



GOVERNMENT OF TAMIL NADU

HIGHER SECONDARY FIRST YEAR

CHEMISTRY

VOLUME - I

A publication under Free Textbook Programme of Government of Tamil Nadu

Department of School Education

Untouchability is Inhuman and a Crime

Government of Tamil Nadu

First Edition - 2018

Revised Edition - 2019, 2020, 2021, 2022

(Published under New Syllabus)

NOT FOR SALE

Content Creation



State Council of Educational Research and Training

© SCERT 2018

Printing & Publishing



Tamil NaduTextbook and Educational Services Corporation

www.textbooksonline.tn.nic.in

Key features

	Scope of Chemistry	Awareness about higher education avenues in the field of Chemistry	
	Learning objectives	Describe the specific competency / performance capability acquired by the learner	
	Do you know	Additional information provided to relate the content to day-to-day life / development in the field	
	Example Problems	Model problems worked out for clear-cut comprehension by the learners	
	Evaluate yourself	To help the students to assess their own conceptual understanding	
	Q.R code	Quick access to concepts, videos, animations and tutorials	
	ICT	Opens up resources for learning; enables the learners to access, extend transform ideas / informations	
	Summary	A glance on the substance of the unit	
	Concept map	Inter relating the concepts for enabling learners to visualize the essence of the unit	
	Evaluation	To assess the level of understanding through multiple choice question, numerical problems etc.	
	Books for Reference	List of relevant books for further reading	
	Key answers	To help the learners confirm the accuracy of the answers arrived and remedy the gaps in learning	
	Glossary	Important terms are enlisted with equivalent Tamil words	
	Appendix	Comprises fundamental constants and Data tables	

The courses offered, top colleges and competitive exams conducted for higher education after 12th in Chemistry field were summarized below.

Courses	Institution	Selection Mode	Careers in Chemistry
Bachelor Degree • B.Sc. (Chemistry) • B.Sc. (Analytical Methods in Chemistry) • B.Sc. (Applied Chemistry) • B.Sc. (Industrial Chemistry) • B.Sc. (Polymer Chemistry) • B.Sc. (Bio Chemistry)	• Arts and Science Colleges in India	Counseling based on 12 th Marks in Science Subjects	• Teacher for Secondary Schools • Lab Chemist • Food Processing Firms • Paint Manufacturing Companies • Plastics Industries and Textile Industries • Agrochemical Industry • Petrochemical Industry • Water Quality and Cosmetic Chemists • Can write any type of competitive examinations such as TNPSC, Bank exams, Civil service, RRB etc.
• B.E.(Chemical Engineering)	• Indian Institute of Technologies • Birla Institute of Technology and Science • All Govt. and Private Engineering colleges in Tamilnadu	# JEE (Main & Advanced) #BITSAT	• Architectural engineering works • Resin and artificial synthetic fibers • Petroleum and coal products manufacturing • Space Fuel Processor • Biotechnology and pharmaceutical companies • Climate Change Reversal Engineer • Food Manufacturing unites, Electronics and Energy manufacturers
• B.Tech. (Rubber plastics technology) • B.Tech. (Petroleum Refining and Petrochemicals, Ceramic Technology(S.S), Textile Technology, Leather Technology) • B.E. / B.Tech. (Plastics Engineering / Technology)	• Madras Institute of Technology • Anna University, Alagappa College of Technology, CSIR-Central Leather Research Institute and other affiliated colleges • Central Institute of Plastics Engineering & Technology	TNEA Counseling based on cut off scored in 12 th std	
Diploma	• Maharashtra State Board of Technical Education (MSBTE) - Government of Maharashtra. • Central Institute of Plastics Engineering & Technology	Counseling based on percentage scored in degree (Eligibility: Any Degree) # JEE	• Chemical, pharmaceutical, food and paint industries as Analysts, Chemists and Q.C. Chemists • Plastics Industries
Masters Degree			

Courses	Institution	Selection Mode	Careers in Chemistry
Bachelor Degree	Pondicherry University	#Pondicherry University Entrance exam	- Analytical Chemist - Higher Secondary Teacher - Production Chemist - Research & Development Manager - Biomedical Chemist - Industrial Research Scientist - Materials Technologist - Quality Controller - Safety Health and Environment Specialist - Pharmaceutical Companies - Environmental Law - Space Exploration Agencies - Forensic Science Department - Ceramics Industry and Paper Industry - Military Systems Department - Patent Attorney - Nuclear engineer
	- Indian Institute of Technology (IIT Roorkee) - Indian Institute of Technology (IIT Khagarpur) - Indian Institute of Technology (IIT Bombay)	#Joint Admission Test for M.Sc. (JAM)	
	Central University of Tamil Nadu : School of Basic and Applied Science, Thiruvavur	#CUCET entrance	
	NISER School of Chemical Sciences, Cuttack	#NEST entrance	
	- Birla Institute of Technology and Science - Annamalai University	#BITSAT entrance	
M.Sc. (Integrated Chemistry)	Arts and Science Colleges in India	Based on percentage scored in degree and Separate Entrance exams will be conducted by the concern institute	- Industry related jobs - Quality Control Chemist - Production Chemist - Petrochemical industry - Food processing - Paint industry
	Government Universities like University of Madras, Alagappa University, Anna University, Annamalai University, Bharathiar University, Bharathidasan University, Madurai Kamaraj University and IISc, Bangalore, University of Delhi, etc. Arts and Sciences colleges in India	Separate Entrance exams will be conducted by the concern institute	
	- Anna University - Andhra University - Birla Institute of Technology Cochin - University of Science and technology - PSG College, Coimbatore - Sri Venkateshwara University, Tirupati.	Separate Entrance exams will be conducted by the concern institute	
M.Sc.-General Chemistry, Analytical Chemistry, Inorganic Chemistry Organic Chemistry, Physical Chemistry, Polymer Chemistry Environmental Science NanoScience and Nanotechnology			
	M.Sc.-General Chemistry, Analytical Chemistry, Inorganic Chemistry Organic Chemistry, Physical Chemistry, Polymer Chemistry Environmental Science NanoScience and Nanotechnology		
M.Sc. Applied Chemistry Chemistry (Hons) Applied Chemistry(Hons) Industrial Chemistry Medicinal Chemistry Pharmaceutical Chemistry Drug Chemistry			
	M.Sc. Applied Chemistry Chemistry (Hons) Applied Chemistry(Hons) Industrial Chemistry Medicinal Chemistry Pharmaceutical Chemistry Drug Chemistry		

Courses	Institution	Selection Mode	Careers in Chemistry
Bachelor Degree			
- M.Tech. -Polymer Science And Technology - Industrial Safety And Hazards Management	Anna University and Alagappa College of Technology	# Tamil Nadu Common Entrance Test (TANCET)	Industrial Safety and Hazards Management jobs in various industry
M.Phil.			
M.Phil.-Chemistry Analytical Chemistry Applied Chemistry Industrial Chemistry Crystal Science	- Universities in India - Arts and Science Colleges in India	Entrance/direct interview depending upon the College/ University	- Teaching related jobs - All industries related jobs - Technicians in imaging labs - Patent Law
Research			
Ph.D. (Chemistry) Area: Organic Synthesis, Inorganic complexes, Computational Chemistry, Nanotechnology Electrochemistry, Material Science & Polymer Composites, Bio-sensors, Molecular modelling, chemoinformatics, Green Chemistry, Catalysts for Green Oxidation Chemistry etc.	- Indian Institute of Science, Indian Institute of Technology, Kharagpur - University of Delhi, Delhi - Indian Institute of Technology, Bombay - Tata Institute of Fundamental Research, Mumbai - Anna University, Chennai - Indian Institute of Technology, Madras - Jawaharlal Nehru Centre for Advanced Scientific Research, - University of Madras, - Bharathiar University, - Jawaharlal Nehru University, - National Institute of Technology, Annamalai University, etc.	Separate Entrance exams will be conducted by the concern institute	- Professor for Govt. colleges and Universities - Chemical scientists - Scientist posts in many central government industry - Post Doctoral Fellow - Quality control in Toxicology - Formulation Chemistry - Chemical Information Management Specialist

Entrance Exams and Pattern

JEE-Main Paper I -3 hrs Paper II-3 hrs www.jeemain.nic.in	- Indian Institutes of Information Technology (IITs) - Indian Institute of Engineering Science and Technology (IIEST) - National Institutes of Technology (NITs) - Indian Institute of Technology (IITs) - Government Funded Technical Institutes (GFTIs)	OMR based and Online based (choice of candidate)	Notification: 1 st week of Dec Exam Date: April Negative marking: 4/-1 Total Marks:360	Physics Chemistry Mathematics Total Questions	30 30 30 90
JEE-Advanced Paper I -3 hrs Paper II-3 hrs Should qualify JEE main (paper-I) www.jeeadv.ac.in	- Indian Institutes of Information Technology (IITs) - Indian Institute of Engineering Science and Technology (IIEST) - National Institutes of Technology (NITs) - Indian Institute of Technology (IITs) - Government Funded Technical Institutes (GFTIs)	Online	Notification: last week of April Exam Date: May second week Negative marking: 4/-1 Total Marks: 306 (Variable each year)	Physics Chemistry Mathematics Total Questions	18 18 18 54
BITSAT http://www.bitsadmission.com Time: 3 hrs	Birla Institute of Technology and Science	Online	Notification: 2 nd week of Dec Exam Date: 2 nd week of May Negative marking: 3/-1 Total Marks: 450	Physics Chemistry Mathematics English Proficiency Logical Reasoning Total Questions	40 40 45 15 10 150
CUCET https://cucetexam.in Time: 2 hrs	All Central Universities	Online	Notification: 2 nd week of Feb Exam Date: April Negative marking: 1/0.25 Total Marks:175	English General Awareness Mathematical Aptitude Analytical Skill Science Total Questions	25 25 25 25 75 175
JAM http://jam.iitb.ac.in/ Time: 3 hrs	All IITs	Online	Notification: September Exam Date: February Negative marking: 1/0.33 2/0.66 Total Marks:100	Chemistry Total Questions	60 60

VIII

CSIR-UGC Net http://csirhrdg.res.in Time: 3 hrs	• Ph.D. admission in all Universities and Colleges	OMR	Sessions: June From out : March Exam Date: June Session: December From out : September Exam Date: December	General Science, Quantitative Reasoning & Analysis and Research Aptitude Chemistry Total Questions	60 15 75
GATE http://gate.iitg.ac.in/ Time: 3 hrs	• Ph.D. admission in all IITs	OMR	From out : September Exam Date: February Negative marking: 1/0.33 Total Marks:100	General Aptitude Chemistry Total Questions	10 55 65
TANCET https://www.annauniv.edu Time: 2 hrs	• Anna University Entrance exam for technology courses	Pen and Paper based exam	From out : January Exam Date: March Negative marking: 1/0.33 Total Marks:100	Engineering Mathematics Basic Engineering and Sciences Chemistry Total Questions	20 20 60 100
University of Madras http://www.unom.ac.in Time: 3 hrs	• M.Sc. Entrance exam	Pen and Paper based exam	From out : 2 nd week of Feb Exam Date: April Negative marking: Nil Total Marks:100	Analytical Chemistry Inorganic Chemistry Organic Chemistry Physical Chemistry Total Questions	25 25 25 25 100
Anna University https://www.annauniv.edu Time: 1 hr	• M.Sc. Entrance exam	Online	From out : April Exam Date : May Negative marking : 1/0.25 Total Marks : 100	Chemistry Total Questions	100 100
Annamalai University http://www.annamalaiuniversity.ac.in	• M.Sc. Admission • B.Sc. Admission	Based on percentage scored in degree and Personal Interview. Counseling based on 12 th Marks in Science Subjects			
Bharathiar University www. b-u.ac.in Time: 1.30 hrs	• M.Sc. Entrance exam	Pen and Paper based exam	From out : May Exam Date : Roughly July Total Marks : 60	Chemistry Total Questions	60 60
Bharathidasan University http://www.bdu.ac.in/	• M.Sc. Entrance exam	Pen and Paper based exam	From out : last week of May Exam Date : second week of June		
Madurai Kamaraj University mkuniversity.ac.in	• M.Sc. Entrance exam	Online	From out : March Exam Date : May/June		

(Note: All these dates are tentative and they are subjected to change every year)

CONTENTS

CHEMISTRY

Unit No.	Topic	Page.No.	Month
1	Basic Concepts of Chemistry and Chemical Calculations	01	June
2	Quantum Mechanical Model of Atom	38	July
3	Periodic Classification Of Elements	68	August
4	Hydrogen	100	September
5	Alkali and Alkaline Earth Metals	125	October
6	Gaseous State	158	June
7	Thermodynamics	186	July
	Appendix	229	



E-book



Assessment



HIGHER SECONDARY FIRST YEAR

CHEMISTRY