



TAMIL NADU PUBLIC SERVICE COMMISSION

Advertisement No.485
Notification No: 28/2017

Dated :24.11.2017

Applications are invited only through online mode upto 20.12.2017 for Direct Recruitment to the following posts:-

It is mandatory for the applicants to register their basic particulars through One Time online Registration system on payment of Rs.150/- (Rupees One Hundred and Fifty only) towards registration fee and then should apply online for this recruitment. (The One Time Registration will be valid for 5 years from the date of registration. Thereafter, the registration should be renewed by paying the prescribed fee.)

Sl. No.	Name of the Post and Code No.	Name of the Service and Code No.	Number of vacancies	Scale of pay
1.	Junior Analyst in the Drugs Testing Laboratory 2015 – 2016, 2016 - 2017 (Code No. 2006)	Tamil Nadu Medical Subordinate Service (Code No.049)	14	Rs.9,300-34,800/- (PB2) + 4,600/- G.P Pre-revised
2.	Junior Chemist in Industries and Commerce Department 2013 – 2014, 2015 - 2016 (Code No. 1914)	Tamil Nadu Industries Subordinate Service (Code No. 044)	6	Rs.9,300-34,800/- (PB2) + 4,400/- G.P Pre-revised
3.	Chemist in Industries and Commerce Department 2015 - 2016 (Code No. 1913)		3	Rs.9,300-34,800/- (PB2) + 5,100/-G.P Pre-revised
4.	Archaeological Chemist in Archaeology Department 2015 – 2016 (Code No.1844)	Tamil Nadu General Subordinate Service (Code No.036)	1	Rs.15,600-39,100/- (PB2) + 5,400/-G.P Pre-revised

2. DISTRIBUTION OF VACANCIES

Name of the Post	GT (G)	GT (PSTM)	GT(W)	BC (G)	BC(W)	MBC/DC(G)	MBC/DC(W)	SC (G)	SC(W)	SC(A) (PSTM)	Total
Junior Analyst	3	1	1	2	1	3	-	1	1	1	14
Junior Chemist	1	-	1	1	1	-	1	1	-	-	6
Chemist	1	-	-	-	1	-	1	-	-	-	3
Archaeological Chemist	1	-	-	-	-	-	-	-	-	-	1

Abbreviation:- GT- General Turn - G- General, W - Women; PSTM - Persons Studied in Tamil Medium; BC - Backward Class (Other than Muslim); MBC/DC - Most Backward Class / Denotified Community; SC – Scheduled Caste; SC (A) – Scheduled caste (Arunthathiyar)

3. IMPORTANT DATES AND TIME

Date of Notification	24.11.2017	
Last date for submission of application	20.12.2017	
Last date for payment of Fee through Bank (State Bank of India or Indian Bank)	22.12.2017	
Date of Written Examination		
Paper – I (Subject Paper) (Degree Standard)	17.02.2018 FN	10.00 A.M. to 01.00 P.M
Paper – II (General Studies)	17.02.2018 AN	02.30 P.M. to 04.30 P.M
Paper – I (Subject Paper) (PG Degree Standard)	18.02.2018 FN	10.00 A.M. to 01.00 P.M

4. FEES

a)	<p><u>Registration Fee</u></p> <p>For One Time Registration (Revised with effect from 01.03.2017 vide G.O.(Ms).No.32, Personnel and Administrative Reforms Department, dated 01.03.2017)</p> <p><u>Note</u> Applicants who have already registered in one time Registration system paying Rs.50/- before 01.03.2017 and those who have registered for One-Time Registration on or after 01.03.2017 by paying Rs.150/- are exempted from paying the registration fee for this recruitment</p>	Rs.150/-
b)	<p><u>Examination Fee</u></p> <p><u>Note</u> The Examination fee should be paid at the time of submitting the online application for this recruitment if they are not eligible for the fee concession noted below :-</p>	Rs.150/-

EXAMINATION FEE CONCESSION

Category	Concession	Condition
(i) Scheduled Castes / Scheduled Caste (Arunthathiyars), Scheduled Tribes.	Full Exemption	--
(ii) Differently Abled Persons, Destitute Widow of all communities.	Full Exemption	(i) For Differently Abled persons, the disability should be not less than 40%. (ii) For DWs, the DW certificate should have been obtained from the RDO / Sub Collector/ Assistant Collector
(iii) Most Backward Class / Denotified Communities, Backward Classes (Other than Muslim) Backward Class (Muslim).	Those who have not availed three free chances so far in the previous recruitments may avail exemption from payment of examination fee.	Should not have availed three free chances in the previous recruitments.

(iv) Ex-Servicemen	Those who have not availed two free chances so far in the previous recruitments may avail exemption from payment of examination fee.	(i) Should not have availed two free chances in the previous recruitments. (ii) Fee concession will not apply to those who have already been recruited to any class or service or category.
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Note

- (i) The three / two free chances referred to above are not for **EACH POST** but for **ANY THREE / TWO APPLICATIONS ONLY**. The claim for exemption from payment of examination fee made in any application which is rejected / admitted or withdrawn will be counted as a free chance availed.
- (ii) Failure to pay the prescribed fee along with the application in-time will be liable for rejection of application.
- (iii) The number of free chances availed by the applicant means the total number of free chances hitherto availed by the applicant in his / her earlier application submitted to the Commission for any post / recruitment.
- (iv) If the examination fee concession claimed in the applications is found to exceed the admissible limits as announced above, the application will be rejected at any stage of selection. The number of free chances availed by the applicants will be counted from the previous applications submitted through One Time Registration and / or submitted directly without One-Time Registration i.e., before One Time Registration was made as mandatory.

5. MODE OF PAYMENT OF EXAMINATION FEE

- Examination fee Rs.150/- (Rupees One Hundred and Fifty only) is payable online through Net banking / Credit card / Debit card or it can be paid offline at SBI / Indian Bank within 2 days from the date of submission of online application, by choosing the option in the online application.
- Applicants have to register their basic particulars through One Time Registration which is mandatory on payment of Rs.150/- (Rupees One Hundred and Fifty only) towards registration fee and then should apply online for this recruitment. The One Time Registration will be valid for 5 years from the Date of Registration. Thereafter, the registration should be renewed by paying the prescribed fee. Applicants who have already registered in One Time Registration system on payment of Rs.50/- before 01.03.2017 and those who have registered for One Time Registration on or after 01.03.2017 by paying Rs.150/- towards One Time Registration are exempted from paying the registration fee for this recruitment.
- Applicants have also to pay the service charges applicable to the State Bank of India / Indian Bank.
- Applicants can avail exemption from paying examination fees as per eligibility criteria.
- Offline mode of payment in the form of Demand Draft / Postal Order etc., will not be accepted and the applications forwarded with such modes of payment will be summarily rejected.
- **Those who have registered in the One Time Registration system, and paid the registration fee of Rs.150/- and received the registration ID need not pay the Registration fee i.e., Rs.150/- and it is enough to pay the examination fee alone.**
- Applicants who have made One Time Registration must pay the prescribed examination fee for this recruitment unless fee exemption is claimed. (One Time Registration is only to avail exemption for Registration fee for a period of 5 years from the date of registration and it will not be considered as prescribed examination fee for this recruitment).

(For further details regarding the Examination fee concession, refer [para 2 \(13 – 23\) of “Instructions to Applicants”](#)).

6. QUALIFICATIONS

(A) AGE (as on 01.07.2017)

Name of the post	Category of Applicants	Maximum Age
Junior Analyst / Junior Chemist / Chemist / Archaeological Chemist	SCs, SC(A)s, STs, MBCs/DCs, BCs, BCMs and DWs of all Castes	No Maximum Age limit
	“Others” [i.e. Applicants not belonging to SCs, SC(A)s, STs, MBCs/DCs, BCs and BCMs]	30 Years (Should not have completed)

Age Concession

- (i) No Maximum age limit for the applicants who belong to SCs, SC(A)s, STs, MBCs/DCs, BCs, BCMs and DWs of all castes.
- (ii) **For Differently Abled Persons**
- (a) No maximum age limit for the applicants who belong to SCs, SC(A)s, STs, MBCs/DCs, BCs and BCMs.
- (b) ‘Others’ i.e. the applicants not belonging to the Categories mentioned in (a) above are eligible for age concession upto 10 years over and above the maximum age limit prescribed above.
- (iii) **For Ex-Servicemen**
- (a) No maximum age limit for the Applicants who belong to SCs, SC(A)s, STs, MBCs/DCs, BCs and BCMs.
- (b) The maximum age limit is 48 years for “others” (i.e.) Applicants not belonging to any of the above said categories.
- (c) The above mentioned age concession will not apply to those Applicants who have already been recruited to any class or service or category.

Note

- (i) “Others” [i.e., Applicants not belonging to SCs, SC(A)s, STs, MBCs/DCs, BCs and BCMs] who have put in 5 years and more of service in the State / Central Government are not eligible to apply even if they are within the age limit.
- (ii) Instructions given with regard to maximum age limit under para 5 of the 'Instructions to Applicants' will apply to this recruitment.

(B) EDUCATIONAL QUALIFICATION AND EXPERIENCE: [as on 24.11.2017 (i.e. the date of notification)]

Applicants should possess the following or its equivalent qualification:-

Name of the post	Educational Qualification	
JUNIOR ANALYST	A Degree in Pharmacy or	Experience in the analysis of drugs for a period of not less than one year.
	A Degree in Chemistry or A Degree in Pharmaceutical Chemistry	Experience in the analysis of drugs for a period of not less than two years.
	or Candidates who possess Post Graduate Degree in Chemistry with Analytical Chemistry as a special subject.	Experience in the analysis of drugs for a period of not less than one year.
JUNIOR CHEMIST	<p>Must possess a first or Second Class Post Graduate Degree in any Branch of Chemistry of any university or institution recognized by the UGC.</p> <p style="text-align: center;">(OR)</p> <p>Associateship Diploma of the Institution of Chemists (India).</p> <p>Note Other things being equal, preference shall be given to a candidate who possesses a post graduate degree in Analytical Chemistry or to a candidate who possesses practical experience for a period of not less than one year in any recognized research or Analytical or Metallurgical Laboratory.</p> <p>Explanation</p> <p>i. "Recognised Research Laboratory" means laboratory recognised by the Ministry of Science and Technology of the Government of India.</p> <p>ii. "Recognised analytical or Metallurgical Laboratory" means a Laboratory, which is engaged in Testing and Analytical and issues Test Certificate.</p>	
CHEMIST	<p>(1) A First or Second Class Degree in M.Sc., in Chemistry OR Chemical Technology OR Industrial Chemistry OR Associateship Diploma of the Institution of Chemists (India). and</p> <p>(2) Experience in research in pure or applied chemistry or Analytical Chemistry for a period of not less than 2 years.</p>	
ARCHAEOLOGICAL CHEMIST	Must have obtained M.Sc., (Chemistry) degree.	

Note

- (i) The qualification prescribed for this post should have been obtained by passing the required qualification in the order of studies viz. 10th + HSC / Diploma or its equivalent +U.G. degree + P.G. degree as stipulated in Section 25 of Tamil Nadu Government Servants (Conditions of Service) Act 2016. The results of examination should have been declared on or before the date of Notification.
- (ii) Applicants claiming equivalence of qualification to the prescribed qualification should upload and submit evidence for equivalence of qualification in the form of G.O. issued prior to the date of this notification when called for, failing which, their application will be summarily rejected. The G.Os issued regarding equivalence of prescribed qualification after the date of this notification will not be accepted. A list of Equivalence of qualification in the related subject is available in **Annexure - I**.
- (iii) The applicants should upload or submit experience certificate as provided in **Annexure - II** to this notification **when called for**.

[\(Refer para 10 of the 'Instructions to Applicants'\)](#)

C. CERTIFICATE OF PHYSICAL FITNESS

Applicants selected for appointment to the above said posts will be required to produce a certificate of physical fitness in the form prescribed below before his/her appointment.

Name of the Post	Standard of Vision Prescribed	Form of Certificate of Physical Fitness
Junior Analyst	Standard – III or Better	Form prescribed for Other than Executive and Ministerial Posts.
Junior Chemist	Standard – III or Better	Form prescribed for Executive Posts.
Chemist	Standard – III or Better	Form prescribed for Executive Posts.
Archaeological Chemist	Standard – III or Better	Form prescribed for Executive Posts.

The Applicants with defective vision should produce eye fitness certificate from qualified eye specialist. Colour Blindness or Night blindness will be a disqualification.

D. KNOWLEDGE IN TAMIL

Applicants should possess adequate knowledge in Tamil on the date of this Notification.

(For details [refer para 11 of the Commission's 'Instructions to Applicants'](#))

7. CONCESSIONS

- (i) Concessions in the matter of age and / or fees allowed to SCs, SC(A)s, STs, MBCs/DCs, BCs, BCMs, Destitute Widows, Differently Abled Persons, Ex-servicemen, other categories of persons etc., are given in [para 12 to 14 of the 'Instructions to Applicants'](#).
- (ii) Persons claiming concession referred to above have to produce evidence for such claim when called for otherwise their application will be liable for rejection.

Note

In all cases, an Ex-Serviceman once recruited to a post in any class or service or category, **cannot claim the concession** of being called an Ex-Serviceman for his further recruitment. (Proviso to Section 3(1) (vii) of Tamil Nadu Government Servants (Conditions of Service) Act 2016)

8. SCHEME OF EXAMINATION OBJECTIVE TYPE (OMR METHOD) AND ORAL TEST:-

For the Post of Junior Analyst

Subject	Duration	Maximum Marks	Minimum Qualifying Marks for Selection	
			SCs, SC(A)s, STs, MBCs/DCs, BCs and BCMs	Others
i. <u>Paper - I</u> Degree Standard (200 Questions) Pharmacy(Code No.246) Pharmaceutical Chemistry (Code No.245) *Chemistry(Code No.243)	3 Hours	300	171	228
ii. <u>Paper - II GENERAL STUDIES</u> (100 Questions) (Code No-003) General Studies (Degree Standard) – 75 Questions and Aptitude and Mental Ability (SSLC Standard) – 25 Questions.	2 Hours	200		
iii. Interview and Record		70		
Total		570		

* For those who have studied PG Degree in Chemistry with Analytical Chemistry as a Special Subject.

For the Posts of Junior Chemist, Chemist and Archaeological Chemist

Subject	Duration	Maximum Marks	Minimum Qualifying Marks for selection	
			SCs, SC(A)s, STs, MBCs / DCs, BCs and BCMs	Others
i. PAPER I (P.G. Degree Standard) (200 Questions) * Chemistry (Code No: 244) Chemical Technology (Code No: 290)	3 hours	300		
ii. PAPER II GENERAL STUDIES (100 Questions) (Code No-003) General Studies (Degree Standard) – 75 Questions and Aptitude and Mental Ability (SSLC Standard) – 25 Questions	2 hours	200	171	228
iii. Interview and Records		70		
Total		570		

***For those who have studied M.Sc.,Chemistry, M.Sc.,Industrial Chemistry and Associateship Diploma of the Institution of Chemists.**

Note

- (i) The Question Paper in the subjects Pharmacy, Pharmaceutical Chemistry and Chemical Technology will be set in English only. The Question Paper in the subjects Chemistry and Paper - II will be set both in English and in Tamil.
- (ii) Refer [para 22 of "Instructions to Applicants"](#) in regard to instructions to be followed while appearing for competitive examinations conducted by the Commission.
- (iii) The Syllabus for Examination is furnished in the [Annexure - III](#) of this notification.
- (iv) Candidates should choose and specify in the application, only the prescribed subject in which they have obtained the educational qualification for appearing to the examination.

9. CENTRE FOR EXAMINATION

Examination will be held in following centres: -

Sl. No	Name of the Centre	CODE
1	Chennai	0100
2	Coimbatore	0200
3	Madurai	1000
4.	Tiruchirapalli	2500
5.	Tirunelveli	2600

Note

- (i) Applicants will be required to appear for the Written Examination / Certificate Verification / Oral Test at their own expenses.

- (ii) The Commission reserves the right to increase/decrease the number of Examination Centre and to re-allot the Applicants.

10. SELECTION PROCEDURE

Selection will be made in two successive stages i.e., (i) Written Examination and (ii) Oral Test in the form of an interview. Final selection will be made on the basis of total marks obtained by the candidates at the Written Examination and Oral Test taken together subject to the rule of reservation of appointments. Appearance in both the papers of the Written Examination and Oral Test is compulsory. A candidate who has not appeared in any one of the papers in Written Examination or Oral Test will not be considered for selection, even if he/she secures qualifying marks in the Written Examination or Oral Test.

(For further details [Refer paragraph 23 \(b\) of Instructions to Applicants](#)).

11. NO OBJECTION CERTIFICATE / INFORMATION TO THE EMPLOYER

No Objection Certificate obtained from appropriate authority shall be produced at the time of Certificate Verification, failing which, the application will be rejected.

For details refer [para 15 \(g\) of Commission's 'Instructions to Applicants'](#). - Any violation of this instruction will be liable for / end in rejection of application and forfeit his/her candidature.

12. GENERAL INFORMATION

- A. The rule of reservation of appointments is applicable to this recruitment except for the post of Archaeological Chemist. The distribution of vacancies will be as per rule in force.
- B. In G.O.Ms.No.145, Personnel and Administrative Reforms(S) Department, dated 30.09.2010 and G.O.Ms.No.40, Personnel and Administrative Reforms(S) Department, dated 30.04.2014, the Government have issued orders to fill up 20% of vacancies in direct recruitment on preferential basis to Persons who studied the prescribed qualification in Tamil Medium. The 20% reservation of vacancies on preferential allotment to **Persons Studied in Tamil Medium (PSTM)** will apply for this recruitment. Applicants claiming PSTM preference must produce certificate issued by Head of Institution as proof as per the specimen contained in the "Instructions to Applicants" for having studied the prescribed qualification in Tamil Medium. (Having written the examination in Tamil language alone will not qualify for claiming this preference). If the Applicants with PSTM certificate are not available for selection for appointment against reserved turn such turn shall be filled up by other eligible Applicants but belonging to the respective communal category. The PSTM certificate, in prescribed format / proforma available in the Commission's website at 'www.tnpsc.gov.in' shall be obtained from the Head of the Institution and shall be produced / uploaded when called for. (For further details refer Instructions to Applicants) However, no reserved turn to PSTM candidate arises for the posts of Junior Chemist, Chemist and Archaeological Chemist.
- C. The number of vacancies advertised is only approximate and is liable to modification with reference to vacancy position at any time including reduction before finalization of selection.
- D. The selection for appointment to the above said posts are purely provisional subject to final Orders on pending Writ Petitions, if any, filed at Madras High Court and Madurai Bench of Madras High Court.
- E. As per the Section 26 and 27(c) of Tamil Nadu Government Servants (Conditions of Service) Act, 2016, reservation of appointment to **Destitute Widows and Ex-Serviceman** respectively **will not apply** to this recruitment.
- F. If the posts are identified as suitable for Differently Abled persons of any category, the reservation of 4% for Differently Abled persons as per G.O.Ms. No. 21, Welfare of Differently Abled Persons (DAP3.2) Department, dated 30.05.2017 will be made applicable. Hence, the Differently Abled persons may apply to this recruitment. Their application will be accepted subject to the orders to be issued by the Government.

- G. The Differently Abled persons should submit copy of Differently Abled Certificate specifying the nature of physical handicap and the degree of disability when called for by the Tamil Nadu Public Service Commission.
- H. If no qualified and suitable women applicants are available for selection against the vacancies reserved for them, those vacancies will be filled by male applicants belonging to the respective communal categories.
- I. Even after filling up of the vacancies reserved for SC Arunthathiyars on preferential basis, if more number of qualified Arunthathiyars are available, they shall be entitled to compete with the Scheduled Castes other than Arunthathiyars in the inter-se merit among them and if any post reserved for Arunthathiyars remain unfilled for want of adequate number of qualified Applicants, it shall be filled up by Scheduled Castes other than Arunthathiyars. However, no required turn to SC(A) candidates arises except for the post of Junior Analyst.
- J. Evidence for claims made in the online application should be uploaded / submitted in time when called for the documents. Any subsequent claim made thereafter on submission of online application will not be entertained. Failure to submit the documents within the stipulated time limit **will entail rejection of the Application.**
- K. Correct and True information regarding arrest, convictions / debarment / disqualification by any recruiting agency, criminal or any disciplinary proceedings initiated / pending or finalized, participation in agitation or any Political Organization, candidature in election for Parliament/State Legislature/Local Bodies etc., if any, should also be furnished to the Commission at the time of application i.e., the details thereof, originals of the Judgement, order or G.O dropping further action in Departmental proceedings or any document that may prove the suitability of such Applicants for a Government appointment in such cases must be produced at the stage / time of Certificate Verification without fail.
- L. **Incomplete applications and applications containing wrong claims or incorrect particulars relating to category of reservation / other basic qualification / eligibility wise / age / communal categories / educational qualification / physical qualification and other basic eligibility criteria will be liable for rejection.**
- M. **One Time Registration is not an application for any Post / Recruitment. Though the details / particulars were furnished in the One Time Registration by the applicants, the details/particulars furnished in the online application submitted for this recruitment alone will be taken into consideration. Tamil Nadu Public Service Commission will not be responsible for any consequences arising out of furnishing of incorrect and incomplete details in the application or omission to provide the required details in the application for this recruitment.**

13. OTHER IMPORTANT INSTRUCTIONS

- a) **Applicants should ensure their eligibility for examination:** The applicants applying for the examination should go through all instructions carefully and ensure that they fulfil all eligibility conditions for admission to examination. **Their admission to all stages of the examination will be purely provisional subject to satisfaction of the eligibility conditions.** Mere issue of memo of admission to the applicant will not imply that his/her candidature has been fully cleared by the Commission.
- b) The **Hall Tickets** for eligible applicants will be made available in the Commission's Website www.tnpsc.gov.in or www.tnpscexams.net or www.tnpscexams.in for downloading the same by applicants. No Hall Tickets will be sent by post. So, the applicants should watch TNPSC website before the scheduled date of examination. The Applicants must comply with each and every instruction given in the Hall Ticket.

c) Communication to Applicants

Individual communication regarding the date and time of certificate verification, oral test and counselling will not be sent to the applicants by post. The details will be made available on the Commission's website. Applicants will be informed of the above fact only through SMS and e-mail.

- d) Grievance Redressal Cell for guidance of applicants: In case of any guidance / information / clarification of their applications, candidature etc., applicants can contact Tamil Nadu Public Service Commission's Office in person or over Telephone No.044-25332833 / 25332855 or the Commission's Office Toll-Free No.1800 425 1002 on all working days from 10.00 a.m. to 05.45 p.m.

e) Mobile Phones and other Articles Banned:

- i. Applicants are not allowed to bring Cellular Phone, Watches and Ring with Inbuilt Memory Notes etc., or any other Electronic device and Non Electronic devices such as P&G Design Data Book, Books, Notes, Hand Bags and Recording Device either as separate piece or part of something used by the applicants such as Watch or Ring etc., to the examination hall / room on the date of examination.
 - ii. If they are found to be in possession of any such thing or instrument, they will not be allowed to write the examination further, besides invalidation of answer paper and / or debarment. If it is considered necessary, they will be subjected to thorough physical search including frisking on the spot. (For further details refer ['Instructions to Applicants'](#)).
 - iii. Applicants must not bring into the Examination Hall any article such as books, notes, loose sheets, electronic or any other type of calculators, mathematical and drawing instruments, Log Tables, stencils of maps, slide rules, Text Books, rough sheets etc., except the permitted writing material (i.e. pen). No colour pen or Pencil must be used.
 - iv. Applicants are advised in their own interest not to bring any of the banned items including Mobile Phones to the venue of the examination, as arrangements for safekeeping cannot be assured.
- f) Unless specific instruction is given, applicants are not required to submit along with their application any certificates in support of their claims regarding age, educational qualifications, practising / service, physical qualification, community certificates and certificates regarding their physical disability etc., which should be submitted when called for by the Tamil Nadu Public Service Commission. The applicants applying for the examination should ensure that they fulfil all the eligibility conditions for admission to the Examination. Their admission at all the stages of examination for which they are admitted by the Commission viz. Preliminary Examination, Main Written Examination and Oral Test will be purely provisional, subject to their satisfying the prescribed eligibility conditions. If on verification at any time before or after Preliminary Examination, Main Written Examination, Certificate Verification and Oral Test, it is found that they do not fulfil any of the eligibility conditions, their candidature for the recruitment will be liable for rejection / cancellation by the Commission. ([For further details refer Instructions to Applicants](#)).
- g) If any of their claims is found to be incorrect, it will lead to rejection of their candidature and suitable penal action including debarment.
- h) **Unfair means strictly prohibited:** No applicants shall copy from the papers of any other candidate or permit his papers to be copied or give or attempt to give or obtain or attempt to obtain irregular assistance of any description. ([For further details refer Instructions to Applicants](#)).

- i) **Conduct in Examination Hall:** No applicant should misbehave in any manner or create a disorderly scene in the Examination Hall or harass the staff employed by the Commission for the conduct of the examination. Any such misconduct will be severely viewed and penalised. ([For further details refer Instructions to Applicants](#)).
- j) For violation of “Instructions to Applicants” in any manner, suitable penalty will be imposed as per the Instructions to Applicants or as deemed fit by the Commission.

14. HOW TO APPLY

1. Applicants should apply only through online mode in the Commission’s Websites www.tnpsc.gov.in / www.tnpscexams.net / www.tnpscexams.in.
2. One Time Registration (OTR) and applicant Dashboard are mandatory before applying for any post. Applicant should register only once in the One Time Registration by paying Rs.150/- as Registration fee. Successfully registered One Time Registration is valid for 5 years from the date of Registration. All the applications should be submitted using the One Time Registration ID and password registered by the applicant.
3. For applying in One Time Registration, the applicants should have scanned image of their photograph, certificate wherever insisted and signature in CD/DVD/Pen Drive to upload the photo, certificate and signature.
4. Applicants who have already registered in One Time Registration on or before 29.09.2015 shall use their existing user ID and Password to create applicant Dashboard in the new One Time Registration system. No applicant is permitted to create more than one registration ID in One Time Registration.
5. Applicants should enter the Unique ID and password to view the already available information and update them.
6. One Time Registration is not an application for any post. It is just a collection of information from the applicants and giving a separate dashboard to each applicant to facilitate them to maintain their own profile. Applicant who wishes to apply for any post shall click “[Apply](#)” against the post Notified in the Commission’s Website and use the same USER ID and PASSWORD given for ONE TIME REGISTRATION.
7. Applicants should select the name of the post or service for which they wish to apply.
8. Applicants are required to upload their **photograph and signature** as per the specifications given in the Guidelines for Scanning and Upload of Photograph and Signature.
9. An Online application uploaded without the photograph, specified documents and signature will be rejected.
10. All the particulars mentioned in the online application including name of the Candidate, Post applied, educational qualifications, Communal Category, Date of Birth, Address, Email ID, Centre of Examination etc. will be considered as final and no modifications will be allowed after the last date specified for applying online. Since certain fields are firm and fixed and cannot be edited, applicants are requested to fill in the online application form with the utmost care and caution as no correspondence regarding change of details will be entertained.
11. Print Option
 - a) After submitting the application, applicants can print / save their application in PDF format.
 - b) On entering user ID and password, applicants can download their application and print, if required.

- c) Need not send the printout of the online application or any other supporting documents to the Commission. The certificates will be verified only when the applicants come up for next stage of selection.

12. One Time Registration will not be considered as an application for any post.

15. UPLOAD OF DOCUMENTS

Applicants should upload or submit the Certificate of Experience referred to the said posts in paragraph 6(B) of the Notification as provided in Annexure – II when called for. If, the required certificate is not uploaded or submitted by the applicant when called for at any point of time by the Commission his/her application will not be considered for the above posts.

16. LAST DATE FOR SUBMITTING APPLICATION

The Online Application can be submitted upto 20.12.2017 till 11.59 p.m., after which the link will be disabled.

(For detailed information applicants may refer Commission's 'Instructions to Applicants' at the Commission's website www.tnpsc.gov.in)

Secretary

DISCLAIMER

“The Government orders relating to Equivalence of qualification have been hosted in the Tamil Nadu Public Service Commission website. However, the applicants while applying for the examination should furnish the details of equivalence of qualification declared in the form of Government order issued prior to the date of this notification if any, which are not mentioned in Annexure-I to the notification and produce the same when called for by Tamil Nadu Public Service Commission, failing which their application will be rejected. The Government Orders issued regarding equivalence of prescribed qualification after the date of this notification will not be accepted.”

Secretary

ANNEXURE- I**(NOTIFICATION NO: 28/2017, DATED 24.11.2017)**

Equivalence of relevant Qualifications	G.O. No.
M.Sc., (Chemistry 5 years Integrated Course) offered by Annamalai University is considered eligible wherever B.Sc, Chemistry is prescribed.	G.O.Ms.No.75, Personnel and Administrative Reforms (M) Department, dated 30.06.2011.
M.Sc., (Applied Chemistry) awarded by Gandhigram University is equivalent to M.Sc., (Chemistry).	G.O.Ms.No.133, Personnel and Administrative Reforms (M) Department, dated 28.07.1999.
M.Sc., (Applied Chemistry) awarded by Anna University is equivalent to M.Sc., (Chemistry).	G.O.Ms.No.164, Personnel and Administrative Reforms (M) Department, dated 21.08.2000.
M.Sc., Analytical Chemistry awarded by University of Madras as equivalent to M.Sc.,(Chemistry). M.Sc., (Organic Chemistry), M.Sc.,(In-organic Chemistry) and M.Sc., (Physical Chemistry) awarded by Annamalai University as equivalent to M.Sc., (Chemistry).	G.O.Ms.No.165, School Education (M2) Department, dated 04.07.2012.
M.Sc., Industrial Chemistry awarded by Bharathidasan University and Alagappa University is equivalent to M.Sc., Chemistry.	G.O.Ms.No.24, Higher Education (K2) Department, dated 13.02.2013.

ANNEXURE-II**EXPERIENCE CERTIFICATE**

1.	Name and Address of the Institution / Organisation	:	
2.	Whether the said Institution / Organisation is a recognized one?	:	
3.	Registration Number of Institution / Organisation if any	:	
4.	Name of the Employee and Date of Birth	:	
5.	Qualification possessed by the Employee on the Date of Joining Service in the above said Institution / Organisation	:	
6.	Designation and period of Experience of the Employee	:	
7.	Nature of the Work/Duty performed by the Employee (To be mentioned in brief)	:	
8.	Whether the Employee possesses experience as laid in para 6(B) of the notification for the Post of (relevant post may mentioned)	:	Yes / No
9.	Whether Attendance Register / Attendance Rolls / Pay Register and other records /available for this Employee	:	Yes / No
10.	Certificate from the Institution / Organisation	:	The above said employee having experience in this Institution / Organisation as stated above. The above particulars furnished by us are correct

Office Seal:

Date:

Place:

Signature.

Name & Designation of
the issuing Authority.Note:

Institution / Organisation which issues the certificate is cautioned that issuing of any certificate containing false details will lead to legal / penal action on them.

ANNEXURE – III
TAMIL NADU PUBLIC SERVICE COMMISSION
(JUNIOR ANALYST) – MAIN WRITTEN EXAMINATION
PAPER – I PHARMACY (DEGREE STANDARD) OBJECTIVE TYPE

CODE NO.246

UNIT- I

- a) The physical, physico-chemical and engineering principles governing design, layout and operation of plants for the process employed in pharmaceutical industry.
- b) Unit operations: size reduction, size separation, mixing, compression, filtration, centrifugation, extraction, evaporation, drying, distillation, crystallization.
- c) Industrial Hazards and Safety Precautions: Mechanical, Chemical, Electrical, Fire and Dust hazards, Industrial dermatitis, Accident records
- d) Containers, closures and packaging materials
- e) Preformulation Studies
- f) Pharmaceutical excipients: Antioxidants, preservatives, Colouring, Flavouring and Sweetening agents, Solvents.
- g) Facts related with formulation:- Physical properties, particle size. Crystal form, flow cohesiveness. Solubility. Chemical properties, Hydrolysis. Oxidation racemization, enzymatic decompositions.
- h) pH determination, application, buffer equation, buffer capacity, buffered isotonic solutions; Micrometrics: Particle size determinations, derived properties of powders; Interfacial phenomenon : HLB values surfactants, factors influencing interfacial phenomenon, Critical micellar concentration, Electrical properties at interface; Coarse dispersions: Suspensions and emulsions, Theories of emulsification, multiple emulsions.
- i) Pharmaceutical calculations: Calculations of doses, alcohol dilutions, proof spirit, isotonic solutions.
- j) Nuclear Pharmacy- Introduction to Radiopharmaceuticals, radioactive half-life, units of radioactivity. Production of radiopharmaceuticals, methods of isotopic tagging, preparation of radioisotopes in laboratory using radiation dosimetry and radioisotope generators. Permissible radiation dose level, radiation hazards, their prevention and specifications for radioactive laboratory.
- k) Good Manufacturing Practice

- l) Quality control, of the following formulations: Semisolids, Solid dosage forms, Liquid dosage forms, Parenteral and ophthalmic preparations
- m) New Drug Delivery Systems- Aerosols, Ocusert, Transdermal Drug Delivery Systems, Osmotic Drug Delivery Systems, Targeted Drug Delivery Systems, Prolonged Drug Delivery Systems
- n) Cosmetics- Dentifrices, Lipsticks, Face powders, shampoos, depilatories and Manicure preparations

UNIT- II

- a) **Blood Products and Plasma Substitutes:** Collection, processing and storage of whole human blood, concentrated human RBCs, dried human plasma, human fibrinogen, human thrombin, human normal immunoglobulin, human fibrin foam, plasma substitutes, ideal requirements of PVP, dextran, etc. Control of blood products as per IP.
- b) Basics of pharmacokinetic studies and their importance
- c) Pharmaceutical Biotechnology- General principles of immunology, immunological techniques used in pharmacy; Sterilization of different pharmaceutical dosage forms; Sterility Testing; Methods of preparation of official sera and vaccines; Microbiological assays of antibiotics and vitamins of the pharmacopeia; Disinfectants- Classification, Mechanism and uses of disinfectants in brief. Factors affecting disinfection and methods of disinfectant evaluation.
- d) Immunologicals: Preparation and quality control of products representing various categories like

Toxoids	– Diphtheria and Tetanus,
Live Bacterial Vaccines	– BCG
Killed Bacterial Vaccines	– Cholera, DPT.
Viral Vaccines	– Polio, Rabies and small pox
Antitoxins	– Diphtheria

UNIT - III

- a) Chemistry of Alkaloids, Vitamins, Flavanoids, Glycosides, steroids, terpenes, vitamins and hormones.

- b) Catalytic hydrogenation, dehydrogenation, metal hydride reduction. Reduction with hydrazine and its derivatives, Birch reduction, Clemenson's reduction, Meerwin – Ponndrof reduction, oxidation with periodic acid, lead tetra acetate, mercuric acetate and selenium oxide. Beckmann rearrangement, Schmidt rearrangement and Darzen's reaction.

UNIT - IV

Synthesis, properties, test for purity, storage of the following categories of drugs - Analgesics and Antipyretics, Anti-inflammatory, Hypnotics and sedatives, Anti convulsants, Anti-psychotics, Anti-histamines, Sympathomimetics, Adrenergic antagonists, Cholinomimetics and anti-cholinergic, Local Anaesthetics, Anti-hypertensives, Anti-anginal, Sulphonamides, antibiotics, Anti-TB, Anti-Viral, Anti-Fungal, Antimalarials, Anti-Neoplastics,

UNIT- V

- a) Principles and Pharmacopeial Assay Procedures involving Non-aqueous Titration, Oxidation-Reduction, Diazotization, complexometric methods, electrometric titration, gravimetric analysis
- b) Polarimetry and refractometry, and gasometric analysis of oils, fats and waxes
- c) Chromatography- TLC, Column, Paper, GC, Ion exchange, HPLC, HPTLC, Gel electrophoresis,
- d) Theory, principle, instruments and applications of colorimetry, UV- Visible Spectrometry, Fluorimetry, Nephelometry, Turbidometry, IR, Mass, NMR, RIA.

UNIT- VI

- a. General Pharmacology:- Routes of administration, Absorption, distribution, Biotransformation and Excretion of drugs, Bioavailability and bio equivalence, Factors affecting bioavailability, Mechanism of action of drugs at receptor level, adverse drug reaction;
- b. Drugs acting on Central Nervous system: Analgesics, Nonsteroidal anti inflammatory drugs, Sedatives and Hypnotic, Anti convulsants and Antipsychotic drugs. Drugs used in parkinsonism.

- c. Drugs acting on Autonomic Nervous system: Drugs which influence the working of autonomic nervous system, Adrenergic drugs (or) sympathomimetic drugs, Adrenergic blocking drugs, Cholinergic drugs and cholinergic blocking drugs, Drugs acting on autonomic ganglia.
- d. Drug acting on cardiovascular system: cardiac glycosides, Anti hypertensive, anti-arrhythmic and anti anginal drugs.
- e. Diuretics & anti diuretics

UNIT- VII

- a. Drugs acting on GIT
- b. Insulin and oral anti diabetic drugs, Thyroid and anti-thyroidal drugs, oral contraceptives. Hormone replacement therapy, drugs acting on uterus.
- c. Antihistaminic drugs and Drugs used in Migraine
- d. Chemotherapy- sulphonamides penicillins, cephalosporins, quinolones, Tetracyclines, Aminoglycosides, Chemotherapy of Tuberculosis, leprosy, malaria, cancer , Ameobiasis, Helminthiasis.
- e. Toxicology- Systematic & local treatment of poisoning and their treatment.

UNIT- VIII

- a. General principles of cultivation and collection of drugs from wild & cultivated sources, their merits and demerits, factors affecting cultivation, adulterants and their detection
- b. Plant growth regulators
- c. Source, synonym, cultivation, collection, preparation for market, diagnostic characters (both macroscopical and microscopical). Constituents, substitutents, adulterants and uses of Cinnamon, Cinchona, Senna, digitalis, Clove, Saffron, Pyrethrum. Cochineal, Ergot, opium, Aloe, Acacia, Tragacanth, Benzoin, Ginseng, Brahmi, Dioscorea, Cascara, Gelatin, umbelliferous fruits, spirulina, nuxvomica, ginseng, belladonna, taxol , vinca.
- d. Principle and application plant tissue culture.
- e. Basics of fermentation technology & production of Antibiotics, Vitamins.

UNIT- IX

- a. Biosynthetic pathways of Tropane alkaloids, Cholesterol, amino acids.
- b. WHO Guidelines for herbal medicines

UNIT- X

- a. Drugs and Cosmetics Act 1940 and Rules 1945
- b. Pharmacy Act 1948

ANNEXURE – III
TAMIL NADU PUBLIC SERVICE COMMISSION
(JUNIOR ANALYST) – MAIN WRITTEN EXAMINATION
PAPER – I PHARMACEUTICAL CHEMISTRY (DEGREE STANDARD)

Code No.245

UNIT I

- 1) Atomic structure and valency, Radioactivity, Radio isotopes and Pharmaceutical applications of Radio Pharmaceuticals, hazards and precautions.
- 2) Sources of impurities in Pharmaceutical substances; Limit test as per I.P; Fundamentals of volumetric Analysis.
- 3) A systematic study of inorganic compounds for their preparation, assay and use which includes Gastrointestinal agents, Topical agents and Dental products.

UNIT II

- 1) Assay, test for purity of sodium, calcium, iron, aluminium and ammonium compounds. Major intracellular and extra cellular electrolytes.
- 2) Preparation and use of Chemical reagents and Volumetric Solutions as per Pharmacopia in Pharmaceutical Analysis.
- 3) Theory of Co-ordination Compounds with special reference to application in Pharmaceutical Analysis via EDTA, Dimercaprol, Pencillamine.

UNIT III

- 1) Physiochemical properties of gases, liquids and solids. Density, Surface tension, Viscosity and physical properties.
- 2) Osmosis, osmotic pressure, vapour pressure, Raoult's law, Ostwalds dilution law, Molecular weight determination by osmotic pressure.
- 3) Non- aqueous and complexometric titrations, analysis of fats, oils and waxes. Importance of quality control, Different types of titrations, Gasometric analysis and determination of Nitrogen.

UNIT IV

- 1) Gases in liquids, liquids in liquids, partially miscible, completely miscible and completely immiscible liquids.
- 2) Thermochemistry: Heat of reaction, heat of solution, heat of formation and heat of neutralization and Hess law.
- 3) Stereo chemistry, optical isomerism, Geometrical isomerism.
- 4) Theory of Polarimetry, Refractometry and catalyst.

UNIT V

- 1) Electronic configuration and electron displacement effects, chemical bonds and polarity.
- 2) Chemistry and medicinal uses of cardiac glycosides and vitamins.
- 3) Synthetic utility of acetoacetic ester, Grignard reagent and Diazonium compounds.

UNIT VI

- 1) Aromaticity, concept of resonance, Nucleophilic, Electrophilic substitution reaction, Elimination reactions in aliphatic and aromatic compounds.
- 2) Anti-infective agents comprising of Anti-fungal agents, synthetic antibacterial agents, anti-tubercular Agents, and Anthelmintics agents.

UNIT VII

Chemical structure, Synthesis, assay and therapeutic uses of organic synthetic drugs like, Antidepressants, General anesthetics, Sedatives and hypnotics, Narcotic analgesics, Anti-histaminics, Antimalarials., Sulphonamides, Drugs acting on CVS.

UNIT VIII

- 1) Structural elucidation of natural products - General methods.
- 2) Structure, chemistry, methods of estimation, and uses of Alkaloids, Carbohydrates, and Proteins.
- 3) Chemistry of steroids and natural hormones, currently used steroidal drugs.

UNIT IX

- 1) Study of separations and determination involving TLC, HPTLC, and column chromatography.
- 2) Colorimetry, UV and Visible Spectrophotometry, Spectrofluorimetry-Theory, Principle, Instrumentation and working.
- 3) Theory and principles of separation techniques involving Ultra centrifugation, HPLC and Gel filtration.

UNIT X

- 1) Conductometry, Potentiometry and Amperometric titrations, Basic concepts and application in pharmaceutical analysis.
- 2) Radio Immuno Assay and Electrophoresis.
- 3) Theory, Principle and application of NMR, MS, IR spectroscopy.

ANNEXURE – III
TAMIL NADU PUBLIC SERVICE COMMISSION
(JUNIOR ANALYST) – MAIN WRITTEN EXAMINATION
PAPER – I CHEMISTRY (DEGREE STANDARD) OBJECTIVE TYPE
CODE NO.243

UNIT - I**PHYSICAL CHEMISTRY:-**

- a) Gas law and Kinetic Theory:- Ideal gas equation - Deviation from ideal behaviour - vander waals equation for real gases - Molecular velocities - the Maxwell's distribution of molecular velocities –heat capacity and viscosity of gases.
- b) Solid State:- Crystal systems - Bravais lattice - Unit Cell - Miller Indices - Symmetry elements in crystals - Bragg's equation - Radius ratio's and packing in crystals – Determination of crystal structures by Bragg's method – structure of NaCl, KCl, ZnS and spinels.
- c) Thermodynamics:- Intensive and extensive variables - First law of thermodynamics – CP and CV relation - Hess's law of constant heat summation - Kirchoff's equation - Second law of thermodynamics - Carnot theorem - entropy and probability, Joule Thomson effect -Free energy and Chemical equilibrium - Temperature and pressure dependence and - Gibb's and Helmholtz functions – Heterogeneous equilibrium and Le – Chatlier principle.

UNIT - II

- d) Chemical Kinetics:- Rate laws - rate constant - order and molecularity of reactions I, II, III, and Zero order reaction Arrhenius theory - collision theory and Transition state theory - catalysis.
- e) Electro-Chemistry:- Types of reversible electrodes - Nernst equation - reference electrode and standard hydrogen electrode - computation of cell e.m.f. calculations of thermodynamic quantities of cell reactions (ΔG , ΔH , ΔS and K) - Over potential and hydrogen over voltage - Arrhenius theory - Debye-Huckel equation - Kohlrausch's law - Ostwald's dilution law - Determination of PH and Pka of acids by potentiometric methods.

UNIT - III

- f) Chemical spectroscopy:- Elementary ideas of microwave, infrared, Raman, uv, NMR, ESR and Mass spectroscopy.

g) Pharmaceutical chemistry: Terminology pharmacology, pharmacotheraies, toxicology, chemotherapy, classification, and nomenclature of drugs, sources of drugs, assay of drugs by biological, chemical and immunological methods, physiological effects of functional groups of drugs different types of drugs like analgesics, antibiotics, antiseptics, disinfectants, anesthetics, antidepressants, antipsychotic etc.

UNIT - IV

h) Colloids and surface Chemistry:- Classification – preparation, purification - properties - Tyndall effect- Gels - Emulsions Absorption - Langmuir isotherms - Heterogeneous catalysis.

i) Physical properties and Chemical constitution:- Surface tension - parachor and its application to structural problems – Dipole moment - applications of dipole moment measurements to structural studies of simple inorganic and organic molecules - magnetic properties of matter, diamagnetism, paramagnetism, ferromagnetism and anti-ferromagnetism - Applications to structural problems.

UNIT - V

INORGANIC CHEMISTRY:-

j) Periodic classification:- Classification based on electronic configuration - periodic properties - atomic and ionic radii, ionisation potential, electron affinity and electronegativity- various scales - trend along periods and groups.

k) Chemical bond:- Lattice energy - VSEPR Theory and its applications - partial ionic character from electronegativity - Fajan's Rules.

l) Compounds of Boron:- Electron deficient nature of boron compounds - preparation and properties of halides and nitrates of boron - diborane – Borazine, silicones and structures of silicates

UNIT - VI

LANTHANIDES AND ACTINIDES:-

m) Occurrence Electronic configuration oxidation state, magnetic properties and complexation behaviour - comparison of lanthanides and actinides, lanthanide contraction and their position in the periodic table.

n) Fertilisers:- Ammonium nitrate, ammonium phosphate, Superphosphate and Diammonium Phosphate, NPK fertilisers.

o) Nuclear Chemistry:- Radio activity – detection and measurement – half life period - Nuclear stability, - n/p ratio - isotopes, isobars and isotones Nuclear reactions Spallation - Nuclear fission and fusion – stellar energy uses of nuclear energy - nuclear power projects in India - applications of tracers in industry, medicine, agriculture.

UNIT - VII

p) Co-ordination Chemistry:- Redo Nomenclature - theories of co-ordination compounds - Werner, valence bond, crystal field and ligand field theories - Effective atomic number - isomerism - Metal Carbonyls of iron and Nickel.

q) Analytical Chemistry:- i) Principles of volumetric analysis - different types of titrations gravimetric analysis - separation and purification techniques.

UNIT - VIII

ORGANIC CHEMISTRY:-

r) Types of reactions:- Nucleophilic, electrophilic, free radicals, addition and elimination reactions.

s) Electron displacement effects:- Inductive, inductometric, electromeric, mesomeric, resonance, hyperconjugation and steric effects.

UNIT - IX

t) Nature of Bonding:- Hybridisation (Sp , Sp^2 & Sp^3) and Geometry of molecule - cleavage of bonds - homolytic and heterolytic fission of carbon – carbon bonds - Reaction intermediates - free radicals, carbocations and carbonions - their stability.

u) Stereo Chemistry:- Optical isomerism and Geometrical isomerism - chirality - optical isomerism of lactic and tartaric acid - Racemisation - Resolution - Asymmetric synthesis - walden inversion - cis and trans isomerism of maleic and fumaric acids - R-S-Notations - conformational analysis of cyclohexane - applications of ORD and CD Techniques.

UNIT - X

- v) Dyes:- Classification and Properties of dyes – methyl orange, congo red, malachite green, fluorescein and indigo.
- w) Carbon hydrates:- Classification and reactions - Glucose, Fructose, Sucrose and lactose- structure of glucose and fructose.
- x) Aromatic Substitution:- Mechanism of nitration, Halogenation, sulphuration and Friedel Crafts reaction - Orientation effects - nucleophilic substitution - Benzyne mechanism.

ANNEXURE – III
TAMIL NADU PUBLIC SERVICE COMMISSION
(JUNIOR CHEMIST – CHEMIST – ARCHAEOLOGICAL CHEMIST) – MAIN WRITTEN EXAMINATION
PAPER – I CHEMISTRY (POST GRADUATE DEGREE) OBJECTIVE TYPE

Code No.244

UNIT- I

Reaction Kinetics:-

Rate laws - rates constant for first, second, third and zero order reaction - Half life period - Arrhenius theory - collision theory - Absolute reaction rate theory - ionic reaction - salt effect - catalysis – Laws of photo chemistry, quantum efficiency - photo physical processes of electronic excited molecules. Green Chemistry – reactions and reagents

Chemical Equilibrium:-

partial molar quantities, gibbs - Duhem equation, Equilibrium constant - temperature dependence of equilibrium constant - phase rule and its applications to two and three components systems.

UNIT- II

Solid State:-

crystal systems - designation of crystal faces, lattice structure and unit cell - law of rational indices - Bragg's law and x rays diffraction by crystals - schottky and Frenkel defects - Electrical properties - Insulators and semiconductors - band theory of solids- Superconductors – nano materials preparations and properties.

Electrochemistry:-

Types of Reversible electrodes - Nernst equation - calculation of thermo dynamic quantities of cell reactions - overpotential and hydrogen over voltage - Determination of pka of acids by potentiometric methods - Kohlrausch's law - Ostwald's dilution law - Debye - Huckel Onsager equation for Strong electrolytes - (no derivation required) - Primary and Secondary fuelcells - corrosion and prevention – drycells and storage batteries

UNIT- III**Structure and Bonding:-**

Electronic configuration of atoms, Term symbols and periodic properties of elements, Ionic radii, ionisation potential electron affinity, electronegativity, concept of Hybridization, molecular orbitals and electronic configuration of homonuclear and heteronuclear diatomic molecules, shapes of polyatomic molecules VSEPR theory, symmetry elements and point groups for simple molecules, Bond lengths, Bond angles, bond order and bond energies Types of chemical bond (weak and strong) intermolecular forces, structure of simple and covalent bonds – covalent character in ionic bond and partial ionic character – lattice energy.

Acids and Bases:-

Bronsted and Lewis acids and bases - pH and pKa acid - base concept in non - aqueous media – HSAB concept - Buffer Solutions. Redox Reactions:- Oxidation numbers, Redox potential, Electro chemical series – application of EMF measurements - Redox indicators.

Chemistry of Non - transition elements:-

General characteristics, structure and reaction of simple compounds - boranes - silicates Oxoacids of N,P,S and halogens - xenon compounds - inter halogens, Pseudohalides and noble gas compounds – metal clusters – S,N ring and chain compounds - inorganic Polymers such as silicones, Borazines and phosphonitrilic compounds.

IUPAC Nomenclature of simple organic and Inorganic compounds.

UNIT - IV**Organic reaction mechanism:-**

General methods (Kinetic and non Kinetic) of study of reaction mechanisms Methods of determining reaction mechanism. – isotopic labelling SN1, SN2 mechanisms - addition substitution, elimination and rearrangements - free radical mechanism - aromatic substitution - and stability of reactive intermediate (Carbocations, Carbanion's free radicals, nitrates and benzyne) - Polar effects - Hammett's equation and its modification.

Chemistry of important organic reaction:-

Aldol condensation - Claisen condensation - perkin reactions - cannizaro reaction - Fridel craft reaction - Favorski reaction - Strok enamine reaction - Michael addition - Baeyer - villigner reaction - Chichibabin reaction - Asymmetric synthesis pericyclic reactions - classification and examples - woodward and Hoffmann rules. - use of OsO₄, NBS, diborane, NaBH₄, LiAlH₄ in organic Synthesis.

UNIT- V**Quantum Chemistry:-**

Planck's quantum theory wave - particle duality, uncertainty principle, operators and commutation relations, postulates of quantum mechanics, schrodinger wave equation, particle in one dimensional box and three dimensional box - harmonic oscillator, rigid rotator and hydrogen atom, angular momentum, spin - orbit coupling.

Classical thermodynamics and elements of statistical thermodynamics:-

First law of thermodynamics:- heat capacity - isothermal adiabatic processes - Thermo chemical laws - Kircheff's equation second law of thermodynamics, entropy, in reversible and irreversible processes - Gibe's free energy and Helmholtz free energy - Third law of thermodynamics

UNIT VI**Spectroscopy:-**

Rotational spectra of diatomic molecules - Isotopic substitution and rotational constants - vibrations spectra of linear symmetric, linear asymmetric and bent triatomic molecules - electronic spectra - selection rules - nuclear magnetic resonance - chemical shifts - spin - spin coupling - electron spin resonance and hyperfine splitting theoretical principles of mass spectroscopy. Application's of UV, IR, NMR, ESR and mass spectroscopy for structural elucidation of organic compounds, inorganic complexes and free radicals.

UNIT - VII**Chemistry of Co-ordination Compounds:-**

structural aspects, isomerism - octahedral and tetrahedral, crystal - splitting of orbitals - CFSE - magnetism and colour of transition metal ions - charge transfer spectra - crystal field theory and ligand field theory – MO theory complexes of pi acceptor ligands - stereochemistry of inorganic co-ordination compounds – ORD and CD Techniques.

Chemistry of lanthanides and actinides:-

Electronic configuration - occurrence and Separation techniques -oxidation states, colour - magnetic and spectroscopic properties – lanthanide contraction , use of lanthanide compounds as shift reagents.

UNIT - VIII**Organometallic compounds and bio inorganic chemistry:-**

Metal carbonyls, Metal nitrosyls, metal alkyl, alkenes and arene compounds - organo metallic compounds in catalysis - Chemistry of porphyrins - chlorophyll hemoglobin, myoglobin, ferredoxin, rubredoxin, and cytochromes, copper proteins, enzymes, zinc enzymes, toxicity of metals and the effect of excess and deficient levels, metal complexes in therapy

UNIT- IX**Stereo chemistry:-**

Elements of symmetry - optical and geometric isomerism E. Z and R.S notation's - Conformational analysis of simple cyclic and acyclic systems - Effects of conformation on reactivity in acyclic compounds and cyclohexanes.

Carbohydrates:-

Classification - configuration and general reactions of monosaccharides - Chemistry of glucose, fructose, Sucrose and Maltose, Important compounds in chemistry - Dyes - azo, triphenylmethane, and phthalin groups - indigo - alizarin vitamins, hormones - antibiotics - proteins. Polymers: Preparation and uses of polyethylene, poly butylene PVC, Nylon - Ziegler - Natta catalysts -

UNIT - X**Instrumental methods of analysis:-**

Adsorption, partition chromatography - Gas chromatography - HPLC - Solvent extraction and ion exchange methods - atomic absorption spectroscopy - Electroanalytical techniques voltammetry, cyclic voltammetry, polarography, amperometry, Coulometry and conductometry, ion - Selective electrodes- TGA, DTA, DSC and ICP. Analysis of industrial products such as ores and Minerals, Coal, Water, Soaps & Detergents, Metals & Alloys, Manures & fertilizer, cement, Aggregate, Bricks, petroleum products, food & products, plastics.

ANNEXURE – III
TAMIL NADU PUBLIC SERVICE COMMISSION
(CHEMIST) – MAIN WRITTEN EXAMINATION
PAPER – I CHEMICAL TECHNOLOGY (PG DEGREE STANDARD)

CODE NO: 290

UNIT- I PROCESS CALCULATIONS AND THERMODYNAMICS

Properties of liquids, solids and gases - Gas laws - Material and Energy balance, Material balance involving recycle by-pass and purge

Thermodynamics functions - Chemical and Phase Equilibrium - Laws of Thermodynamics - Ideal and non-ideal gases and solutions, fugacity, correlation of activity coefficient, partial molal properties.

UNIT- II FLUID MECHANICS AND MECHANICAL OPERATIONS

Newtonian and non-Newtonian fluids, compressible and non - compressible fluids, flow through pipeline systems, flow in closed ducts, packed beds and fluidized bed. Continuity and conservation equations. Macroscopic energy balance, Bernoulli equation and its applications, Dimensional analysis, flow meters, pumps and compressors.

Size reduction and size separation; laws of size reduction, Gravity settling, hindered settling sedimentation; centrifuges and cyclones; thickening and classification, filtration; mixing and agitation; thickening, elutriation, conveying of solids.

UNIT - III REACTION ENGINEERING, HEAT AND MASS TRANSFER

Rate equation, elementary and non-elementary reactions, theories of reaction rate and Prediction; Design equation for constant and variable volume batch reactors.

Non-isothermal homogeneous reactor systems, adiabatic reactors, rates of heat exchanges for different reactors, The residence time distribution, basic models for non-ideal flow; conversion in non-ideal reactors.

Fourier's law of heat conduction, convection and radiation, Heat transfer with phase change, heat exchangers, evaporation, Heat transfer in extended surfaces, Dimensional analysis in heat transfer, heat transfer coefficient for flow through a pipe, flow past flat plate, flow through packed beds. Radiative heat transfer – Black body radiation, Emissivity, Stefan - Boltzman law, Plank's law, radiation between surfaces.

Diffusion, Theories of mass transfer, Analogy, inter-phase mass transfer. Distillation, absorption, leaching, liquid-liquid extraction, crystallization, adsorption, drying, humidification, de-humidification.

UNIT - IV PROCESS CONTROL AND INSTRUMENTAL METHODS OF ANALYSIS

Laplace transformation, application to solve ODEs. Dynamics of process elements, open loop and closed loop systems, principles of pneumatic and electronic controllers, Instrumentation: Sensors for Pressure, Flow, Temperature, Control valves, Computer Control of Processes, Analysis of control systems. Micro processor –based control.

Spectroscopic analysis: Absorption spectroscopy, emission spectroscopy, mass spectroscopy, x-ray diffraction, color measurement by spectrometers, Gas analysis by thermal conductivity Moisture (humidity analysis) p^H measurements, Chromatography - H.P.L.C.

UNIT – V CHEMICAL PROCESSES

Nitration, Sulphonation and Sulfation, Hydrogenation, Halogenation & Oxidation, Kinetics and mechanism, the derivative reactions, Industrial applications, Raw material and manufacture of Soda ash, Sodium bicarbonate, Chlorine and Causticsoda, Bleaching powder, Calcium Hypochlorite; Sodium Hypochlorite; Sodium chloride or common salt, sodium sulfate, sodium bisulfate, or Nitercake, Sodium Bisulfite; Sodium Sulfite, Sodium Hydrosulfite; Sodium sulfide, Sodium Hydrosulfide, Sodium Thiosulfate; Sodium Nitrite; Sodium Silicates; Sodium peroxide, Sodium perborate; Sodium amide; Sodium cyanide and Ferri cyanide.

Industrial alcohols, Beer, Wine, Butyl alcohol. Raw Materials, Manufacture of phosphoric acid, nitric acid, Sulfuric acid and HCL & the occurrence, Purification of all acids.

Occurrences of oils, fats and waxes, classification, chemical composition, Extraction and refining oils and fats. Manufacture of edible oil.

Surfactant : Concept of surface activity, Hydrophilic-lypophilic balance; Mechanism of detergency. Classification of surfactants; Biodegradation of surfactant; application of surfactants.

Soap and Detergent: Soap, detergent, Glycerine: spentlye, synthetic glycerine manufacture and their applications

Origin, Occurrence, exploration and classification of crude oils, Hydrocarbon, composition of petroleum and petroleum products (liquid and gas); Refining of crude oil, Catalytic cracking, thermal cracking; reforming. Chemical conversions, Extraction of Aromatics.

UNIT - VI PULP AND PAPER, AGROCHEMICALS AND FERTILIZERS

Classification and manufacture of Insecticides and pesticides, Plant derivatives, Pyrethrin, Nicotine, Rotenone, attractants and repellents, Fumigants, Nematocides, Acaricides, Fungicides, Industrial Biocides, Plant growth regulators, Herbicides.

Raw material for fertilizers; Synthesis of ammonia, Ammonium nitrate, ammonium sulfate, Ammonium Phosphates; Urea, Super phosphates, Mixed fertilizers, organic fertilizers.

Raw material for pulp, manufacture of pulp and paper. Hydrolysis of wood, Wood extractives. Cellulose; Hemi cellulose, lignin and associated materials. composition of cell walls. Physical and Chemical properties of cellulose and derivatives.

UNIT- VII PHARMACEUTICALS, POLYMERS, PLASTICS AND RUBBERS

Types of polymers, Thermoplastics and thermosetting plastics, Polymerization Types. Degradation of polymers through thermal, mechanical and chemical methods. Raw materials for polymers and resins. Chemistry of Natural resins and polymers such as lac, rosin, cellulose, rubber, proteins, fossil resins, etc. Preparation and applications of phenolics, amino resins, polyesters, polyamides, epoxides, polyurethanes, vinyls. Raw materials, manufacturing processes of plastics.

Composites: Raw materials, Comparison of different materials with composite; advantages and disadvantages of Natural rubber, synthetic rubber, rubber compounding, rubber fabrication; latex compound, rubber derivatives.

Alkylations, Carboxylation and Acetylation; Condensation and Cyclization; Dehydration; Halogenation; Oxidation; Sulfonation; Amination; Complex Chemical Conversions. Fermentation and Life processing for antibiotics, Biologicals, Hormones and Vitamins, Biologicals, Steroids Hormones; Isolates from Plants and Animals.

UNIT - VIII COAL CHEMICALS AND INDUSTRIAL CARBON AND EXPLOSIVES

The destructive distillation of coal; Coking of coal; Distillation of coal tar; coal to Chemicals. Methods of manufacture and applications of Lampblack; carbon black; activated carbon; Natural graphite; Manufactured graphite and carbon; Industrial diamonds.

Nuclear reactions: uranium and Thorium fission; Uranium as an energy source; nuclear fuels and processing. Types, Characteristics & Uses of explosive, Industrial Explosives.

UNIT - IX CERAMIC, GLASS, CEMENT AND LIME

Basic raw Materials; Chemical conversions, Including Basic Ceramic Chemistry; White wares: Structural Clay products; Refractories; Specialized Ceramic products: Vitreous Enamel; Kiln, Composition, manufacture of specialty glasses.

Portland cement: Raw materials & Manufacture of Portland cements; Setting and Hardening of cement; Manufacture and use of Lime and Gypsum.

UNIT - X FOOD AND FOOD BY- PRODUCTS

Classification and structure of carbohydrates, Physical and chemical properties of sugar, starch, pectin substances, gum and other polysaccharide, Functional properties of carbohydrates in foods, Definition and classification of lipids, chemistry of fatty acids and glycerides.

Functional properties of lipids in foods, structure and chemistry of amino acids, peptides and proteins, Source and distribution of proteins, Isolation, identification and purity of proteins.

Texture of fruits and vegetables, Plant pigments, Effects of cooking on texture and composition of fruits and vegetables Animal proteins, Structure and chemical composition of muscles .Composition of milk, Physical and chemical properties of milk proteins and effects, chemistry of milk products like cheese, cream, butter, ghee, etc.

ANNEXURE - III
TAMIL NADU PUBLIC SERVICE COMMISSION
(MAIN WRITTEN EXAMINATION)
PAPER - II GENERAL STUDIES (DEGREE / PG DEGREE STANDARD)
OBJECTIVE TYPE

UNIT – I GENERAL SCIENCE

Physics - Universe - General Scientific laws - Scientific instruments - Inventions and discoveries - National scientific laboratories - Science glossary - Mechanics and properties of matter - Physical quantities, standards and units - Force, motion and energy - electricity and Magnetism - Electronics & communications - Heat, light and sound - Atomic and nuclear physics - Solid State Physics-Spectroscopy – Geophysics - Astronomy and space science.

Chemistry - Elements and Compounds - Acids, bases and salts - Oxidation and reduction – Chemistry of ores and metals - Carbon, nitrogen and their compounds -Fertilizers, pesticides, insecticides - Biochemistry and biotechnology –Electrochemistry - Polymers and plastics

Botany - Main Concepts of life science-The cell-basic unit of life-Classification of living organism - Nutrition and dietetics-Respiration - Excretion of metabolic waste-Bio-communication

Zoology - Blood and blood circulation-Endocrine system-Reproductive system-Genetics the science of heredity-Environment, ecology, health and hygiene, Bio- diversity and its conservation-Human diseases, prevention and remedies-Communicable diseases and non- communicable diseases-Alcoholism and drug abuse-Animals, plants and human life-

UNIT – II CURRENT EVENTS

History - Latest diary of events – National - National symbols -Profile of States-Defence, national security and terrorism - World organizations-pacts and summits-Eminent persons & places in news-Sports & games - Books & authors - Awards & honours - Cultural panorama - Latest historical events - India and its neighbours - Latest terminology-Appointments - who is who?

Political Science - India's foreign policy - Latest court verdicts – public opinion - Problems in conduct of public elections- Political parties and political system in India- Public awareness & General administration- Role of Voluntary organizations & Govt.,- Welfare oriented govt. schemes, their utility.

Geography - Geographical landmarks-Policy on environment and ecology.

Economics - Current socio-economic problems-New economic policy & govt. sector.

Science - Latest inventions on science & technology - Latest discoveries in Health Science - Mass media & communication.

UNIT – III GEOGRAPHY

Earth and Universe - Solar system - Atmosphere hydrosphere, lithosphere -Monsoon, rainfall, weather and climate - Water resources - rivers in India - Soil, minerals & natural resources-Natural vegetation - Forest & wildlife-Agricultural pattern, livestock & fisheries - Transport & communication - Social geography – population-density and distribution-Natural calamities – disaster management-Climate change - impact and consequences - Mitigation measures - Pollution Control.

UNIT – IV HISTORY AND CULTURE OF INDIA

Pre-historic events - Indus valley civilization-Vedic, Aryan and Sangam age - Maurya dynasty - Buddhism and Jainism - Guptas, Delhi Sultans, Mughals and Marathas - Age of Vijayanagaram and the bahmanis - South Indian history - Culture and Heritage of Tamil people - Advent of European invasion - Expansion and consolidation of British rule-Effect of British rule on socio-economic factors - Social reforms and religious movements - India since independence - Characteristics of Indian culture - Unity in diversity – race, colour, language, custom - India-as secular state - Organizations for fine arts, dance, drama, music-Growth of rationalist, Dravidian movement in TN-Political parties and populist schemes – Prominent personalities in the various spheres – Arts, Science, literature and Philosophy – Mother Teresa, Swami Vivekananda, Pandit Ravishankar , M.S.Subbulakshmi, Rukmani Arundel and J.Krishnamoorthy etc.

UNIT – V INDIAN POLITY

Constitution of India - Preamble to the constitution - Salient features of constitution - Union, State and territory - Citizenship-rights amend duties - Fundamental rights - Fundamental duties - Human rights charter - Union legislature – Parliament - State executive - State Legislature – assembly - Status of Jammu & Kashmir - Local government – panchayat raj – Tamil Nadu - Judiciary in India – Rule of law/Due process of law - Indian federalism – center – state relations - Emergency provisions - Civil services in India - Administrative challenges in a welfare state - Complexities of district administration - Elections - Election Commission Union and State - Official language and Schedule-VIII -

Amendments to constitution - Schedules to constitution-Administrative reforms & tribunals- Corruption in public life - Anti-corruption measures – Central Vigilance Commission, lok-adalats, Ombudsman, Comptroller and Auditor General of India. - Right to information - Central and State Commission - Empowerment of women- Voluntary organizations and public grievances redressal - Consumer protection forms.

UNIT – VI INDIAN ECONOMY

Nature of Indian economy - Five-year plan models-an assessment - Land reforms & agriculture - Application of science in agriculture -Industrial growth - Capital formation and investment - Role of public sector & disinvestment - Development of infrastructure- National income - Public finance & fiscal policy - Price policy & public distribution - Banking, money & monetary policy - Role of Foreign Direct Investment (FDI) – WTO - globalization & privatization - Rural welfare oriented programmes - Social sector problems – population, education, health, employment, poverty - HRD – sustainable economic growth- Economic trends in Tamil Nadu - Energy Different sources and development - Finance Commission - Planning Commission - National Development Council.

UNIT – VII INDIAN NATIONAL MOVEMENT

National renaissance- Early uprising against British rule-1857 Revolt- Indian National Congress - Emergence of national leaders- Gandhi, Nehru, Tagore, Netaji -Growth of militant movements -Different modes of agitations-Era of different Acts & Pacts-World war & final phase struggle - Communalism led to partition- Role of Tamil Nadu in freedom struggle - Rajaji, VOC, Periyar, Bharathiar & Others - Birth of political parties /political system in India since independence.

UNIT – VIII APTITUDE & MENTAL ABILITY TESTS

Conversion of information to data - Collection, compilation and presentation of data - Tables, graphs, diagrams - Parametric representation of data-Analytical interpretation of data - Simplification – Percentage - Highest Common Factor (HCF) - Lowest Common Multiple (LCM) - Ratio and Proportion - Simple interest - Compound interest - Area- Volume - Time and Work - Behavioral ability - Basic terms, Communications in information technology - Application of Information and Communication Technology (ICT) - Decision making and problem solving.

Logical Reasoning - Puzzles – Dice - Visual Reasoning - Alpha numeric Reasoning- Number Series - Logical Number/Alphabetical/Diagrammatic Sequences.