Of Diatomic Molecules, Polarizability, Selections Rules.

Photochemistry, Fluorescence Phosphorescence, Chemiluminescence, Quantum Yield.

4.3.3. Syllabus for written entrance test for M.Sc. (Mathematics)

Calculus: Sequences of real numbers. Convergent sequences and series, absolute and conditional convergence. Continuity and differentiability. Rolle's Theorem, Mean value theorem. Taylor 's theorem. Maxima and minima of functions of a single variable. Functions of two and three variables. Partial derivatives, maxima and minima. Fundamental theorem of integral calculus. Double and Triple, integrals, Surface areas and volumes.

Real Analysis: Open and closed sets, limit points, completeness of **R**, Uniform Continuity, Uniform convergence, Power series.

Vector Calculus: Gradient, divergence, curl and Laplacian. Directional Derivatives. Green's, Stokes and Gauss theorems and their applications.

Differential Equations: Ordinary differential equations of the first order of the form $y'=f(x,y)$. Orthogonal Trajectory. Linear differential equations of higher order with constant coefficients. Euler-Cauchy equation. Method of variation of parameters.

Linear Algebra: Systems of linear equations. Matrices, rank, determinant, inverse. Eigenvalues and eigenvectors. Finite Dimensional Vector Spaces over Real and Complex numbers, Basis, Dimension, Linear Transformations.

Algebra: Groups, subgroups and normal subgroups, Lagrange's Theorem for finite groups, group homomorphisms and basic concepts of quotient groups, rings, ideals, quotient rings and fields.

Analytical Geometry: Planes, Spheres, right circular Cones and right circular Cylinders.

4.4 Institute Written test merit list:

- Based on performance in the written test conducted by VNIT, separate merit list will be prepared for each course viz. M.Sc. (Physics), M.Sc. (Chemistry) and M.Sc.(Mathematics).
- During the Admission process, if there is a tie, candidate with higher B.Sc./Bachelor degree aggregate marks percentage will be given the preference and then respective subject aggregate marks percentage will be considered.
- Programme wise merit list will be displayed on the Institute website and Notice Board in Department of Mathematics. There will not be any individual communication to the candidates. Candidates are advised to see as above.
- *The Merit list of the Institute written test will be operated only if any seats remain vacant after CCMN-2017 final round. If all the seats are filled through CCMN-2017, the merit list of Institute Written Test stands null and void. There cannot be any claim by the merit list candidate of Institute written test for the admission to the M.Sc. programmes in Physics, Chemistry and Mathematics.*

5.0 Fees Structure for M.Sc. Programme: 2017-2018:

Payment of fees to be made in the form of DD drawn in favour of "The Director, VNIT, Nagpur" payable at Nagpur. Cash/Cheques will not be accepted.

5.1 Institute Tuition Fee:

Fee information for M.Sc. Admission 2017-18 is as under:

a) Fees per Year

Description	Amount (in Rs)
Tuition Fee	15000.00
Registration Fee	500.00
Library Fee	750.00
Gym. Cultural Activity & Magazine Fee	1000.00
Sports Fee	500.00
Internet & Computer Maint. Fee	750.00
Training & Placement Fee	400.00
Industry Institute Interaction Fee	300.00
Development Fee	2000.00
End Semester Examination Fee (1 st / 2 nd Semester)	1000.00
Total Fees per year	22200.00
Above fees is to be paid semester wise Rs 11100.00 per semester	

b) One Time Fees

Description	Amount (in Rs)
Identity Card	200.00
Medical Exam	100.00
Welfare Fund	600.00
Medical Aid Fund	2000.00
#Library Deposit	5000.00
#Caution Deposit	5000.00
Total One Time Fees	12900.00
# Deposits are Refundable on completion of program	

Total Fees to be paid at the time of admission 11100 + 12900 = Rs 24000.00

Hostel charges are separate & not part of above fees.

Note: In addition to above fees, Convocation fees of Rs 500/- and Thesis/Dissertation evaluation fees of Rs 1500/- shall be charged in 4th semester of M.Sc. Programme.

Candidates shall be required to pay all one time charges (b) in admission year only.

Revision in fees, if any, in future shall be applicable.

Aspirants are kindly requested to forward any queries regarding the Institute Fees to the Dy. Registrar - Academic (Email: dr_acd@vnit.ac.in, Phone: 0712-2801365 / 2801241).

5.2 Hostel Accommodation and Rules:

Hostel accommodation is available on first come first served basis.

For Hostel/Mess Fee information, please visit the website www.vnit.ac.in

Aspirants are kindly requested to forward any queries regarding the hostel to the Asst. Registrar-Hostel (Email: hostelmanager@vnit.ac.in, Phone: 0712-2801373 / 2801233).

6.0 Communication:

All communications by the Institute for the Admission Process will be made only through the institute website www.vnit.ac.in Candidates are advised to access the website on regular basis for admission updates. **No individual communication shall be entertained.**

For any other queries:

Contact Numbers : 0712–2801407 ; 0712–2801172

Email : m_devakar@yahoo.co.in
rupesh_gedam@rediffmail.com

7.0 Seat Allotment Process:

- **Institute Written Test merit list will be operated for the admission, subject to availability of seats in the respective M.Sc. programmes after the CCMN-2017 final round. While operating merit list, candidates will be called as per their rank to the registration desk. Seat allotment will be done as per inter-se-merit after completion of other formalities like document verification and payment of fees.**
- Candidate getting allotment of multiple seats is required to cancel earlier seat. Vacant seat will be offered to the next merit candidate.
- If at any stage, the information provided by a candidate is found to be false, his/her admission candidature will be cancelled and he/she will be debarred from the admission process. **Suitable legal action will be initiated, if necessary.**

8.0 Closing of Admission:

In no circumstances admission will be given after **3rd August 2017**.

9.0 Cancellation of Admission and Refund of fees:

In case candidate withdrawing/cancelling the admission and **no further additional round of admission is conducted** to fill the vacant seats arising out of cancellation/non-filling of seats, candidate shall forfeit all tuition fees (TF).

Candidate **shall receive the refund of other fees only (excluding TF)**, if admission is withdrawn/cancelled **within 30 days** of joining the institute.

Candidate **shall not receive the refund of any fees** if admission is withdrawn/cancelled **after 30 days** of joining the institute.

In case candidate withdrawing/cancelling the admission and admission authority **conducts additional round(s)** to fill the vacant seats arising out of cancellation/non-filling of seats, candidate will **receive refund of tuition and other fees after deduction of Rs 1000/-** towards the processing charges. Such refunds, if any, shall be processed only after the receipt of initial fees of all candidates from the admission authority.

In case, candidate having allotted the seat in VNIT and **not reported** for admission (i.e. Institute reporting)/**not withdrawn** at any stage, he/she **will not receive refund of initial fees** and will stand forfeited.

Candidates who, at any stage, cancel their admission by own will not be considered for subsequent admission if any.

Once the allotment of seat is done, it will not be considered again for re-allotment for other available seat at the same instant for other course provided earlier allotment is cancelled.

If any of the information supplied by the candidate in connection with his/her admission found to be false or incorrect at any stage, his/her admission will be cancelled, fees will be forfeited. He/she shall be expelled from the Institute and prosecuted, if deemed necessary.

10.0 Provisions of admission

Students while studying in the Institute, who are found indulging in anti-national activities contrary to the provisions of acts and laws enforced by Government or in any activity contrary to rules of discipline, will be liable to be expelled by the Director of the Institute from the institute without any notice.

If any dispute arises by interpreting any of the above provisions, the decision of the Director, VNIT shall be final and binding on all candidates.

The above Rules are subject to modifications whenever found necessary by the Institute.

The Admission Policy & Procedures are subject to the jurisdiction of Hon'ble Court of Nagpur.

**Director
VNIT, Nagpur**

Disclaimer: Institute is not responsible for any inadvertent error that may have crept in the soft copy of the M.Sc. admission information published on the website and reserves the right to correct/alter the information if necessary at any stage.