TAMIL NADU PUBLIC SERVICE COMMISSION

Advertisement No. 624
Notification No. 20/2022 **DATED: 08.08.2022**

Applications are invited from eligible candidates only through online mode upto **06.09.2022** for direct recruitment to the post of **Forest Apprentice** in Tamil Nadu Forest Subordinate Service **(Group-VI Services)**.

WARNING

- All recruitments by the Tamil Nadu Public Service Commission are purely merit based.
- The Tamil Nadu Public Service Commission hereby cautions the applicants against touts and agents who may cheat, by making false promises of securing jobs through unfair means.
- The Tamil Nadu Public Service Commission shall not be responsible or liable for any loss that may be caused to any applicant on account of indulging in any sort of dealings with such unscrupulous elements.
- Applicants are solely responsible for their claims in the online application. They cannot blame service providers like Internet Cafes / Browsing Centres / Common Service Centres for the mistakes made while applying online for recruitment.
- Applicants are advised to check the filled in online application along with required documents (Refer **Annexure-III**) before finally submitting the same.
- **Applicants shall mandatorily upload the certificates / documents (in support of all the claims made / details furnished in the online application) at the time of submission of online application itself. It shall be ensured by the applicants that the online application is submitted with all the required certificates.**
- **Applicants are directed to read all the information / instructions / guidelines given in this notification and the Commission's "Instructions to applicants" before applying for this recruitment. Clarification if any required may be obtained over phone and email well ahead of the last date for submission of online application. Candidates should follow the instructions given in the online application also.**

1. ONE TIME REGISTRATION:

It is mandatory for 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 they should apply only through online for this recruitment. The One Time Registration will be valid for five years from the date of registration. Thereafter, the registration should be renewed by paying the prescribed renewal fee. One Time Registration will not be considered as an application / Examination fee for any post. An applicant should submit online application separately for each and every examination / recruitment for which he / she intends to appear. The registration fee paid towards the One Time Registration is not an application / Examination fee for this recruitment. Candidates have to pay the prescribed examination fee. **Linking of Aadhaar with OneTime Registration is mandatory.**

For further details refer para 2(B) and 2(C) of the Commission's "Instructions to Applicants".

2. DETAILS OF VACANCIES:

Name of the Post and Post Code	Name of the Service and Service Code	No. of vacancies	Scale of pay
Forest Apprentice (Code No. 1652)	**Tamil Nadu Forest Subordinate Service (008)**	**10** [incl. ***2*** *C/F vacancy]*	**37,700 - 1,38,500 (Level-20)**

Note:
The number of vacancies notified is approximate and is liable to modification as indicated in para 11-A of 'Instructions to Applicants'.

3. DISTRIBUTION OF VACANCIES:

The rule of reservation of appointments is applicable for this recruitment.

GT(G)	GT(W)	BC (OBCM)(G)	BC (OBCM) (LC/AC)**	BC(W)	MBC/DC (G)	MBC/DC (G) (LC/AC)**	SC(A)(G)	TOTAL
2	1	1	1	1	2	1	1	10

***** Carried forward vacancy***

Abbreviation:
GT- General Turn; BC (OBCM)- Backward Classes (Other than Backward Class Muslim); MBC/DC- Most Backward Classes / Denotified Communities, SC(A) – Scheduled Castes (Arunthathiyars)
[G-General; W-Women; LC-Leprosy Cured, AC-Acid attack victims]

4. IMPORTANT DATES AND TIME:

Date of Notification		**08.08.2022**
Last date for submission of application		**06.09.2022**
Application Correction Window Period*		**From 11.09.2022 (12.01 A.M.) To 13.09.2022 (11.59 P.M.)**
Date and Time of Written Examination		
Paper – I A. கட்டாயத் தமிழ் மொழித் தகுதித் தேர்வு B. General Studies	**03.12.2022 To 13.12.2022**	**FN 09.30 A.M. to 12.30 P.M. AN 02.00 P.M. to 05.00 P.M**
Paper – II and Paper – III Optional Subjects		

***Note:**

i. The applicants are permitted to submit and edit their online application till the last date for submission of online application.
ii. Candidates who have made mistakes / errors and furnished wrong information in the online application inadvertently can edit the application details in the Application Correction Window period and furnish the correct details. After Correction Window Period, no modification is allowed and request in this regard will not be entertained.
iii. Candidates who have failed to pay the examination fee may also avail the Correction Window Period.
iv. Refer **Annexure-V** of this Notification regarding tentative timeline for the recruitment process.
v. Applicant should submit only one application for this recruitment.

5. QUALIFICATIONS:

(A) AGE LIMIT (as on 01.04.2022):

Sl. No.	Category of Applicants	Minimum Age (should have completed)	Maximum Age (should not have completed)
1.	Scheduled Castes / Scheduled Castes (Arunthathiyar), Scheduled Tribes, Most Backward Classes / Denotified Communities, Backward Classes (Other than Backward Class Muslim), Backward Classes (Muslim) and Destitute Widows of all castes	**18** Years	**37*** Years
2.	"Others" [i.e., Applicants not belonging to SCs, SC(A)s, STs, MBCs/DCs, BC(OBCM)s, BCMs and DWs of all castes]		**32*** Years
3.	For Ex-Servicemen (Irrespective of caste)		**39*** Years

Note:

***** *As per G.O.(Ms).No.91, Human Resources Management (S) Department, dated 13.09.2021, the Maximum Age Limit prescribed for appointment by direct recruitment has been enhanced by 2 years.*

AGE CONCESSION:

(i) For Persons with Benchmark Disability :
Persons with Benchmark Disability are eligible for age concession upto 10 years over and above the maximum age limit prescribed.
[Section 64 of the Tamil Nadu Government Servants (Conditions of Service) Act, 2016]

(ii) For Ex-Servicemen:
Age concession for Ex-Servicemen mentioned in the "Instructions to Applicants" will not apply to this recruitment.

(a) The above mentioned age concession **will not apply** to the Ex-Servicemen applicants who have already been recruited to any class or service or category.
[Section 3(j) of the Tamil Nadu Government Servants (Conditions of Service) Act, 2016]

(iii) Paragraph 5 of the "Instructions to Applicants" will not apply to this recruitment.

[For further details refer to para 3(F) of "Instructions to Applicants", Section 3(r) of Tamil Nadu Government Servants (Conditions of Service) Act, 2016]

(B) EDUCATIONAL QUALIFICATION (as on 08.08.2022)

Applicants should possess the following or its equivalent qualification:

Educational Qualification (1)	Preferential Qualification (2)
(a) Must possess a Bachelor's degree in Forestry or its equivalent degree of any University recognised by UGC **OR** (b) Must possess a Bachelor's Degree or its equivalent degree of any recognised University in any **one** of the following subjects:- 1. Agriculture 2. Animal Husbandry and Veterinary Science 3. Botany 4. Chemistry 5. Computer Applications/Computer Science 6. Engineering (All Engineering subjects including Agricultural Engineering) 7. Environmental Science 8. Geology 9. Horticulture 10. Marine Biology 11. Mathematics 12. Physics 13. Statistics 14. Wildlife Biology 15. Zoology	**Provided that if candidates with the qualification referred to in item (a) in column(1) are not available for selection, candidates with qualification referred to in item (b) in column(1)will be considered for selection in the respective communal categories.**

Note:

(i) The educational qualifications prescribed for this post should have been obtained by passing the required qualification in the following order of studies viz., **10th + HSC or its equivalent + U.G. Degree** as required under Section 25 of the Tamil Nadu Government Servants (Conditions of Service) Act, 2016. The results of examination should have been declared on or before the date of Notification. [Section 20(4)(iv) and Section 25 of the Tamil Nadu Government Servants (Conditions of Service) Act 2016]

(ii) Applicants claiming equivalence of qualification to the prescribed qualification should upload and submit evidence for equivalence of qualification in the form of Government Order issued on or before the date of this notification and submit it along with the online application, failing which, their application **will be summarily rejected after due process**. The Government Orders regarding equivalence of qualification issued after the date of this notification will not be accepted. [Refer Para 9 of the "Instructions to Applicants" and "Disclaimer"].

A list of Equivalence of qualification in the related subject is available in **Annexure–I** to this notification.(Refer also the disclaimer announced with the notification)

(C) PHYSICAL QUALIFICATION:

Category	Height (not less than)	Chest Measurement (not less than) (round the chest)		
		(on full expiration)	(on full inspiration)	Difference
Men	163 cms	84 cms	89 cms	5 cms
Women	150 cms	79 cms	84 cms	5 cms

Note:

Applicants belonging to **Scheduled Tribes and races such as Assamese, Bhutanese, Garhwalis, Gorkhas, Kumoanis, Ladakhese, Mizo, Naga, Nepalese, Sikkimese and those from Arunachal Pradesh, Lahaul and Spiti, Meghalaya**	**Minimum Height** **Men : 152 cms** **Women : 145 cms**

(D) CERTIFICATE OF PHYSICAL MEASUREMENT:

A certificate containing the following particulars should be obtained from a Medical Officer, not below the rank of an Assistant Surgeon appointed by the Government / Government Medical Institution on or after the date of Notification (08.08.2022) and should be uploaded at the time of submitting online application.

Height :
Chest (on full expiration) :
Chest (on full inspiration) :
Difference :

(The measurements should be specified only with reference to metric system)

(E) PHYSICAL TEST (WALKING TEST)

1. An applicant will be required to undergo a Physical Test consisting of a walk over 25 Kms and 16 Kms to be completed in four hours by Male and Female applicants respectively, which will be conducted by the Principal Chief Conservator of Forests before admission to Oral Test. A certificate to this effect must be produced from a Gazetted Forest Officer nominated by the Principal Chief Conservator of Forests on his behalf. **(Walking Test will be conducted only at Chennai**)
2. An applicant must satisfy a Medical Board in Chennai as to his/her physique, fitness and capacity for rough outdoor work in the Forest Department.

(F) CERTIFICATE OF PHYSICAL FITNESS:

Applicants selected for appointment to the said post will be required to produce a certificate of physical fitness in the form prescribed below. The model format is enclosed in **Annexure-IV** of this Notification.**The said Certificate should be submitted by the selected candidate to the Appointing Authority, at the time of joining the post.**

Standard of Vision	Certificate of physical fitness
Standard-I (i.e., Distant vision without glasses 6/6 each eye. Near vision 0.5 (sn) each eye).	Form prescribed for Executive posts

Applicants with defective vision should produce eye fitness certificate from a qualified Eye Specialist working in Government Hospital.

(G) KNOWLEDGE IN TAMIL

Applicants should possess adequate knowledge in Tamil. (For further details refer para 14(I) of 'Instructions to Applicants'.)

6. FEES:

a)	**Registration Fee:** For One Time Registration [G.O.(Ms).No.32, Personnel and Administrative Reforms (M) Department, dated 01.03.2017]. **Note:** Applicants who have already registered in One Time online Registration system and are within the validity period of 5 years are exempted.	Rs.150/-
b)	**Examination Fee:** 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.	Rs.150/-

EXAMINATION FEE CONCESSIONS:

Sl. No.	Category	Concession
(i)	Scheduled Castes / Scheduled Caste (Arunthathiyars)	Full Exemption
(ii)	Scheduled Tribes	Full Exemption
(iii)	Most Backward Classes / Denotified Communities	Three Free Chances
(iv)	Backward Classes (other than Muslim) / Backward Classes (Muslims)	Three Free Chances
(v)	Ex-Servicemen	Two Free Chances
(vi)	Persons with Benchmark Disability (the Disability shall be not less than 40%)	Full Exemption
(vii)	Destitute Widow (Destitute Widow Certificate should have been obtained from RDO/ Sub-Collector/ Assistant Collector)	Full Exemption

Note:

(i) The total number of free chances availed, will be calculated on the basis of claims made in previous applications.

(ii) The number of free chances availed by the applicant may be verified by the Commission at any stage of the selection process.

(iii) In case an applicant who makes a false claim for exemption from payment of application fee by suppressing information regarding his/her previous application(s) his/her candidature shall be rejected after due process and he/she shall be debarred for a period of one year from appearing for examinations and selections conducted by the Commission.

(iv) Applicants are directed to carefully choose the options 'Yes' or 'No' regarding availing the fee concession.

(v) Applicants are advised in their own interest, to keep an account of the number of times fee concession has been availed, irrespective of the information displayed in the <Application History> of the applicant dashboard.

(vi) An application (irrespective of the post applied for) claiming fee concession will operate to exclude one chance from the number of free chances allowed.

(vii) Applicants who have availed the maximum number of free chances permitted / applicants who do not wish to avail of the fee concession / applicants who are not eligible for fee concession, shall choose the option 'No' against the query regarding fee concession. Such applicants shall thereafter pay the requisite fee through the prescribed mode of payment.

(viii) Failure to pay the prescribed fee in time along with the online application, will result in the rejection of application after due process.(For further details regarding examination fee concessions refer to Para 6 of 'Instructions to Applicants')

7. MODE OF PAYMENT OF EXAMINATION FEE:

i. Examination fee of **Rs.150/- (Rupees One hundred and Fifty only)**, is payable by online through Net Banking / Credit card / Debit card on or before the last date of submission of online application by choosing the option in the online application. Payment of Examination Fee may also be made during Application Correction Window period mentioned Para.4 of this Notification.

ii. Applicants have to pay the service charges also as applicable.

iii. Applicants can avail exemption from paying examination fee as per eligibility criteria.

iv. Offline mode of payment, if any received 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 and the same will not be either returned or refunded.

v. **The Commission is not responsible for online payment failure or delayed reconciliation of fee by the banks. It is the responsibility of the applicant to ensure that the transaction made by them is successful.**

(For further details regarding the Examination fee, refer para. 2(V) of "Instructions to Applicants").

8. CONCESSIONS:

(i) Concessions in the matter of examination fees allowed to SCs, SC(A)s, STs, MBCs/DCs, BC(OBCM)s, BCMs, Destitute Widows, Persons with Benchmark Disability and Ex-Servicemen are given in Para.6 of the 'Instructions to Applicants'.

(ii) Persons claiming concessions referred to above and other claims made in the application have to upload evidence along with online application for such claims, otherwise their application **will be rejected after due process.**

Note:

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

9. SCHEME OF EXAMINATION: OBJECTIVE TYPE (OMR/CBT METHOD)

<table>
<tr><th rowspan="2">Subject</th><th rowspan="2">Duration</th><th rowspan="2">Maximum Marks</th><th colspan="2">Minimum qualifying Marks for Selection</th></tr>
<tr><th>SCs, SC(A)s, STs, MBCs/DCs, BC(OBCM)s and BCMs</th><th>Others</th></tr>
<tr><td><u>Paper – I</u>
<u>(Compulsory Subject)</u>
<u>Part-A</u>
கட்டாயத் தமிழ் மொழித் தகுதித் தேர்வு (பத்தாம் வகுப்புத் தரம்)
100 questions /150 marks</td><td rowspan="2">3 Hours</td><td>150</td><td>60*</td><td>60*</td></tr>
<tr><td><u>Part-B</u>
General Studies (Code No. 003)
(Degree standard) (75 questions)
and
Aptitude and Mental Ability Test
(SSLC standard) (25 questions)
100 questions / 150 marks</td><td>150</td><td rowspan="4">255</td><td rowspan="4">340</td></tr>
<tr><td><u>Paper – II (200 questions)</u>
Optional Subject–1 (Degree Standard)
<u>Paper – III (200 questions)</u>
Optional Subject–2 (Degree Standard)
<u>For Papers-II and III, Candidates may Choose any two optional subjects from the following 17 subjects given below subject to the conditions that the applicant shall not be allowed to take more than one subject in the same group</u>:-
<u>Group I</u>
1. Agriculture (Code No.284)
2. Horticulture (CodeNo.278)
3. Animal Husbandry and Veterinary Science (Code No. 296)
<u>Group II</u>
4. Computer Applications (Code No. 288)
5. Computer Science (Code No.286)
<u>Group III</u>
6. Mathematics (CodeNo.276)
7. Statistics (Code No.274)
<u>Other Subjects</u>
8. Botany (Code No.268)
9. Chemistry (Code No.243)
10. Engineering (All Engineering subjects including Agricultural Engineering) (Code No. 230)
11. Environmental Science (Code No.298)
12. Forestry (Code No.283)
13. Geology (Code No.239)
14. Marine Biology (Code No.293)
15. Physics (Code No.241)
16. Wildlife Biology (Code No.291)
17. Zoology (Code No.270)</td><td>3 Hours
+
3 Hours</td><td>300
+
300</td></tr>
<tr><td>(ii) Interview and Records</td><td>---</td><td>100</td></tr>
<tr><td colspan="2">Total</td><td>850</td></tr>
</table>

*****_Minimum Qualifying Marks – **60 marks (40% of 150)**. Marks secured in Part-A of Paper-I will not be taken into account for ranking._

Note:

(a) Answer sheets of Part-B of Paper-I, Paper-II and Paper-III will be evaluated, only if the candidate secures minimum qualifying marks [40% - i.e., 60 Marks] in Part-A of Paper-I.

(b) Only Marks secured in Part-B of Paper-I, Paper-II and Paper-III will be considered for ranking.

(c) Appearance in all papers of written examination as well as Oral Test is compulsory. The candidate who have not appear for any one or more papers in the written examination shall not be considered for selection even if they secure the minimum qualifying marks for selection.

(d) **However, as per the orders issued in G.O.(Ms) No.49, Human Resources Management (M) Department, dated 23.05.2022, Differently Abled candidates (irrespective of percentage of disability) can avail exemption from writing Part-A (Tamil Eligibility Test) in Paper-I. Such candidate should furnish the required details in the application without fail. Subsequent claim will be receive no attention. The candidates need to upload Disability Certificate as prescribed in G.O. (Ms) No. 08, Welfare of Differently Abled Persons (DAP-3.2) Department dated 21.09.2021. (Enclosed in Annexure-III)**

(e) The applicants should choose two subjects from the 17 subjects specified in the scheme in which he/she wishes to be examined. However, no applicant shall be allowed to take more than one subject in the same group (i) Agriculture, Horticulture, Animal Husbandry and Veterinary Science, (ii) Computer Applications and Computer Science, (iii) Mathematics and Statistics. However, applicant may choose two subjects in the "Other subjects" category (Serial numbers 8 to 17 in Page - 8.)

(f) **The questions in Part-A of Paper-I (கட்டாயத் தமிழ் மொழித் தகுதித் தேர்வு) will be set in Tamil only.**

(g) **In respect of Part-B of Paper-I (i.e., General Studies + Aptitude and Mental Ability Test):**
The questions on General Studies (75 Questions) and Aptitude and Mental Ability Test (25 Questions) will be set both in English and in Tamil.

(h) **In respect of Optional Subjects Papers-II and III**
The question papers in the following subjects will be set both in Tamil and in English:
Botany, Chemistry, Mathematics, Physics, Statistics and Zoology.
For the following subjects the question paper will be set in English only:
Agriculture, Animal Husbandry and Veterinary Science, Computer Applications, Computer Science, All Engineering subjects (Including Agricultural Engineering), Environmental Science, Forestry, Geology, Horticulture, Marine Biology and Wildlife Biology.

(i) Refer to Para.17 of "Instructions to Applicants" with regard to Instructions to be followed while appearing for competitive Examinations conducted by the Commission.

(j) The syllabus for written examination is available in **Annexure-II** to this Notification and also made available in the Commission's website.

10. SELECTION PROCEDURE:

Selection will be made in three successive stages i.e., (i) Written Examination (ii) Physical Test (Walking Test) and (iii) Oral Test.

i. Based on the total marks obtained by the applicant in Written Examination and Rule of Reservation for appointments, the required number of candidates will be shortlisted for Physical Test (Walking Test). The candidates who are qualified in the physical test alone will be considered for Oral Test in the specified ratio.

ii. Final selection will be made on the basis of the total marks obtained by the applicants at the Written Examination and Oral Test taken together subject to the rule of reservation of appointments. Appearance in all papers of the Written Examination (i.e., Paper-I, Paper-II and Paper-III), Physical Test and Oral Test is compulsory.

iii. An applicant who has not appeared in any of the papers or the Physical Test will not be considered for Oral Test, even if he/she secures qualifying marks for selection. [For details refer Para 18-B of Commission's Instructions to Applicants].

iv. As per the Special Rules governing the appointment to the post of Forest Apprentice, the applicants with Degree qualification in Forestry subject will be given absolute preference. Only if sufficient applicants with Forestry subject are not available for selection against any vacancy / category, the applicants with other Degree qualification shall be considered for selection process towards those remaining vacancies.

11. CENTRES FOR EXAMINATION:

The Written Examination will be held at the following Centres:

Name of the Centre	Centre Code	Name of the Centre	Centre Code	Name of the Centre	Centre Code
Chennai	**0101**	**Madurai**	**1001**	**Thanjavur**	**1901**
Coimbatore	**0201**	**Pudukottai**	**1501**	**Udhagamandalam**	**1301**
Chidambaram	**0303**	**Ramanathapuram**	**1601**	**Tiruchirappalli**	**2501**
Kancheepuram	**0701**	**Salem**	**1701**	**Tirunelveli**	**2601**
Nagercoil	**0801**	**Karaikudi**	**1805**	**Vellore**	**2701**

Note:

(i) Applicant shall choose any two of the above centres for appearing for writing the examination. Applicants will be allotted a venue in one of these two District Centres. However, applicants with benchmark disability (40% and above) (Differently Abled Persons applicants) will be permitted to choose one District Centre. [For further details refer para 2(R) of Instruction to Applicants]

(ii) Request for change of Examination centre will not be permitted (For further details refer para 17 (A) (ii) of "Instructions to Applicants')

(iii) The Commission reserves the right to increase or decrease the number of Examination Centres and to re-allot the applicants accordingly

(iv) Applicants should appear for the Written Examination / Certificate Verification / Physical Test / Oral Test / Counselling at their own expense.

12. (A) EMPLOYMENT DETAILS:

NO OBJECTION CERTIFICATE / INFORMATION TO THE EMPLOYER

Persons who are in the service of the Indian Union or a State in India or in the employment of Local Bodies or Universities or Quasi Government Organizations or Public Sector Units constituted under the authority of the Government of India or of a State in India, whether in regular service or in temporary service need not send their applications through their Head of Department or office or employer. Instead, they may directly apply to the Commission after duly informing their employer in writing that they are applying for the particular recruitment subject to the condition that they should produce "No Objection Certificate" in the prescribed form, from an authority not below the Head of Department or Office or employer at the time of online certificate verification.

[For further details refer para. 14 (P) of "Instructions to Applicants"]

(B) DECLARATION REGARDING CRIMINAL CASES (OR) DISCIPLINARY CASES:

(i) Details regarding Criminal case(s) filed against the candidate, acquittal, arrest, convictions, disciplinary proceedings etc., initiated / pending or finalised if any, should also be furnished to the Commission at the time of applying.

(ii) Candidates who have declared pending criminal or disciplinary cases in their online application, must upload / produce the copy of First Information Report (FIR) or Memorandum of Charges / Show Cause Notice, as the case may be. Failure to upload / produce such papers when called for, shall result in rejection of candidature after due process.

(iii) Candidates who have declared conviction in criminal cases or punishment in disciplinary cases, in their online application, must upload / produce the relevant court orders and/or release orders or Memorandum of Proceedings, as the case may be, when called for. Failure to upload / produce such papers, shall result in rejection of candidature after due process.

(iv) In case of any criminal case is filed / disciplinary action is taken against or conviction / punishment is imposed / acquittal on a candidate after submission of the on-line application at any stage of the recruitment process before the completion of entire selection process such candidates should report this fact to the Commission in the next immediate stage when Commission calls for uploading / producing documents. Failure to comply with these instructions shall result in rejection of candidature after due process and debarment for a period of one year.

[For further details refer para. 14 (S) of "Instructions to Applicants"]

Any violation of instruction therein will result in rejection of application and forfeiture of his / her candidature after due process.

13. GENERAL INFORMATION:

(A) The rule of reservation of appointments is applicable to this recruitment.

(B) **Persons Studied in Tamil Medium**

(i) As per Section 2(d) of the Tamil Nadu Appointment on preferential basis in the services under the State of Persons Studied in Tamil Medium Act, 2010, as amended by Act 35 of 2020, **Persons Studied in Tamil Medium means a person who has studied through Tamil Medium of instruction upto the educational qualification prescribed for direct recruitment in the rules or regulations or orders applicable to any appointment in the services under the State.**

(ii) Candidates claiming to be Persons Studied in Tamil Medium (PSTM) must upload evidence for the same in the form of SSLC, HSC, Transfer Certificate, Provisional Certificate, Convocation Certificate, Degree Certificate, PG Degree Certificate, Mark Sheets, Certificate from the Board or University or from the Institution, as the case may be, with a recording that he / she had studied **the entire duration of the respective course(s) through Tamil Medium of instruction at the time of submission of online application.**

(iii) Candidates must upload documents, **at the time of submission of online application**, as evidence of having studied in the Tamil Medium, all educational qualification upto the educational qualification prescribed.
Example:
If the prescribed educational qualification is Degree, then the candidate should have studied from the First Standard to Degree through Tamil Medium of instruction.

(iv) If no such document as evidence for 'PSTM' is available, a certificate from the Principal / Head Master / District Educational Officer / Chief Educational Officer / District Adi Dravidar Welfare Officer / Controller of Examinations / Head / Director of Educational Institution / Director / Joint Director of Technical Education / Registrar of Universities, as the case may be, in the prescribed format must be uploaded **at the time of submission of online application**, for each and every educational qualification up to the educational qualification prescribed.

(v) Failure to upload such documents **at the time of submission of online application** as evidence for 'Persons Studied in Tamil Medium' for all educational qualification up to the educational qualification prescribed, shall result in the rejection of candidature after due process.

(vi) Documents uploaded **at the time of submission of online application** as proof of having studied in Tamil medium, for the partial duration of any course / private appearance at any examination, shall not be accepted and shall result in the rejection of candidature after due process.
(For further details refer to para. 14 (R) of the "Instructions to Applicants")

(C) The selection for appointment to the posts is purely provisional subject to the final orders in the Writ Petitions, if any, pending on the files of the Hon'ble High Court of Madras and Madurai Bench of Madras High Court.

(D) As per Sections 26 and 27(c) of the Tamil Nadu Government Servants (Conditions of Service) Act, 2016, reservation of appointment to "Destitute Widows" and "Ex-Servicemen" **will not apply** to this recruitment.

(E) **PERSONS WITH BENCHMARK DISABILITY:**
As per ***G.O.(Ms.)No.20, WDAP (DAP.3.2) Department, dated 20.06.2018***, the said post has been identified as suitable for differently abled persons with the following disabilities – **LC, AC, HH** [LC-Leprosy Cured; AC-Acid attack victims, HH-Hard of Hearing (with Assistive Device)].

(F) Persons with Benchmark Disability should submit / upload a copy of Disability Certificate in the format prescribed in the Rights of Persons with Disabilities Rules, 2017 [Department of Empowerment of Persons with Disabilities (Divyangjan), Ministry of Social Justice and Empowerment, Government of India] and issued by the competent authority defined in G.O. (Ms) No.28, Welfare of Differently Abled Persons (DAP 3.1), dated 27.07.2018.
[For further details refer Para.14 (M) of "Instructions to Applicants"]

(G) 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. [Section 26(5) of the Tamil Nadu Government Servants (Conditions of Service) Act, 2016].

(H) Wherever vacancies are reserved for Arunthathiyars on preferential basis, even after filling 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 posts reserved for Arunthathiyars remain unfilled for want of adequate number of qualified applicants, it shall be filled by Scheduled Castes other than Arunthathiyars. [Section 27 of the Tamil Nadu Government Servants (Conditions of Service) Act, 2016].

(I) **Evidence for all the claims made in the online application should be uploaded at the time of submission of online application. Any subsequent claim made after submission of online application will not be entertained. Failure to upload the documents at the time of submission of online application will entail rejection of application after due process**.

(J) Suppression of following material information in the online application regarding (i) free chances availed (ii) Employment in the Service of the Indian Union or a State in India or in the employment of Local Bodies or University or Quasi Government Organization or Public Sector units constituted under the authority of the Government of India or of a State in India in regular service or temporary service (iii) Wilful suppression of criminal cases / disciplinary action pending / punishments if any, against the applicant (iv) violation of undertaking given by the applicant in the online application etc., may invite suitable penal action including debarment for a specific period as decided by the Commission for various recruitments/ selections conducted by the Commission, besides rejection of application after due process.

(K) Correct and true information regarding arrest, convictions, acquittal, criminal or any disciplinary proceedings initiated / pending or finalised, debarment / disqualification by any recruiting agency, if any, should also be furnished to the Commission at the time of submission of online application. The details thereof, i.e. originals of the judgement / order / G.O. dropping further action in the departmental proceedings or any document that may prove the suitability of such applicants for appointment in such cases must be produced at the stage / time of certificate verification without fail. All such events that occur after the submission of application and till the date of his / her selection and appointment shall be reported to the Commission forthwith. Failure to report on the part of the applicant will be considered as suppression of material information and will attract suitable penal action.
[For further details refer para 12 of the "Instructions to applicants"]

(L) **Incomplete applications and applications containing wrong claims or incorrect particulars relating to category of reservation / eligibility / age /gender / communal category / educational qualification / medium of instruction / physical qualification / other basic qualifications and other basic eligibility criteria will be summarily rejected after due process.**

(M) One Time Registration is not an application for any post / recruitment. Though the details/particulars have already been furnished by the applicants under One Time Registration system, **the claims made in the online application for this recruitment alone will be taken into consideration**.

The 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.

(N) **DETERMINATION OF COMMUNITY FOR TRANSGENDER:**

(i) The Transgender candidates, who do not possess any community certificate may choose to be considered under Most Backward Classes as per G.O.(Ms.) No.28, Backward Classes, Most Backward Class and Minorities Welfare Department, dated 06.04.2015 or under 'Others'.

(ii) The Transgender candidates who belong to Scheduled Caste / Scheduled Caste (Arunthathiyar) / Scheduled Tribe communities and possess community certificate as such, shall be considered as per their respective community.

(iii) The Transgender candidates who belong to the communities other than Scheduled Caste/ Scheduled Caste (Arunthathiyar) / Scheduled Tribe and possess community certificate as such are permitted to choose to be considered as belonging to their own community or as Most Backward Class whichever is advantageous to them, at the time of One Time Registration itself. Once the individual opts to be considered as a particular community, it shall be crystallized and this option shall not be changed in future. {Refer G.O.(Ms.) No.90, Social Welfare and Nutritious Meal Programme [SW8(2)] Department, dated 22.12.2017 and Para. 14 (F) (vi–xi) of "Instructions to Applicants"}

(O) **RESERVATION IN EMPLOYMENT FOR TRANSGENDER:**

(i) The Transgender candidates who identify themselves as 'Female' shall be considered against both 30% reservation for women as well as 70% reservation for the General category (both Men & Women).

(ii) The Transgender candidates, who identify themselves as 'Male' or 'Transgender', shall be considered against the 70 % reservation for General category (both Men & Women).

(iii) The above concessions shall be granted subject to production of certificate identifying them as Transgender or Transgender (Male) or Transgender (Female), as the case may be, issued by the Tamil Nadu Transgender Welfare Board (TNTGWB)."

14. OTHER IMPORTANT INSTRUCTIONS:

(a) **Applicants should ensure their eligibility for the examination.** Before applying for / appearing for the examination, the applicants should ensure their eligibility for such examination and that they fulfil all the conditions in regard to age, educational qualifications, number of chances for fee concession, etc., as prescribed by the Commission's notification. Their admission to all stages of the examination will be purely provisional, subject to their satisfying the eligibility conditions. Mere admission to the written examination / certificate verification / oral test / counselling or inclusion of name in the selection list will not confer on the candidates any right to appointment. The candidature is therefore, provisional at all stages and the Commission reserves the right to reject candidature at any stage, after due process even after selection has been made, if a wrong claim or violation of rules or instructions is confirmed.
[Refer Para. 11 (B) (C) and (D) of "Instructions to Applicants']

(b) The memorandum of admission (hall ticket) for eligible applicants will be made available in the Commission's website **www.tnpscexams.in**/ **www.tnpsc.gov.in** for downloading by applicants. The memorandum of admission will **not** be sent by post. The applicants must comply with each and every instruction given in the memorandum of admission.
[Refer in Note (g) under Para 2(V) of "Instructions to applicants"]

(c) **ONLINE CORRESPONDENCE :** Applicants requiring clarification, can contact the office of the Tamil Nadu Public Service Commission in person or over the Toll-Free No.**1800 419 0958** on all working days between 10.00 A.M and 5.45 P.M. Queries relating to One Time Registration/ online application may be sent to helpdesk@tnpscexams.in. Other queries may be sent to grievance.tnpsc@tn.gov.in
[Refer in Note (h),(i),(j) under Para 2(V) of "Instructions to applicants"]

(d) **COMMUNICATION TO APPLICANTS:**
Individual communication regarding the date and time of Certificate Verification, Publication of results of Written Examination, Oral Test and Counselling (as applicable) will not be sent to the applicants by post. The details will be made available on the Commission's website.

(e) **During the process of recruitment i.e., from Notification to till the completion of selection process, NO information / clarification / particulars / details of selection / recruitment will be furnished to any petitions including petitions under Right to Information Act.**

(f) **MOBILE PHONES AND OTHER ARTICLES BANNED:**

(i) Except the permitted writing material (Black ball point pen), applicants are not allowed to bring cellular phones, electronic or any other type of calculators, watches and rings with inbuilt memory notes, recording devices either as a separate piece or part of something used by the applicant such as watch or ring etc., or any other electronic devices and non-electronic devices such as P&G design data book, mathematical and drawing instruments, log tables, stencils of maps, slide rules books, notes, loose sheets, rough sheets, hand bags etc., into the examination hall / room.

(ii) If they are found to be in possession of any such things or instruments, 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.

(iii) 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 of the same cannot be assured. (For further details refer Para 17-E to "Instructions to Applicants").

(g) 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 will be purely provisional, subject to their satisfying the prescribed eligibility conditions. **If, on verification at any time before or after the written examination / certificate verification, it is found that they do not fulfil any of the eligibility conditions, their candidature for the recruitment will be summarily rejected after due process.**

(h) If any of their claims is found to be incorrect, it will lead to rejection of their candidature after due process and suitable penal action including debarment.

(i) **UNFAIR MEANS STRICTLY PROHIBITED**: No applicant shall copy from the papers of any other applicant or permit his / her papers to be copied or give or attempt to give or obtain or attempt to obtain irregular assistance of any description.

(j) **CONDUCT IN THE 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 viewed seriously and penalised.

(k) For violation of "Instructions to Applicants" in any manner, suitable penalty will be imposed as per Para 17-E to "Instructions to Applicants" or as deemed fit by the Commission.

(l) Tentative answer keys will be hosted in the Commission's website within **Six (6)** working days from the date of conduct of objective type examination. Candidates can challenge the tentative answer keys of the objective type examination through the 'Answer Key Challenge' window available in the Commission's website [Results → Answer Keys].

Representations, if any, challenging the tentative answer keys shall be submitted only through online mode **within seven days from the date of publication of tentative answer keys**. Representations received by post or e-mail will receive no attention.

Detailed instructions, procedures to challenge the tentative answer keys have been made available in the Commission's website. Representations made online / offline after the closure of the window will also receive no attention.

The challenges submitted on time, through the online mode, shall be referred to a committee comprising of experts in each subject. The decision on the final answer key shall be made, based on the recommendations of the expert committee and paper evaluation shall commence thereafter.

The Commission shall not publish the final answer key until the completion of the entire selection process.

Requests from candidates for furnishing of their marks or answer paper copy before the completion of the entire selection process, will not be entertained by the Commission.

After conclusion of the entire selection process, relevant particulars of all candidates who had applied for recruitment to the post shall be made available on the Commission's website.

[Refer Para 17(D) (v) to (xii) of "Instructions to Applicants"]

15. HOW TO APPLY:

(1) Applicants should apply only through online mode in the Commission's websites www.tnpsc.gov.in or www.tnpscexams.in.

(2) "One Time Registration" using Aadhaar is 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 five 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) To apply under One Time Registration System, applicants should have a scanned image of their photograph, certificates specified, if any, and signature in CD/DVD/Pen Drive to upload the same, as per the specifications given in the guidelines for scanning and uploading of photograph and signature.

(4) No applicant is permitted to create more than one registration ID under One Time Registration System.

(5) Applicants should enter the Unique ID and Password to view the already available information and update them. They shall not share the ID / PASSWORD with any other Person or Agency.

(6) **One Time Registration is not an application for any post.** It is just a collection of information from the applicants and provides a separate dashboard to each applicant to facilitate maintenance of their own profile. Applicants who wish to apply for this recruitment shall click "Apply" against the recruitment notified in the Commission's website using the same USER ID and PASSWORD given for ONE TIME REGISTRATION.

(7) Applicants should select the name of the post for which the applicant wishes to apply.

(8) **Online applications uploaded without the photograph, signature and the documents specified in Annexure-III will be summarily rejected after due process.**

(9) All the particulars mentioned in the online application will be considered as final and no modifications will be allowed after the last date for submission of the online application. Change of details will be entertained only upto the last date for submission of online application. **The applicants shall not be permitted to edit the details in the online application after the last date stipulated for submission of online application.** Hence, the applicants are instructed to fill the online application with utmost care and caution.

(10) APPLICATION CORRECTION WINDOW:

After the last date for submission of online application, the candidates are allowed to edit their online application during the Application Correction Window period as mentioned in para 4 of the Notification (Important Date and Time). After the last date of Correction Window period no modification will be allowed in the online application. The applications will be processed as per the details finally furnished by the candidates. It is the responsibility of the candidates and the Commission has no liability for subsequent rejection of application caused due to editing the details already submitted in application. Request / representation addressed to the Commission for modification of claims in the online application, in any mode, will not be entertained.

(11) PRINT OPTION:

a) After submitting the application, applicants can save / print their application in PDF format.

b) On entering user ID and password, applicants can download their application and print, if required.

c) **Applicants need not send the printout of the online application or any other supporting documents to the Commission.**

[For further details refer para 2 of "Instructions to Applicants"]

16. UPLOAD OF DOCUMENTS:

A. Applicants shall mandatorily upload the certificates / documents (in support of all the claims made / details furnished in the online application) at the time of submission of online application itself. It shall be ensured that the online application shall not be submitted by the applicants without mandatorily uploading the required certificates. The applicants shall have the option of verifying the uploaded certificates through their OTR. If any of the claims have wrongly been uploaded or not uploaded or if any modifications are to be done in the uploading of documents, the applicants shall be permitted to edit and upload / re-upload the documents till two days prior to the date of hosting of hall tickets for that particular post (i.e., twelve days prior to the date of examination)

Refer Annexure-III for the list of documents to be uploaded by the Applicants"

[For further details refer para 2-W of "Instructions to Applicants"]

B. Intimation to the Candidates:

The Commission will publish the results of Written Examination, list of candidates shortlisted for Physical Test / Oral Test, date and time for Uploading Certificates, Oral Test, etc., in the Commission's Website. No individual Communication will be sent to the candidates by Post. However, the Commission provide the additional facility to the candidates by informing the above said dates, events and intimation relating to Certificate upload, Certificate Verification and Oral Test etc., via SMS and e-mail through the registered Mobile Number and email ID. Candidates are directed to watch the Commission's website periodically for all updates and intimations. Commission is not responsible for failure / delay in delivery of SMS / email to the candidates due to any reason including technical issues. Any representation from the candidates for non-receipt of SMS or e-mail will receive no attention.

17. LAST DATE FOR SUBMISSION OF APPLICATION:

i. Online application can be submitted / edited upto **06.09.2022 till 11.59 P.M.,** after which the link will be disabled.

ii. Application Correction Window will be available from **11.09.2022 (12.01 A.M.) 13.09.2022 till 11.59 P.M.**

iii. The uploaded documents can be edited / uploaded /re-uploaded upto **20.11.2022 till 11.59 P.M.**

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

Secretary

DISCLAIMER

"Government orders relating to Equivalence of qualification are available on the Tamil Nadu Public Service Commission website. However, if the candidates possesses an equivalent qualification other than one mentioned in **Annexure-I** to this Notification and if Government orders to this effect have been issued on or before the date of this notification, applicants should furnish the details of the same while applying and **should upload a copy of the Government orders, along with the online application**, failing which their application will be rejected after due process. The Government orders regarding equivalence of qualification issued after the date of this notification will not be considered for this recruitment".

Secretary

ANNEXURE - I / பிற்சேர்க்கை - I

G.O's/Government letters relating to equivalence of qualification

Sl. No.	Degree	Eligible Equivalent Degree	G.O.
1	B.Sc., Botany	1. B.Sc., Plant Biology and Plant Bio-technology awarded by Bharathiyar University	G.O (1D) NO.268 Higher Education (H1) Department, dated 20.09.2012.
		2. B.Sc., Plant Biology & Plant Bio Technology of Madras University	G.O.117, Higher Education (K2) Department, dated 02.07.2013.
		3. B.Sc., (Botany) (Vocational Bio Technology) awarded by Periyar University	G.O.(Ms)No.112, Higher Education (K2) Dept, dated 18.07.2014.
		4. B.Sc., (Special) in Botany (Specialisation in Industrial Microbiology) awarded by Lady Doak College Madurai Kamaraj University	
		5. B.Sc., Plant Biology & Plant Biotechnology awarded by Bharathidasan University and B.Sc Plant Biology & Plant Biotechnology (offered by St.Joseph's College (Autonomous)) Trichy affiliated to Bharathidasan University	G.O.(Ms)No.171, Higher Education (K2) Dept, dated 30.09.2014.
		6. B.Sc., Plant Biology & Plant Biotechnology awarded by St.Xavier's College (Autonomous), Palayamkottai affiliated to Manonmaniam Sundaranar University	G.O.(Ms)No. 72, Higher Education (K2) Dept, dated 20.04.2015
		7. B.Sc., (Micro Biology) awarded by Bharathiyar University	G.O.(Ms)No. 254, P&AR (R) Dept, dated 22.10.1998.
		8. B.Sc., Plant Biology and Plant Biotechnology degree offered by Ramakrishna Mission Vivekananda College, Chennai (Autonomous) affiliated to University of Madras	G.O.(Ms)No.266, Higher Education (K2) Dept, dated 29.11.2019
		9. B.Sc., Plant Biotechnology degree offered by Mother Teresa Women's University	G.O.(Ms)No.266, Higher Education (K2) Dept, dated 29.11.2019
		10. B.Sc., Plant Biology and Plant Biotechnology degree offered by Government Arts College for Men (Autonomous), Nandanam,	G.O.(Ms)No.266, Higher Education (K2) Dept, dated 29.11.2019

		Chennai affiliated to University of Madras	
		11. B.Sc., Plant Biology and Plant Biotechnology Programme offered by A.V.C. College (Autonomous) affliated to Bharathidasan University	G.O.(Ms)No.185, Higher Education (K1) Dept, dated 16.12.2020
		12. B.Sc., B.Ed., (Chemistry, Botany, Zoology) (4 year Integrated Programme) offered by Vels Institute of Science Technology & Advanced Studies, Chennai	G.O.(Ms)No. 259, Higher Education (K1) Dept, dated 21.12.2021
		13. B.Sc., Botany (Plant Biology and Biotechnology) offered by the American College, Madurai affiliated with Madurai Kamaraj University	G.O.(Ms)No. 259, Higher Education (K1) Dept, dated 21.12.2021
		14. B.Sc., (Chemistry, Botany, Zoology) awarded by Bangalore University	G.O.(Ms)No. 259, Higher Education (K1) Dept, dated 21.12.2021
2	B.Sc., Chemistry	1. B.Sc., (Special) Chemistry with Cheminformatics awarded by Lady Doak College affiliated to MKU	G.O.(Ms)No.232, Higher Education (K2) Dept, dated 18.11.2016.
		2. M.Sc., Chemistry 5 year integrated courses offered by Annamalai University as equivalent to corresponding UG degree	G.O.(Ms).No.75, Personnel and Administrative Reforms (M) Department, dated 30.06.2011
		3. B.Sc., (Special) Chemistry semester Degree course of Lady Doak College (Autonomous) affiliated to Madurai Kamaraj University .	G.O.(Ms).No.323, Higher Education (K2) Department, dated 13.11.2017
		4. B.Sc., (Special) Chemistry semester Degree course of American College (Autonomous), Madurai Affiliated to Madurai Kamaraj University	G.O.(Ms).No.323, Higher Education (K2) Department, dated 13.11.2017
		5. B.Sc., Nanoscience degree offered by Sarah Tucker College (Autonomous), Tirunelveli affiliated to Manonmaniam Sundaranar University	G.O.(Ms).No.123, Higher Education (K2) Department, dated 25.06.2018
		6. B.Sc., Industrial Chemistry (Vocational Stream) awarded by Periyar University	G.O.(Ms).No.123, Higher Education (K2) Department, dated 25.06.2018

		7. B.Sc., Applied Chemistry awarded by Annamalai University	G.O.(Ms).No.65, Higher Education (K2) Department, dated 24.04.2019
		8. B.Sc., B.Ed., (4 year Integrated Programme) awarded by Periyar Maniammai Institute of Science and Technology (Deemed to be University)	G.O.(Ms).No.65, Higher Education (K2) Department, dated 24.04.2019
		9. M.Sc., Chemistry (5 year Integrated) degree offered by Annamalai University	G.O.(Ms).No.266, Higher Education (K2) Department, dated 29.11.2019
		10. M.Sc., BS-MS (Chemical Science)-5 years (Dual Degree Programme) awarded by Indian Institute of Sconce Education and Research, Kolkatta	G.O.(Ms).No.84, Higher Education (K1) Department, dated 03.06.2022
		11. B.Sc. B.Ed., 4 years Integrated Chemistry awarded by Tamil Nadu Teacher's Education University	G.O.(Ms).No.84, Higher Education (K1) Department, dated 03.06.2022
		12. B.Sc., Applied Sciences offered by Coimbatore Institute of Technology affiliated to Anna University	G.O.(Ms).No.107, Higher Education (J1) Department, dated 20.06.2022
3	B.Sc., Mathematics	1. B.Sc., Mathematics with Specialization in Computer Application degree awarded by Bharathidasan University	G.O.(Ms)No. 270, Higher Education (K2) Dept, dated 31.12.2013
		2. B.Sc., (Special) Mathematics offered by lady Doak College, MKU	G.O.(Ms)No. 212, Higher Education (K2) Dept, dated 17.12.2014.
		3. B.Sc., Mathematics with Computer Applications of Bharathiyar University	G.O.(Ms)No. 72, Higher Education (K2) Dept, dated 20.04.2015
		4. M.Sc., Mathematics 5 year integrated courses offered by Annamalai University	G.O.(Ms).No.75, Personnel and Administrative Reforms (M) Department, dated 30.06.2011
		5. B.Sc., Mathematics (Computer Applications) Degree awarded by Periyar University	G.O.(Ms).No.33, Higher Education (K2) Department, dated 12.02.2018
		6. B.Sc., Mathematics with Computer Applications awarded by Manonmaniam Sundaranar University	G.O.(Ms).No.194, Higher Education (K2) Department, dated 14.08.2018

		7. B.Sc., Mathematics with Computer Applications awarded by Madurai Kamaraj University	G.O.(Ms).No.194, Higher Education (K2) Department, dated 14.08.2018
		8. B.Sc., (Special) in Maths with Specialisation in Computer Application offered by Lady Doak College College (Autonomous) affiliated to Madurai Kamaraj University	G.O.(Ms).No.194, Higher Education (K2) Department, dated 14.08.2018
		9. B.Sc., Mathematics with Computer Applications awarded by Annamalai University	G.O.(Ms).No.194, Higher Education (K2) Department, dated 14.08.2018
		10. B.Sc., Mathematics and B.Sc., Computer Science (Dual Degree System) four years course awarded by Annamalai University	G.O.(Ms).No.194, Higher Education (K2) Department, dated 14.08.2018
		11. M.Sc., Mathematics with Computer Applications (5 years integrated) awarded by Annamalai University	G.O.(Ms).No.194, Higher Education (K2) Department, dated 14.08.2018
		12. B.Sc., B.Ed., (4 year Integrated Programme) awarded by Periyar Maniammai Institute of Science and Technology (Deemed to be University)	G.O.(Ms).No.65, Higher Education (K2) Department, dated 25.06.2018
		13. B.Sc., Mathematics (Actuarial Science) degree offered by Periyar University	G.O.(Ms)No.266, Higher Education (K2) Dept, dated 29.11.2019
		14. B.Sc., Mathematics (Computer Applications) degree offered by Periyar University	G.O.(Ms)No.266, Higher Education (K2) Dept, dated 29.11.2019
		15. B.Sc., Science (Mathematics, Electronics, Computer Science) offered by Mangalore University	G.O.(Ms)No.186, Higher Education (K1) Dept, dated 15.12.2020
		16. B.Sc., Family & Community Science & Mathematics (1989-1990) offered by Avinashilingam Institute for Home Science and Higher Education	G.O.(Ms)No.186, Higher Education (K1) Dept, dated 15.12.2020
		17. B.Sc., Mathematics & Physics (2004-2005) offered by Avinashilingam Institute for Home Science and Higher Education	G.O.(Ms)No.186, Higher Education (K1) Dept, dated 15.12.2020
		18. B.Sc., Family and Community Science & Mathematics (1992-1994) offered by Avinashilingam	G.O.(Ms)No.185, Higher Education (K1) Dept, dated 15.12.2020

		Institute for Home Science and Higher Education	
		19. B.Sc., Mathematics & Physics (1991-1994) offered by Avinashilingam Institute for Home Science and Higher Education	G.O.(Ms)No.185, Higher Education (K1) Dept, dated 15.12.2020
		20. B.Sc., B.Ed., (4 years Integrated Course) (Physics, Mathematics, Chemistry) offered by VELS Institute of Science, Technology & Advanced Studies	G.O.(Ms)No.129, Higher Education (K1) Dept, dated 12.07.2022
4.	B.Sc., Physics	1. B.Sc (Special) Physics with Computer Application awarded by Madurai Kamaraj University	G.O.(Ms)No.27,Higher Education (K2) Dept, dated 13.02.2014.
		2. B.Sc Physics with Computer Application awarded by Bharathiyar University	
		3. B.Sc Physics Electronics &Communication & Computer Application by Vivekananda College Autonomus Madurai Kamaraj University	
		4. B.Sc (Special) Physics awarded by Lady Doak College (Autonomous) affiliated to Madurai Kamaraj University.	G.O.(Ms)No. 116, Higher Education (K2) Dept, dated 22.07.2014.
		5. B.Sc Physics with specialization in PC Hardware and networking awarded by Lady Doak College, affiliated Madurai Kamaraj University and B.Sc (Special) Physics with Computer Applications awarded by MKU	
		6. B.Sc Physics with specialization in Electronics awarded by Bharathidasan University.	G.O.(Ms)No. 270, Higher Education (K2) Dept, dated 31.12.2013
		7. M.Sc., Physics 5 year integrated courses offered by Annamalai University	G.O.(Ms).No.75, Personnel and Administrative Reforms (M) Department, dated 30.06.2011
		8. B.Sc., (Hons) Physics Degree course of Hansraj College affiliated to University of Delhi as equivalent to B.Sc., Physics Degree Course.	G.O.(Ms).No.323, Higher Education (K2) Department, dated 13.11.2017

		9. B.Sc., Physics (Computer Application) (Vocational Stream) awarded by Periyar University	G.O.(Ms).No.123, Higher Education (K2) Department, dated 25.06.2018
		10. B.Sc., B.Ed., (Four year Integrated) degree offered by Periyar Maniammai Institute of Science & Technology (Deemed to be University)	G.O.(Ms)No.266, Higher Education (K2) Dept, dated 29.11.2019
5.	B.Sc., Zoology	1. B.Sc., (Animal Science Bio-Technology) (2002-2003)	G.O. (Ms) No. 104, Higher Education Department, dated 22.06.2012.
		2. B.Sc., (Advanced Zoology & Bio-Technology 2005-2006) B.Sc (Zoology & Bio-Technology 2008-09)	
		3. B.Sc., (Advanced Zoology & Bio Technology), Madras University	G.O.(Ms)No. 117, Higher Education (K2) Department, dated 02.07.2013.
		4. B.Sc., (Special) Zoology (Special in Bio-Technology) awarded by Lady Doak College, affiliated to Madurai Kamaraj University	G.O.(Ms)No.27,Higher Education (K2) Department, dated 13.02.2014.
		5. B.Sc., Advanced Zoology & Bio-Technology) Manonmaniam Sundaranar University till 2009 - 2010. (Subsequently the nomenclature of the said course has been changed as B.Sc. Zoology)	
		6. B.Sc., (Zoology with Bio-Technology) awarded by AVVM Sri Pushpam College, Autonomous, Bharathidasan University	G.O.(Ms)No.112, Higher Education (K2) Department, dated 18.07.2014.
		7. B.Sc., (Advanced Zoology & Bio-Tecnology) awarded by Vivekananda College affiliated to Madurai Kamaraj University.	G.O.(Ms)No. 116, Higher Education (K2) Department, dated 22.07.2014.
		8. B.Sc., Environmental Zoology awarded by the Bharathidasan University	G.O.(Ms)No. 58, Higher Education (K2) Department, dated 15.04.2013
		9. B.Sc., Zoology Specialization in Bio-Technology offered by Holy Cross College (Autonomous) Trichy awarded by the Bharathidasan University.	G.O.(Ms)No. 270, Higher Education (K2) Department, dated 31.12.2013

		10. B.Sc Applied Zoology semester course awarded by Madurai Kamaraj University .	
		11. B.Sc., Zoology (Vocational) awarded by Mother Teresa Women's University	G.O.(Ms)No. 72, Higher Education (K2) Department, dated 20.04.2015
		12. B.Sc., Advanced Zoology and Biotechnology (Sericulture) awarded by Manonmaniam Sundaranar University	
		13. B.Sc., (Zoology) with allied subject Viz., Vocational-Industrial Micro Biology awarded by Periyar University	G.O.(Ms)No. 58, School Education (CC4(2)) Department, dated 01.03.2016
		14. B.Sc., Zoology (Vocational Stream Sericulture) awarded by Periyar University	G.O.(Ms)No. 232, Higher Education (K2) Department, dated 18.11.2016
		15. B.Sc., (Micro Biology) awarded by Bharathiyar University	G.O.(Ms)No. 254, P&AR (R) Department, dated 22.10.1998.
		16. B.Sc., Zoology (Animal Science and Animal Biotechnology) Degree course offered by Seethalakshmi Ramaswami College (Autonomous) Tiruchirapalli affiliated to Bharathidasan University.	G.O.(Ms).No.33, Higher Education (K2) Department, dated 12.02.2018
		17. B.Sc., Zoology (Vocational) degree offered by M.C.C. Chennai affiliated to University of Madras	G.O.(Ms)No.266, Higher Education (K2) Dept, dated 29.11.2019
		18. B.Sc., Zoology (Wild Life Biology) offered by Bharathiar University	G.O.(Ms)No.186, Higher Education (K1) Dept, dated 15.12.2020
6	B.Sc., (Horticulture)	B.Tech., (Horiticulture) Tamil Nadu Agricultural University	G.O.(Ms)No.7, Agriculture Department, dated 10.01.2011.
7	B.Sc., (Statistics)	1. M.Sc., Statistics with Computer Application (5 years Integrated Programme) awarded by Annamalai University equivalent to 3 years U.G and 2 years P.G. Statistics.	G.O.(Ms)No.116, Higher Education (K2) Department, dated 22. 07.2014.
		2. B.Sc (Mathematics, Statistics and Computer Science) (Chosen Subjects) in Part II of the degree awarded by Sri Venkateswara University, Tirupathi, AP	G.O.(Ms)No. 232, Higher Education (K2) Department, dated 18.11.2016.

		3. B. Stat., Degree course of various Autonomous Institutions affiliated to Bharathidasan University as equivalent to B.Sc., Statistics a) St. Joseph's College, Trichy – B.Stat b) Kunthavai Naachiyar, Thanjavur – B.Stat c) Government Arts College, Karur – B.Stat d)Rajah Serfoji College, Thanjavur – B.Stat e) Periyar EVR College, Trichy – B.Stat	G.O.(Ms).No.323, Higher Education (K2) Department, dated 13.11.2017
		4. B.Sc., Statistics and Computer Applications awarded by Periyar University	G.O.(Ms).No.123, Higher Education (K2) Department, dated 25.06.2018
		5. M.Sc., Statistics (5 year Integrated) degree offered by Annamalai University	G.O.(Ms).No.266, Higher Education (K2) Department, dated 29.11.2019
8	Environmental Science	Five Year Integrated Course M.Sc (Environmental Science) awarded by Annamalai University	G.O.(Ms) No.25, Higher Education (K2) Department, dated 22.02.2013.
9.	B.Sc., (Geology)	B.Sc Applied Geology awarded by Periyar University	G.O.(Ms)No. 72, Higher Education (K2) Department, dated 20.04.2015
10.	B.Sc., (Computer Science)	1. B.Sc (Computer and Information Technology) awarded by MS University	G.O.(Ms)No.2 Higher Education (K2) Department, dated 05.01.2016
		2. B.Sc (Information Technology) awarded by MS University	
		3. B.Sc Applied Science (Computer Technology) awarded by Bharathiyar University	
		4. (i) B.C.A awarded by Periyar University as equivalent to B.Sc., (Computer Science). (ii) B.Sc., (Information Science) awarded by Periyar University as equivalent to B.Sc (Computer Science) (iii) B.Sc Applied Science (Computer Technology) awarded by Periyar	G.O.(Ms).No.55, Higher Education (K2) Department, dated 15.03.2018

		University as equivalent to B.Sc., (Computer Science)	
		(i) M.Sc., (Software Science) (5 years Integrated) awarded by Periyar University (ii) M.Sc., Applied Science (Computer Technology) (5 years Integrated) awarded by Periyar University	G.O.(Ms).No.55, Higher Education (K2) Department, dated 15.03.2018
		5. B.C.A., awarded by Bharathidasan University	G.O.(Ms).No.65, Higher Education (K2) Department, dated 24.04.2019
		6. B.C.A., awarded by Periyar University	G.O.(Ms).No.65, Higher Education (K2) Department, dated 24.04.2019
		7. B.Sc., Information Science awarded by Periyar University	G.O.(Ms).No.65, Higher Education (K2) Department, dated 24.04.2019
		8. B.C.A., awarded by Bharathiar University	G.O.(Ms).No.65, Higher Education (K2) Department, dated 24.04.2019
		9. B.Sc., Information Technology awarded by Bharathiar University	G.O.(Ms).No.65, Higher Education (K2) Department, dated 24.04.2019
		10. B.Sc., Software System awarded by Bharathiar University	G.O.(Ms).No.65, Higher Education (K2) Department, dated 24.04.2019
		11. B.Sc., Computer Technology awarded by Bharathiar University	G.O.(Ms).No.65, Higher Education (K2) Department, dated 24.04.2019
		12. B.Sc., Multimedia and Web Technology awarded by Bharathiar University	G.O.(Ms).No.65, Higher Education (K2) Department, dated 24.04.2019
		13. B.Sc., Computer Science Applications awarded by Bharathiar University	G.O.(Ms).No.65, Higher Education (K2) Department, dated 24.04.2019

		14. B.Sc., Computer Technology offered by Dr. SNS Rajalakshmi College of Arts and Science (Autonomous) affiliated to Bharathiar University	G.O.(Ms).No.65, Higher Education (K2) Department, dated 24.04.2019
		15. B.Sc., Software Engineering awarded by Manonmaniam Sundaranar University	G.O.(Ms).No.65, Higher Education (K2) Department, dated 24.04.2019
		16. B.C.A., Programme offered by Madurai Sivakasi Nadars Pioneer Meenakshi Women's' College affiliated to Alagappa University	G.O.(Ms).No.65, Higher Education (K2) Department, dated 24.04.2019
		17. B.Sc., Computer Science with Data Analytics offered by Dr. N.G.P. Arts and Science College (Autonomous) affiliated to Bharathiar University	G.O.(Ms).No.268, Higher Education (K2) Department, dated 29.11.2019
		18. B.Sc., Computer Science with Cognitive Systems offered by Dr. N.G.P. Arts and Science College (Autonomous) affiliated to Bharathiar University	G.O.(Ms).No.268, Higher Education (K2) Department, dated 29.11.2019
		19. B.Sc., Systems & Design awarded by PSG College of Technology affiliated to Anna University	G.O.(Ms).No.214, Higher Education (J1) Department, dated 30.12.2020
		20. B.Voc., (Software Development) awarded by Alagappa University	G.O.(Ms).No.33, Higher Education (K1) Department, dated 15.02.2021
		21. B.Sc., Software awarded by Alagappa University	G.O.(Ms).No.33, Higher Education (K1) Department, dated 15.02.2021
		22. B.Sc., Information Technology awarded by Alagappa University	G.O.(Ms).No.33, Higher Education (K1) Department, dated 15.02.2021
		23. B.Sc., Computer System & Design offered by Kongu Engineering College affiliated to Anna University	G.O.(Ms).No.41, Higher Education (J1) Department, dated 16.02.2021
		24. B.Sc., Applied Sciences (Information Technology) offered by Bharathiar University	G.O.(Ms).No.259, Higher Education (K1) Department, dated 21.12.2021
		25. B.Sc., Computer Science and Technology offered by the	G.O.(Ms).No.259, Higher Education (K1)

		Women's Christian College, Chennai affiliated to University of Madras	Department, dated 21.12.2021
		26. B.C.A., (DDE) awarded by Alagappa University	G.O.(Ms).No.84, Higher Education (K1) Department, dated 03.06.2022
		27. B.Sc., Software Application awarded by University of Madras	G.O.(Ms).No.84, Higher Education (K1) Department, dated 03.06.2022
		28. B.Sc., Computer Technology offered by Coimbatore Institute of Technology, Coimbatore affiliated to Anna University	G.O.(Ms).No.107, Higher Education (J1) Department, dated 20.06.2022
		29. B.Sc., Software Engineering awarded by Anna University, Coimbatore	G.O.(Ms).No.107, Higher Education (J1) Department, dated 20.06.2022
11.	B.C.A.,	1. B.Sc., Software Degree offered by Madurai Kamaraj University	G.O.(Ms).No.266, Higher Education (K1) Department, dated 29.11.2019
		2. B.Sc., Information Technology offered by SFR College affiliated to Madurai Kamaraj University	G.O.(Ms).No.186, Higher Education (K1) Department, dated 15.12.2020
		3. B.Sc., Information Technology offered by Women's Christian College, Chennai affiliated to University of Madras	G.O.(Ms).No.84, Higher Education (K1) Department, dated 03.06.2022
12.	i) B.Sc Mathematics ii) B.Sc Physics iii) B.Sc Chemistry iv) B.Sc Zoology	The following Five Year Integrated courses offered by Annamalai University are considered as eligible to corresponding UG degrees i) M.Sc Mathematics ii) M.Sc Physics iii) M.Sc Chemistry iv) M.Sc Zoology	G.O.(Ms.)No.75, P&AR(M) Department, dated 30.06.2011
13.	B.Sc., (Environmental Science)	The following Five year Integrated Courses awarded by Annamalai University are considered as eligible to corresponding Under Graduate Degree M.Sc(Environmental Science)	G.O.(Ms.)No.25, Higher Education(K2) Department, dated 22.02.2013
14.	B.E. (Chemical Engineering)	B.Tech (Petrochemical Technology Bharathidasan University	G.O.(Ms) No.178, Higher Education(J1) Dept, dated 17.07.2015

15.	B.E.,	B.E., degree acquired through Distance Learning Mode by the candidates enrolled during academic sessions 2001-2005 in (i) JRN Rajasthan Vidyapeeth, Udaipur (Rajasthan), (ii) IASE Sardarshahar (Rajasthan), (iii) AAI, Allahabad (Uttar Pradesh) validated by AICTE-UGC by conducting special examination as per the Supreme Court's Order – Validation and approval as equivalent to degrees of regular stream	G.O.(Ms) No.4, Higher Education (J1) Department, dated 07.01.2022
16.	B.E., Computer Science and Engineering	M.S., (Software Engineering) (5 year Integrated Programme) awarded by Vellore Institute of Technology	G.O.(Ms) No.58, Higher Education (J1) Department, dated 06.05.2022

Annexure – II / பிற்சேர்க்கை – II

Syllabus

Forest Apprentice (Group-VI Services)

Paper-I – Part-A

கட்டாயத் தமிழ் மொழித் தகுதித் தேர்விற்கான பாடத்திட்டம்

(கொள்குறி வினாவிற்கான தலைப்புகள்)

பத்தாம் வகுப்பு தரம்

1. பிரித்தெழுதுதல் / சேர்த்தெழுதுதல்.
2. எதிர்ச்சொல்லை எடுத்தெழுதுதல்.
3. பொருந்தாச் சொல்லைக் கண்டறிதல்.
4. பிழை திருத்தம் (i) சந்திப்பிழையை நீக்குதல் (ii) மரபுப் பிழைகள், வழுவுச் சொற்களை நீக்குதல் / பிறமொழிச் சொற்களை நீக்குதல்.
5. ஆங்கிலச் சொல்லுக்கு நேரான தமிழ்ச் சொல்லை அறிதல்.
6. ஒலி மற்றும் பொருள் வேறுபாடறிந்து சரியான பொருளையறிதல்.
7. ஒரு பொருள் தரும் பல சொற்கள்.
8. வேர்ச்சொல்லைத் தேர்வு செய்தல்.
9. வேர்ச்சொல்லைக் கொடுத்து / வினைமுற்று, வினையெச்சம், வினையாலணையும் பெயர், தொழிற் பெயரை / உருவாக்கல்.
10. அகர வரிசைப்படி சொற்களை சீர் செய்தல்.
11. சொற்களை ஒழுங்குப்படுத்தி சொற்றொடராக்குதல்.
12. இருவினைகளின் பொருள் வேறுபாடு அறிதல்.
    (எ.கா.) குவிந்து-குவித்து
13. விடைக்கேற்ற வினாவைத் தேர்ந்தெடுத்தல்.
14. எவ்வகை வாக்கியம் எனக் கண்டெழுதுதல் - தன்வினை, பிறவினை, செய்வினை, செயப்பாட்டு வினை வாக்கியங்களைக் கண்டெழுதுதல்.
15. உவமையால் விளக்கப்பெறும் பொருத்தமான பொருளைத் தேர்ந்தெழுதுதல்
16. அலுவல் சார்ந்த சொற்கள் (கலைச் சொல்)
17. விடை வகைகள்.

18. பிறமொழிச் சொற்களுக்கு இணையான தமிழ்ச் சொற்களைக் கண்டறிதல் (எ.கா.) கோல்டு பிஸ்கட் – தங்கக் கட்டி.
19. ஊர்ப் பெயர்களின் மரூஉவை எழுதுக (எ.கா.) தஞ்சாவூர் – தஞ்சை
20. நிறுத்தற்குறிகளை அறிதல்.
21. பேச்சு வழக்கு, எழுத்து வழக்கு (வாரான் – வருகிறான்).
22. சொற்களை இணைத்து புதிய சொல் உருவாக்கல்.
23. பொருத்தமான காலம் அமைத்தல்
    (இறந்தகாலம், நிகழ்காலம், எதிர்காலம்).
24. சரியான வினாச் சொல்லைத் தேர்ந்தெடு.
25. சரியான இணைப்புச் சொல்
    (எனவே, ஏனெனில், ஆகையால், அதனால், அதுபோல).
26. அடைப்புக்குள் உள்ள சொல்லைத் தகுந்த இடத்தில் சேர்க்க.
27. இருபொருள் தருக.
28. குறில் – நெடில் மாற்றம், பொருள் வேறுபாடு.
29. கூற்று, காரணம் – சரியா? தவறா?
30. கலைச் சொற்களை அறிதல் :-
    எ.கா. – Artificial Intelligence – செயற்கை நுண்ணறிவு
    Super Computer - மீத்திறன் கணினி
31. பொருத்தமான பொருளைத் தெரிவு செய்தல்
32. சொற்களின் கூட்டுப் பெயர்கள் (எ.கா.) புல் –புற்கள்
33. சரியான தொடரைத் தேர்ந்தெடுத்தல்
34. பிழை திருத்துதல் (ஒரு-ஓர்)
35. சொல் – பொருள் – பொருத்துக
36. ஒருமை-பன்மை பிழை
37. பத்தியிலிருந்து வினாவிற்கான சரியான விடையைத் தேர்ந்தெடு.

Forest Apprentice (Group-VI Services)
Paper-I – Part-B

General Studies (Degree Standard)
Topics for Objective Type

UNIT-I: GENERAL SCIENCE

(i) Scientific Knowledge and Scientific Temper - Power of Reasoning - Rote Learning vs Conceptual Learning - Science as a tool to understand the past, present and future.

(ii) Nature of Universe - General Scientific Laws – Mechanics - Properties of Matter, Force, Motion and Energy - Everyday application of the Basic Principles of Mechanics, Electricity and Magnetism, Light, Sound, Heat, Nuclear Physics, Laser, Electronics and Communications.

(iii) Elements and Compounds, Acids, Bases, Salts, Petroleum Products, Fertilisers, Pesticides.

(iv) Main concepts of Life Science, Classification of Living Organisms, Evolution, Genetics, Physiology, Nutrition, Health and Hygiene, Human Diseases.

(v) Environment and Ecology.

UNIT-II: CURRENT EVENTS

(i) History - Latest diary of events - National symbols - Profile of States - Eminent personalities and places in news – Sports - Books and authors.

(ii) Polity - Political parties and political system in India - Public awareness and General administration - Welfare oriented Government schemes and their utility, Problems in Public Delivery Systems.

(iii) Geography - Geographical landmarks.

(iv) Economics - Current socio - economic issues.

(v) Science - Latest inventions in Science and Technology.

(vi) Prominent Personalities in various spheres – Arts, Science, Literature and Philosophy.

UNIT-III: GEOGRAPHY OF INDIA

(i) Location – Physical features - Monsoon, Rainfall, Weather and Climate - Water Resources - Rivers in India - Soil, Minerals and Natural Resources - Forest and Wildlife - Agricultural pattern.

(ii) Transport - Communication.

(iii) Social Geography – Population density and distribution - Racial, Linguistic Groups and Major Tribes.

(iv) Natural calamity – Disaster Management – Environmental pollution: Reasons and preventive measures – Climate change – Green energy.

UNIT–IV: HISTORY AND CULTURE OF INDIA

(i) Indus Valley Civilization - Guptas, Delhi Sultans, Mughals and Marathas - Age of Vijayanagaram and Bahmani Kingdoms - South Indian History.

(ii) Change and Continuity in the Socio-Cultural History of India.

(iii) Characteristics of Indian Culture, Unity in Diversity – Race, Language, Custom.

(iv) India as a Secular State, Social Harmony.

UNIT-V: INDIAN POLITY

(i) Constitution of India - Preamble to the Constitution - Salient features of the Constitution - Union, State and Union Territory.

(ii) Citizenship, Fundamental Rights, Fundamental Duties, Directive Principles of State Policy.

(iii) Union Executive, Union Legislature – State Executive, State Legislature – Local Governments, Panchayat Raj.

(iv) Spirit of Federalism: Centre - State Relationships.

(v) Election - Judiciary in India – Rule of Law.

(vi) Corruption in Public Life – Anti-corruption measures – Lokpal and Lok Ayukta - Right to Information - Empowerment of Women - Consumer Protection Forums, Human Rights Charter.

UNIT-VI: INDIAN ECONOMY

(i) Nature of Indian Economy – Five year plan models - an assessment – Planning Commission and Niti Ayog.

(ii) Sources of revenue – Reserve Bank of India – Fiscal Policy and Monetary Policy - Finance Commission – Resource sharing between Union and State Governments - Goods and Services Tax.

(iii) Structure of Indian Economy and Employment Generation, Land Reforms and Agriculture - Application of Science and Technology in Agriculture - Industrial growth - Rural Welfare Oriented Programmes – Social Problems – Population, Education, Health, Employment, Poverty.

UNIT-VII: INDIAN NATIONAL MOVEMENT

(i) National Renaissance – Early uprising against British rule - Indian National Congress - Emergence of leaders – B.R.Ambedkar, Bhagat Singh, Bharathiar, V.O.Chidambaranar Jawaharlal Nehru, Kamarajar, Mahatma Gandhi, Maulana Abul Kalam Azad, Thanthai Periyar, Rajaji, Subash Chandra Bose, Rabindranath Tagore and others.

(ii) Different modes of Agitation: Growth of Satyagraha and Militant Movements.

(iii) Communalism and Partition.

UNIT-VIII: History, Culture, Heritage and Socio - Political Movements in Tamil Nadu

(i) History of Tamil Society, related Archaeological discoveries, Tamil Literature from Sangam Age till contemporary times.

(ii) Thirukkural : (a) Significance as a Secular Literature
(b) Relevance to Everyday Life
(c) Impact of Thirukkural on Humanity
(d) Thirukkural and Universal Values - Equality, Humanism, etc
(e) Relevance to Socio - Politico - Economic affairs
(f) Philosophical content in Thirukkural

(iii) Role of Tamil Nadu in freedom struggle - Early agitations against British Rule - Role of women in freedom struggle.

(iv) Evolution of 19^{th} and 20^{th} Century Socio-Political Movements in Tamil Nadu - Justice Party, Growth of Rationalism - Self Respect

Movement, Dravidian Movement and Principles underlying both these Movements, Contributions of Thanthai Periyar and Perarignar Anna.

UNIT–IX: Development Administration in Tamil Nadu

(i) Human Development Indicators in Tamil Nadu and a comparative assessment across the Country – Impact of Social Reform Movements in the Socio - Economic Development of Tamil Nadu.

(ii) Political parties and Welfare schemes for various sections of people – Rationale behind Reservation Policy and access to Social Resources - Economic trends in Tamil Nadu – Role and impact of social welfare schemes in the Socio - Economic Development of Tamil Nadu.

(iii) Social Justice and Social Harmony as the Cornerstones of Socio-Economic Development.

(iv) Education and Health Systems in Tamil Nadu.

(v) Geography of Tamil Nadu and its impact on Economic growth.

(vi) Achievements of Tamil Nadu in various fields.

(vii) e-Governance in Tamil Nadu.

UNIT-X: APTITUDE AND MENTAL ABILITY

(i) Simplification – Percentage - Highest Common Factor (HCF) - Lowest Common Multiple (LCM).

(ii) Ratio and Proportion.

(iii) Simple interest - Compound interest - Area - Volume - Time and Work.

(iv) Logical Reasoning - Puzzles-Dice - Visual Reasoning - Alpha numeric Reasoning – Number Series.

Forest Apprentice (Group-VI Services)
Paper-I – Part-B

பொது அறிவு)
(பட்டப்படிப்புத் தரம்)

கொள்குறி வகைகளுக்கான தலைப்புகள்

அலகு–I: பொது அறிவியல்

(i) அறிவியல் அறிவு மற்றும் அறிவியல் உணர்வு – பகுத்தறிதல் - பொருள் உணராமல் கற்றலும் கருத்துணர்ந்து கற்றலும் - கடந்த காலம், நிகழ்காலம், எதிர்காலம் பற்றி புரிந்து கொள்வதற்கான ஒரு கருவி அறிவியல்.

(ii) பேரண்டத்தின் இயல்பு - பொது அறிவியல் விதிகள் – இயக்கவியல் - பருப்பொருளின் பண்புகள், விசை, இயக்கம் மற்றும் ஆற்றல் - அன்றாட வாழ்வில் இயக்கவியல், மின்னியல், காந்தவியல், ஒளி, ஒலி, வெப்பம், அணுக்கரு இயற்பியல், லேசர் (LASER), மின்னணுவியல் மற்றும் தகவல் தொடர்பியல் ஆகியவற்றின் அடிப்படை கோட்பாடுகளின் பயன்பாடுகள்.

(iii) தனிமங்களும் சேர்மங்களும், அமிலங்கள், காரங்கள், உப்புகள், பெட்ரோலிய பொருட்கள், உரங்கள், பூச்சிகொல்லிகள்.

(iv) உயிரியலின் முக்கியகோட்பாடுகள், உயிர் உலகின் வகைப்பாடு, பரிணாமம், மரபியல், உடலியங்கியல், உணவியல், உடல் நலம் மற்றும் சுகாதாரம், மனிதநோய்கள்.

(v) சுற்றுப்புறச்சூழல் மற்றும் சூழலியல்.

அலகு-II: நடப்பு நிகழ்வுகள்

(i) வரலாறு - அண்மை நிகழ்வுகளின் தொகுப்பு - தேசியச் சின்னங்கள் – மாநிலங்கள் குறித்த விவரங்கள் - செய்திகளில் இடம்பெற்ற சிறந்த ஆளுமைகளும் இடங்களும் - விளையாட்டு – நூல்களும் ஆசிரியர்களும்.

(ii) ஆட்சியியல் - இந்தியாவில் அரசியல் கட்சிகளும் ஆட்சியியல் முறைமைகளும் - பொது விழிப்புணர்வும் (Public Awareness) பொது நிர்வாகமும் – நலன்சார் அரசுத் திட்டங்களும் அவற்றின் பயன்பாடும், பொது விநியோக அமைப்புகளில் நிலவும் சிக்கல்கள்.

(iii) புவியியல் - புவியியல் அடையாளங்கள்.

(iv) பொருளாதாரம் - தற்போதைய சமூக பொருளாதார பிரச்சினைகள்.

(v) அறிவியல் – அறிவியல் மற்றும் தொழில்நுட்பத்தில் அண்மைக்கால கண்டுபிடிப்புகள்.

(vi) கலை, அறிவியல், இலக்கியம் மற்றும் தத்துவம் ஆகிய வெவ்வேறு துறைகளில் தனித்துவம் கொண்ட ஆளுமைகள்

அலகு–III: இந்தியாவின் புவியியல்

(i) அமைவிடம் – இயற்கை அமைவுகள் – பருவமழை, மழைப்பொழிவு, வானிலை மற்றும் காலநிலை – நீர் வளங்கள் – இந்திய ஆறுகள் – மண், கனிம வளங்கள் மற்றும் இயற்கை வளங்கள் – காடு மற்றும் வன உயிரினங்கள் – வேளாண் முறைகள்.

(ii) போக்குவரத்து - தகவல் தொடர்பு.

(iii) சமூகப் புவியியல் – மக்கள் தொகை அடர்த்தி மற்றும் பரவல் – இனம், மொழிக் குழுக்கள் மற்றும் முக்கியப் பழங்குடிகள்.

(iv) இயற்கைப் பேரிடர் – பேரிடர் மேலாண்மை – சுற்றுச்சூழல் மாசுபடுதல்: காரணங்களும் தடுப்பு முறைகளும் – பருவநிலை மாற்றம் – பசுமை ஆற்றல்.

அலகு–IV: இந்தியாவின் வரலாறும் பண்பாடும்

(i) சிந்து சமவெளி நாகரிகம் – குப்தர்கள், தில்லி சுல்தான்கள், முகலாயர்கள் மற்றும் மராத்தியர்கள் – விஜயநகர மற்றும் பாமினி அரசுகளின் காலம் - தென் இந்திய வரலாறு.
(ii) இந்திய சமூகப் பண்பாட்டு வரலாற்றில் மாற்றங்களும் தொடர்ச்சியும்.
(iii) இந்தியப் பண்பாட்டின் இயல்புகள், வேற்றுமையில் ஒற்றுமை – இனம், மொழி, வழக்காறு.
(iv) இந்தியா ஒரு மதச்சார்பற்ற நாடு, சமூக நல்லிணக்கம்.

அலகு-V: இந்திய ஆட்சியியல்

(i) இந்திய அரசியலமைப்பு - அரசியலமைப்பின் முகவுரை - அரசியலமைப்பின் முக்கிய கூறுகள் - ஒன்றியம், மாநிலம் மற்றும் யூனியன் பிரேதசங்கள்.
(ii) குடியுரிமை, அடிப்படை உரிமைகள், அடிப்படைக் கடமைகள், அரசின் நெறிமுறைக் கோட்பாடுகள்.
(iii) ஒன்றிய நிர்வாகம், ஒன்றிய நாடாளுமன்றம் - மாநில நிர்வாகம், மாநில சட்டமன்றம் – உள்ளாட்சி அமைப்புகள், பஞ்சாயத்து ராஜ்.
(iv) கூட்டாட்சியின் அடிப்படைத் தன்மைகள்: மத்திய - மாநில உறவுகள்.
(v) தேர்தல் - இந்திய நீதி அமைப்புகள் - சட்டத்தின் ஆட்சி.
(vi) பொதுவாழ்வில் ஊழல் – ஊழல் தடுப்பு நடவடிக்கைகள்- லோக்பால் மற்றும் லோக் ஆயுக்தா - தகவல் உரிமை - பெண்களுக்கு அதிகாரமளித்தல் - நுகர்வோர் பாதுகாப்பு அமைப்புகள் - மனித உரிமைகள் சாசனம்.

அலகு-VI: இந்தியப் பொருளாதாரம்

(i) இந்தியப் பொருளாதாரத்தின் இயல்புகள் - ஐந்தாண்டு திட்ட மாதிரிகள் - ஒரு மதிப்பீடு - திட்டக்குழு மற்றும் நிதி ஆயோக்.
(ii) வருவாய் ஆதாரங்கள் - இந்திய ரிசர்வ் வங்கி - நிதி கொள்கை மற்றும் பணவியல் கொள்கை - நிதி ஆணையம் – மத்திய மாநில அரசுகளுக்கிடையேயான நிதிப் பகிர்வு - சரக்கு மற்றும் சேவை வரி.
(iii) இந்திய பொருளாதார அமைப்பு மற்றும் வேலைவாய்ப்பு உருவாக்கம், நிலச் சீர்திருத்தங்கள் மற்றும் வேளாண்மை - வேளாண்மையில் அறிவியல் தொழில்நுட்பத்தின் பயன்பாடு – தொழில் வளர்ச்சி – ஊரக நலன்சார் திட்டங்கள் – சமூகப் பிரச்சினைகள் - மக்கள் தொகை, கல்வி, நலவாழ்வு, வேலைவாய்ப்பு, வறுமை.

அலகு–VII: இந்திய தேசிய இயக்கம்

(i) தேசிய மறுமலர்ச்சி - ஆங்கிலேயர் ஆட்சிக்கு எதிரான தொடக்க கால எழுச்சிகள் – இந்திய தேசிய காங்கிரஸ் – தலைவர்கள் உருவாதல் – பி.ஆர்.அம்பேத்கர், பகத்சிங், பாரதியார், வ.உ.சிதம்பரனார், ஜவகர்லால் நேரு, காமராசர், மகாத்மா காந்தி, மௌலானா அபுல் கலாம் ஆசாத், தந்தை பெரியார், இராஜாஜி, சுபாஷ் சந்திர போஸ், ரவீந்திரநாத் தாகூர் மற்றும் பலர்.
(ii) விடுதலைப் போராட்டத்தின் பல்வேறு நிலைகள்: அகிம்சை முறையின் வளர்ச்சி மற்றும் புரட்சிகர இயக்கங்கள்.
(iii) வகுப்புவாதம் மற்றும் தேசப்பிரிவினை.

அலகு–VIII: தமிழ்நாட்டின் வரலாறு, மரபு, பண்பாடு மற்றும் சமூக – அரசியல் இயக்கங்கள்

(i) தமிழ் சமுதாய வரலாறு, அது தொடர்பான தொல்லியல் கண்டுபிடிப்புகள், சங்க காலம் முதல் இக்காலம் வரையிலான தமிழ் இலக்கிய வரலாறு.

(ii) திருக்குறள்:

அ) மதச் சார்பற்ற தனித்தன்மையுள்ள இலக்கியம்.

ஆ) அன்றாட வாழ்வியலோடு தொடர்புத் தன்மை

இ) மானுடத்தின் மீதான திருக்குறளின் தாக்கம்

ஈ) திருக்குறளும் மாறாத விழுமியங்களும் – சமத்துவம், மனிதநேயம் முதலானவை

உ) சமூக அரசியல் பொருளாதார நிகழ்வுகளில் திருக்குறளின் பொருத்தப்பாடு

ஊ) திருக்குறளில் தத்துவக் கோட்பாடுகள்

(iii) விடுதலைப் போராட்டத்தில் தமிழ்நாட்டின் பங்கு – ஆங்கிலேயருக்கு எதிரான தொடக்க கால கிளர்ச்சிகள் – விடுதலைப் போராட்டத்தில் பெண்களின் பங்கு.

(iv) பத்தொன்பது மற்றும் இருபதாம் நூற்றாண்டுகளில் தமிழ்நாட்டின் சமூக – அரசியல் இயக்கங்களின் பரிணாம வளர்ச்சி – நீதிக்கட்சி, பகுத்தறிவு வாதத்தின் வளர்ச்சி - சுயமரியாதை இயக்கம், திராவிட இயக்கம் மற்றும் இவ்வியக்கங்களுக்கான அடிப்படை கொள்கைகள், தந்தை பெரியார் மற்றும் பேரறிஞர் அண்ணாவின் பங்களிப்புகள்.

அலகு-IX: தமிழகத்தில் வளர்ச்சி நிர்வாகம்

(i) தமிழ்நாட்டின் மனிதவள மேம்பாட்டுக் குறியீடுகளும் அவற்றை தேசிய மற்றும் பிற மாநிலங்களுக்கான குறியீடுகளுடன் ஒப்பாய்வும் - தமிழகத்தின் சமூக பொருளாதார வளர்ச்சிக்கு சமூக மறுமலர்ச்சி இயக்கங்களின் பங்களிப்பு.

(ii) அரசியல் கட்சிகளும் பலதரப்பு மக்களுக்கான நலத்திட்டங்களும் – இடஒதுக்கீட்டுக் கொள்கைக்கான நியாயங்களும் சமூக வளங்களைப் பெறும் வாய்ப்புகளும் – தமிழகத்தின் பொருளாதார போக்குகள் - தமிழகத்தின் சமூக பொருளாதார வளர்ச்சியில் சமூகநலத் திட்டங்களின் தாக்கமும் பங்களிப்பும்.

(iii) சமூக நீதியும் சமூக நல்லிணக்கமும் சமூகப் பொருளாதார மேம்பாட்டின் மூலாதாரங்கள்.

(iv) தமிழகத்தின் கல்வி மற்றும் நலவாழ்வு (Health) முறைமைகள் .

(v) தமிழகப் புவியியல் கூறுகளும் பொருளாதார வளர்ச்சியில் அவற்றின் தாக்கமும்.

(vi) பல்வேறு துறைகளில் தமிழகம் நிகழ்த்தியுள்ள சாதனைகள்.

(vii) தமிழகத்தில் மின்னாளுகை.

அலகு–X: திறனறிவும் மனக்கணக்கு நுண்ணறிவும் (APTITUDE AND MENTAL ABILITY)

(i) சுருக்குதல் – விழுக்காடு – மீப்பெறு பொதுக் காரணி (HCF) – மீச்சிறு பொது மடங்கு (LCM).

(ii) விகிதம் மற்றும் விகிதாச்சாரம்.

(iii) தனி வட்டி – கூட்டு வட்டி – பரப்பு – கொள்ளளவு – காலம் மற்றும் வேலை.

(iv) தருக்கக் காரணவியல் – புதிர்கள் – பகடை – காட்சிக் காரணவியல் – எண் எழுத்துக் காரணவியல் – எண் வரிசை.

Syllabus

Forest Apprentice (Group-VI Services)

Optional Papers - II and III
(DEGREE STANDARD) (OBJECTIVE TYPE)

AGRICULTURE
(DEGREE STANDARD)

SUBJECT CODE 284

UNIT- I IMPORTANCE OF AGRICULTURE

Importance of Agriculture in Indian Economy and its sectoral relationship - Agricultural Development through five year plans in India and Tamil Nadu - Growth pattern of crops in India and Tamil Nadu in terms of area, production and productivity - Government Agricultural Policies – Agricultural development through NITI AYOG – import and export – role of NSC, FCI and PDS.

UNIT – II FUNDAMENTALS OF CROP PRODUCTION

Factors of Production - Agricultural seasons of India and Tamil Nadu - Cropping patterns in India and Tamil Nadu - package of practices of different crops - Agro-Climatic zones of India and Tamil Nadu and their features - Weather and Climate - Weather forecasting - Climate change and its impact – Minimal tillage practices – Stress mitigating technologies including microorganisms – Nanoparticles and their applications.

UNIT – III NATURAL RESOURCE MANAGEMENT

Soil - Soil structure - Factors influencing soil structure - Physical and Chemical properties - Effect of nutrient availability and plant growth - Problem soils and their management - Soil survey - its objectives and scope - Soil fertility and productivity - Dry farming - Rainfed agriculture - Conservation of soil and water - Watershed and waste land development. Land use pattern and planning - Size and distribution of holdings - types and systems of farming - Water resources development and management - Command area development - Ground water Development and Conjunctive use - Water use efficiency - Quality of irrigation water - Its effect in soil and crops - Management of poor quality water for crop growth.

UNIT - IV CROP MANAGEMENT & ALLIED AGRICULTURAL ACTIVITIES

Cropping systems and integrated farming - Recycling of agricultural waste - Organic manures, green manures, bio fertilizers - Balanced usage - integrated nutrient management - Physiological disorders in crop plants and their management- Irrigation management of different crops Mushroom cultivation, bee keeping, silkwork rearing etc., Energy in Agricultural production - Sources - Solar, wind, animal, biomass and biogas - Mechanization in agriculture - Tractors & tillers - Agricultural implements and Machineries and their usage - livestock and poultry rearing.

UNIT - V CROP IMPROVEMENT

Principles of breeding - Breeding methods in self , cross and vegetatively propogated crops - Modern tools in crop improvement – Heterosis breeding and Hybrid seed production technologies - Latest varieties of major crops in Tamil Nadu - Breeding for Climate resilience varieties – Variety release procedures -Application of bio technology in Agriculture - Tissue culture & its significance - Transgenic Plants. Plant Genetic Resources: Collection conservation and exchange-Crop varietal protection-PPV& FR authority and its role

UNIT- VI SEED SCIENCE AND TECHNOLOGY

Seeds - Importance of quality seeds in Agriculture – Nucleus, Breeder, foundation, certified and labelled seeds - Seed certification techniques and processing in Tamil Nadu - Seed testing – Seed testing laboratories-ISTA standards for seed testing- seed village concept Seed Act - Seed coating and priming technologies - Seed enhancement technologies

UNIT – VII CROP PROTECTION PRINCIPLES AND PRACTICES

Importance of pest, disease, nematodes and weed management in agriculture – categories of pests, diseases, nematodes and weeds - pest and disease surveillance and forecasting weather on pest and disease incidence - Symptoms of damages and control measures of pest, disease and nematodes of major crops in Tamil Nadu - Integrated pest, disease and nematode management in crop production - Pesticides and their use in IPM – mode of action - Pattern - plant protection equipments and their use - Plant quarantine. Storage pests, disease and nematodes and their management. Importance of biological control in pest, disease and nematode management. Weeds - Major weeds and their control.

UNIT – VIII FARM BUSINESS AND FINANCE MANAGEMENT

Farm business management - Principles of farm business management – Types and systems of farms-Classical Production Functions - Cost concepts - Management of resources - Farm Planning and budgeting - Investment analysis – Risk and uncertainties in Agriculture-Agricultural credit system in India - Multi credit delivery system - Role of nationalized banks, NABARD and Regional Rural Banks - Lead Bank Scheme - Service area approach - Scale of finance-Credit Worthiness-3 Rs,5Cs and 7Ps of credit- Crop Insurance - Kisan Credit Cards (KCC) - Agricultural Insurance Company

UNIT – IX AGRICULTURAL MARKETING AND MARKET INTELLIGENCE

Marketing - Agricultural marketing - Market structure – Marketing Efficiency - Price Spread-Market Integration-Market Risk-Speculation and hedging - Market Institutions- Warehouses and rural godowns - Agmark-Cooperatives - Commodity Boards – Agri business management – Principles of Management-Entrepreneurship Development - Forms of Business organizations - Agricultural Price Policy - CACP-MSP - FRP- Procurement Price-Policies for agricultural development - Economic liberalization - WTO and its impact on agricultural export - Importance of Agriculture in Indian economy - Land size and distribution of holdings and land use pattern in Tamil Nadu - Agriculture under Five year Plans (FYPs) - Food Security - Public Distribution Systems (PDS) - Buffer Stock

UNIT – X AGRICULTURAL EXTENSION: PRINCIPLES AND METHODS Extension methods for transfer of technology - AV aids-Communication models - Use of ICT in transfer of technology-Diffusion and adoption- Pre and post independence rural development initiatives: key features, strength and weakness of individual programmes - Programme planning and evaluation methods- Rural sociology - key features of Indian rural system-value system-social change- rural migration. Role of women in Agriculture

ANIMAL HUSBANDRY AND VETERINARY SCIENCE
(DEGREE STANDARD)

SUBJECT CODE 296

UNIT – I GENERAL

Role of livestock and their products in Indian economy and human health, current livestock programmes and policies of State and Nation – Economics of dairy, sheep, goat, poultry, pig and rabbit farming; constraints to the livestock development programs, common offences against animals – SPCA, Animal Welfare Board of India, NGOs.

UNIT – II LIVESTOCK MANAGEMENT

Common terms used in Animal Husbandry – Identification of age of animals – Livestock and poultry breeds and breed characters; housing systems, and requirements of space, ventilation, water, sanitation and waste disposal.

Management of milk, meat, egg and wool producing livestock, breeding bulls and draft animals and wild animals in captivity, farm records and their maintenance, systems and strategies for livestock improvement for enhancing productivity.

UNIT – III LIVESTOCK NUTRITION

Nutritional terms and definitions – Role of nutrition in health and production; classification and composition of feed and fodders including forest grasses; anti-nutritional factors and toxins in feeds and fodders; feeding standards and nutrient requirements of different categories of livestock / poultry and computation of rations.

Nutritional deficiency and its influence on livestock performance; feed supplements and additives; conservation and preservation of feed and fodders; economic utilization of agro by-products for feeding livestock – Utilisation of unconventional feeds – Wildlife nutrition.

Quality control of feed, feed block/baling, By-Pass Proteins and by-pass Fat, Feeding livestock during scarcity, Metabolic disorders in Livestock and Poultry, Processing of feeds and forage to improve nutritive value.

UNIT – IV LIVESTOCK BREEDING AND GENETICS

Important breeds of cattle, buffalo, sheep, goat, pig and poultry with special reference to economic characters – Important species of wild animals and their breeding in captivity. Selection of Livestock for production, reproduction and disease resistance traits. Principles of genetics and basis of population genetics, genetic parameters. Nature of DNA and RNA-their models and functions; applications of recombinant DNA technology, cloning and marker Assisted selection and Cytogenetics. Animal breeding policies and programmes in state and Nation.

UNIT – V VETERINARY ANATOMY, PHYSIOLOGY AND BIOCHEMISTRY

Gross study of bones, joints and muscles of skeleton Gross study of heart and its conduction system. Gross study of organs of digestive, respiratory urinary and reproductive systems. Digestion, metabolism and absorption of carbohydrates, proteins and fats in simple stomach animals and ruminants – mechanism of respiration. General functions of blood (blood cells, plasma & serum) coagulation, cardiac cycle, Blood circulation, Blood pressure, renal function Hormonal control of Lactogenesis. Environmental factors affecting animal production – Environmental stress on animal performance – Green Houses Gases – Role of ruminants.

UNIT – VI VETERINARY MICROBIOLOGY, VETERINARY PREVENTIVE MEDICINE

Bacteriology & Mycology: Classification - isolation, identification and culturing of bacteria and fungi -Methods of transmission of infection - Sterilization and disinfection - Antibiogram. Virology: Classification, - cultivation, replication General characteristics of various families of RNA and DNA viruses. Immune system organs, tissues and cells; infection and immunity; type and grade of immunity, serological reactions and modern diagnostic techniques – vaccine.
Epidemiology - Concept, Scope, Objectives and Uses. Monitoring and surveillance-epidemiological disciplines. Pathogenesis, clinical signs, differential diagnosis, prevention and control of common bacterial, viral, fungal, rickettsial and parasitic diseases of livestock, poultry and pet animals including wild life species- Regional, endemic, emerging and re-emerging important disease. Allergic skin tests and modern diagnostic techniques.

UNIT – VII PATHOLOGY AND PARASITOLOGY

Concept and causes of diseases in animals; general principles and procedures of necropsy; collection, preservation and dispatch of morbid materials for laboratory diagnosis, disease investigation; common pathological conditions seen in domestic, wild, zoo and laboratory animals and birds. Vetro-legal implications.
Classification of Parasites – Parasite and parasitism in animals; important morphological features, life-cycles, mode of transmission, pathogenesis, diagnosis, chemotherapy and general control measures of parasites associated with disease in animals, birds and zoo animals.

UNIT – VIII PHARMACOLOGY

Drug action – Pharmacokinetics (absorption, distribution, biotransformation and excretion), Pharmacodynamics – local and general anesthetics. Antibiotics and chemotherapy – Toxicology - Ethnoveterinary practices.

UNIT - IX VETERINARY CLINICAL MEDICINE, VETERINARY GYNAECOLOGY AND OBSTETRICS AND VETERINARY SURGERY AND RADIOLOGY

General and special clinical examination, etiology, clinical signs, pathogenesis, diagnosis, prevention and control of metabolic, deficiency diseases. Ethics and jurisprudence in domestic and wild animals.

Reproductive physiology; hormones and reproduction; Accidents of gestation, livestock fertility and infertility; artificial insemination; semen characteristics of different species of livestock and cryopreservation. Multiple ovulation and embryo transfer technology in livestock and zoo animals Reproductive disorders and their management.

General surgical principles – Pre and post-operative considerations, anesthesia, asepsis and anti-sepsis and sterilization; scope, history and development of veterinary radiology; Imaging pathology of different parts of body-surgical emergencies – Intensive care – Physiotherapy – Diathermy.

UNIT - X LIVESTOCK PRODUCTS TECHNOLOGY

Ante mortem and Post mortem inspection – Objectives of meat inspection – Abattoir practices, methods of slaughtering and dressing; Meat Inspection Laws, utilization of by products; unsound meat and its disposal; quality control of meat and eggs and their products. Milk: Proximate Composition, milk collection, cooling / chilling and transportation; physio-chemical and nutritional characters of milk and milk products; processing of raw milk and production of market milk. Condensed and dried milk, special milk and Indian Dairy Products - Packaging and storage.

Cleaning and sanitization of dairy equipments and plants; role of micro-organisms in milk and milk products; legal standards and quality assessment of milk and milk products-role of milk and milk products, meat and egg in human nutrition – Detection of adulterants in milk. Good Manufacturing Practices (GMP) in dairy and Hazard analysis in critical control point (HACCP) in dairy Processing. FSSAI laws.

BOTANY
(DEGREE STANDARD)

SUBJECT CODE 268

UNIT – I PHYCOLOGY, MYCOLOGY & LICHENOLOGY

Phycology - Fritsch's classification of Algae - pigmentation - Thallus organization - Life cycles-patterns of Algae - Evolutionary trends in the Sexulity of Algae - Economic importance - Algae as food, fodder, fertilizer and medicines - phytoplanktons and their role.

Mycology - Classification of fungi (Alexopoulos and Mims 1979) - structure, reproduction and economic importance of Phycomycetes, Ascomyates, Basidiomycetes and Deuteromyates.

Lichenology - structure, reproduction and economic importance of lichens.

UNIT- II BRYOLOGY AND PTERIDOLOGY

Byrophytes - General characteristics, structure; reproduction and alternation of generations. Pteridophytes - General characteristics - Psilopsida, Lycopsida, Sphenopsida and Pteropsida - Stelar organisation - origin of heterospory and seed habit.

UNIT –III GYMNOSPERMS AND PALEOBOTANY

A comparative account of vegetative and reproductive structure of Cycadales, Coniferales and Gnetales - Structure of wood in Gymnosperm - Economic importance of Gymnosperms – Paleobotany, Geological Time Scale - Fossilization methods - Fossil types.

UNIT- IV ANGIOSPERM MORPHOLOGY, TAXONOMY AND ECONOMIC BOTANY Root and Stem modification in relation to habitat. Infloresence: Raceme, Cyme and Special types Pollination – Types, Agents (Biotic and Abiotic) and contrivances promoting cross pollination. Taxonomy - Angiosperm Classification - Bentham and Hooker's system - International code of Botanical Nomenclature (outline). Characteristics features and Economic importance of the following families:-

1) Magnoliaceae

2) Rutaceae
3) Anacardiaceae
4) Leguminosae
5) Asteraceae
6) Apiaceae
7) Euphorbiaceae
8) Arecaceae
9) Poaceae

Economic Botany of Plants yielding wood timber, fibre, oil and medicines.

UNIT- V ANATOMY AND EMBRYOLOGY

Anatomy - Meristems and types. Permanent tissues, Simple and Complex tissues - Normal and Abnormal secondary thickening.

Embryology - Microsporogenesis, Megasporogenesis - types of embryo sacs (Mono-bi-and tetrasporic). Double fertilization and Triple fusion, Types of Endosperm - Embryo development in Dicots and Monocots. Apomixis and Polyembryony Culture techniques - anther and embryo.

UNIT –VI GENERAL MICROBIOLOGY AND PLANT PATHOLOGY

Morphology, reproduction and economic importance of Bacteria. Viruses - Bacteriophages, Cyanophages, Mycophages, their general structures and multiplication. Mycoplasma - Structure. Fermentation and Antibiotic production.

Plant Pathology - Name of the causative organism, etiology and control measures of the following plant diseases.

1) Blast of Paddy
2) Wilt of Cotton
3) Citrus Canker
4) Powdery Mildew
5) Red rot of Sugarcane
6) Little leaf of Brinjal
7) Bunch Top of Banana
8) Early and late Blights of Potato
9) Rust and Smut diseases.

UNIT – VII PHYSIOLOGY, BIOCHEMISTRY AND BIOPHYSICS

Physiology - Water relations of plants - absorption and translocation of water and minerals - mineral nutrition - Photosynthesis, Photochemical reactions and carbon fixation pathways – Respiratory metabolism: aerobic and anaerobic respiration. Enzymes: Role as biocatalysts - Nitrogen Metabolism: Nitrogen cycle - Nitrogen fixation - Nitrate reduction. Plant growth substances chemical nature and physiological functions of auxins, gibberellins, cytokinins, ethylene, abscissic acid and Brassinosteroids.

Biochemistry and Biophysics

Biopolymers - A brief account of Carbohydrates, Lipids,Proteins and Nucleic acids and their monomers. An elementary account of thermodynamics - definition of energy - structure and role of ATP.

UNIT – VIII CYTOLOGY, GENETICS AND EVOLUTION

Cytology - Organization of Prokaryotic and Eukaryotic cells. Cell organelles - structure and function. Chromosomes: morphology structure and their role. Cell division: Mitosis and Meiosis.

Genetics - Medelism - Interaction factors - linkage and crossing over, multiple, alleles, mutation, structure, replication and role of nucleic acids.

Evolution- Origin of life: Theories of evolution Darwin, Lamarck and De Vries.

UNIT –IX ECOLOGY, ENVIRONMENT AND CONSERVATION BIOLOGY

Ecology: Ecosystem concept - Plant communities: Hydrophytes, Xerophytes, Mangroves. Plant sucession primary and secondary - Climax formation.

Environment: water, air and land, Garbage disposal, Environmental Protection Agencies, Pollution monitoring and control.

Ecosystem: Components and functions – Global warming, Green house effect, Ozone Layer Depletion

Conservation Biology: Conservation and sustainable development/ Productivity of Soil, forests and natural resources.

UNIT-X HORTICULTURE AND PLANT BREEDING

Horticulture: Importance and scope of Horticulture, Classification of Horticultural Plants - Fruits, Vegetables and Ornamentals.

Garden design and types:- Rockery, Bonsai, Kitchen garden, Lawn making, Floriculture. Cultivation of Commercial Flowers – Jasmine; plant propagation methods - cutting, grafting, layering (Rose) budding, stock - scion relations in Mango,

Plant Breeding: Hybridization techniques Plant breeding methods employed in the following crops:-

1) Cotton
2) Sugarcane
3) Paddy

CHEMISTRY
(DEGREE STANDARD)

SUBJECT CODE .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 - Bravaislattice - Unit Cell - Miller Indices - Symmetry elements in crystals - Bragg's equation - Radius ratio's and packing in crystals – Determination of crystal structures by Braggs method – structure of NaCl, KCl, ZnS and spinals.
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 (DG, DH, DS and K) - Over potential and hydrogen over voltage - Arrhenius theory - Debye 'Huckel equation - Kohliraush'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 dipolemoment 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

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

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

n)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

o) 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.

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

UNIT - VIII ORGANIC CHEMISTRY

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

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

UNIT - IX

s) Nature of Bonding:- Hybridisation (Sp, Sp2 & Sp3) and Geometry of molecule - cleavage of bonds - homolytic and heterolytic fission of carbon – carbon bonds - Reaction intermediates - free radicals, carbocations and carbonions - their stability.

t) 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 fumeric acids - R-S-Notations - conformational analysis of cyclohexane - applications of ORD and CD Techniques.

UNIT - X

u) Dyes:- Classification and Properties of dyes – methyl orange, cangored, malachite green, fluorenscein and indigo.

v) Carbon hydrates:- Classification and reactions - Glucose, Fructose, Sucrose and lactose - structure of glucose and fructose.

w) Aromatic Substitution:- Mechanism of nitration, Halogenation, sulphoration and Friedel Crafts reaction - Orientation effects - nucleophilic substitution - Benzyne mechanism.

COMPUTER APPLICATIONS
(DEGREE STANDARD)

SUBJECT CODE 288

UNIT – I BASIC MATHEMATICS

Prepositional logic sets, relations, functions, partial orders, matrix, algebra, integration, differentiation.

UNIT – II DIGITAL COMPUTER FUNDAMENTALS

Number systems - Decimal, Binary, Octal, Hexadecimal - Conversion from one to another - Characters and codes - ASCII code, Excess-3 code, gray code - Binary addition, subtraction, multiplication and division - Unsigned binary numbers - Signed magnitude numbers - Complements in number systems - Truth tables, AND, OR, NOT, NOR & NAND gates, EX-OR gates - Parity generators and checkers.

Boolean Algebra and Digital Circuits : Boolean laws and theorems - De Morgan's theorems - Duality theorem - Simplification of sum of 2 product and product of sum expressions - Karnaugh map and simplifications - Simple arithmetic circuits - Half and Full adders - Binary adder/subtracter - BCD adder - Data processing circuits - Multiplexers - Demultiplexers - Encoders and Decoders.

Operating Systems: Types - Scheduling algorithms, Memory Management - Requirements - Partitioning - Paging - Segmentation - Virtual memory

UNIT - III PROGRAMMING IN C AND C++

Data Types - Variables - Operators - Control structures - Looping structures - Arrays - Strings - Built-in-functions. Function - Scope of Variables - Advanced features of functions. Pointer - Pointers to Array - Pointer Array - Pointer Arithmetic - Pointer of Pointer - Functions and Pointers -Structures and Pointers - Dynamic Allocation - Function pointer.

C++ Objects - Classes - Inheritance-reusability - Creating new data types - Polymorphism and overloading.

UNIT – IV MANAGEMENT INFORMATION SYSTEMS

Fundamentals of Information System – Overview of Information of System Solving Business Problems with Information Systems : System Approach to Problem Solving – Developing Information System Solution – Information Systems for Strategic Advantages – Fundamentals of Strategic Advantage - Strategic Applications and Issues in IT; Managing IT : Enterprise and Global Management.

Business applications of Information Technology: The Internet and Electronic Commerce – Fundamentals of Electronic Commerce – Information System for Business Operations: Business Information System – Transaction – processing Systems. Information systems for Managerial Decision Support : Decision Support Systems – Artificial Intelligence technology in Business – Managing IT – Planning for Business change with IT – Implementing business change with IT – Security & Control Issues in I/S – Ethical and societal challenges of Information Technology.

UNIT – V COMPUTER NETWORKS

Introduction to Computer Networks and Data Communication: Need for computer networks - evolution - Data Communication - Data Transmission - Transmission media - Classification of

Networks - Switching and Routing - Routing - Multiplexing and Concentration Concentrator - Terminal Handling - Components of a Computer Network. Network Standards and OSI - Need for network standard - OSI reference model - Physical layer - Data link layer - Network layer - Transport layer - Session layer - Application layer.

UNIT – VI FUNDAMENTALS OF DATABASES

Early Information Systems - Problems with Early Information Systems - Organization of Data Base - Components of Data Base Management System-Data Models - Entity - Relationship Model - Network Data Model, Hierarchical Data Model - Semantic Data Modelling. File Organization - Sequential file organization - The indexed sequential file organization -Creation and manipulating of indexed sequential file - Hashing - Key-to-address transformation. Relational Data Model: Introduction - Basic definition and terminology - Relational algebra.

UNIT – VII OFFICE AUTOMATION

Features of MS – Windows, Control Panel, Taskbar, Desktop, Windows Application, Icons, Windows Accessories, Notepad, Paintbrush.

Editors and Word Processors: Basic Concepts, Examples: MS-Word, Introduction to desktop publishing.

Spreadsheets and Database packages : Purpose, usage, command, MS-Excel, Creation of files in MS-Access, Switching between application, MS-Power Point.

UNIT – VII MULTIMEDIA AND APPLICATIONS

Uses of Multimedia – Introduction to making multimedia – Multimedia skills. Multimedia hardware and software – Connections – Memory and storage devices – Input devices – Output devices – Communication devices. Basic software tools – Text editing and word processing tools – Painting and drawing tools – 3-D modelling and animation tools – Image editing tools – Animation, video and digital movie tools. Making instant multimedia – Multimedia authoring tools. Multimedia Building Blocks – Text – Sound – Multimedia System Sounds – MIDI versus Digital Audio – Digital Audio – Making MIDI Audio – Audio File Formats – Production tips - Images – Animation - Video.

UNIT – IX WEB TECHNOLOGIES

The world wide web: Browsing the Web - Web address - Web browser basics - Strong and managing (book marks) - Surfing the web with web browser - Searching the web directory - Search engines - Navigation tools.

Email: Sending - Reading - Replying - Deleting - Exiting - Sending Mail to more than one person sending folder - Forwarding a mail - Checking the spelling - Attachments.

HTML: Overview of HTML - Adding structure to a page formatting text and pages - Linking page to the world - Including picture - Clearing lists - Arranging items within tables - Getting feedback from form - Splitting a page into frames.

UNIT – X ORGANIZATIONAL BEHAVIOR

Organizational Behaviour models, Foundation of individual Behaviour, Concept of Attitude, Concept of value, concept of JOB Satisfaction learning theories, Foundation of GROUP BEHAVIOUR – reasons for GROUP formation by people, Leadership concept.

COMPUTER SCIENCE
(DEGREE STANDARD)

SUBJECT CODE 286

UNIT – I MATHEMATICAL FOUNDATIONS

Prepositional logic sets, relations, functions, partial orders and lattices, regular and context free languages, finite state machines and pushdown automata.

UNIT – II COMPUTER ORGANIZATION

Function organization, machine instructions, addressing modes, introduction to microprocessors, study of 8085/8086 communication between processor and I/O via DMA and interrupt priority, I/O processors, problems associated with bus scheduling. Micro computer memory, virtual memory, basic concepts, problems of virtual memory, page replacements algorithms, cache memory, associative memory.
Fundamentals of parallel processing and its necessity pipelined processors and multiprocessors.

UNIT – III DATA STRUCTURES IN C

Data types, control statements, procedures, Scope rules, arrays and records, enumerated data types, sets, pointers, recursion. Sequential, indexed files, sorting and merging report generations. Arrays, queues, linked lists, stacks, tree traversal, evaluation of expressions using postfix notation, sorting algorithms, bubble sort, quick sort, heap sort, complexity of algorithms.

UNIT – IV SYSTEMS SOFTWARE

Editors, loaders, linkers, assemblers, phases of a compiler and their function, lexical analysers and parsers, parsing techniques, symbol table, code generation.
Batch, Multi-programming and time sharing systems, processor memory, device and file management, virtual memory, process scheduling, inter process communication, I/O redirection, process synchronization and concurrency, deadlocks, prevention, avoidance, detection and recovery, auxiliary storage management, file system functions and its hierarchy.

UNIT – V DATABASE SYSTEMS

File organisation techniques: indexing, relational and network data models, study of ORACLE as a relational DBMS. Data dictionary, normal forms and query languages.

UNIT – VI COMPUTER NETWORKS

Data communication concepts, concepts of LAN, evolution of LAN, OSI - 7 layer reference model and design issues. Physical layer-transmission media, packet and circuit switching, topologies, Data link layer, token passing, sliding window protocols, protocols specification and verification, network layer, routing, congestion control, transport layer, session and presentation layers, design issues, application layer, file transfer, electronic mail.

UNIT – VII SOFTWARE ENGINEERING

Systems analysis, detailed analysis, feasibility study, tools for system designer, input and output design, program definition, module design and design review, structured programming and conversion, testing, training and documentation, systems life cycle, role of System Analyst. Tools for office Automation, word processing Spreadsheets, Financial and Statistical packages, payroll, inventory, picture generation and display in computers, Multimedia systems, Application of computers in Government, Defence, Agriculture, Medicine and Education.

UNIT – VIII COMPUTER GRAPHICS

Introduction – Point plotting techniques – Line drawing displays – Two dimensional displays – Clipping and Windowing. Graphics package – Segmented display files – Display file compilation – Geometric models – Picture structure. Graphical input units – graphical input techniques – Event handling – Input functions. Raster graphics fundamentals – Solid area scan conversion – Interactive raster graphics – Raster graphics systems – Raster display hardware. Two dimensional and three dimensional transformations.

UNIT- IX OBJECT ORIENTED PROGRAMMING (C++ & JAVA)

C ++ and Java programming, objects and data, derived types, loops and relational expressions, branching statements and logical operators, functions, objects and classes, operator overloading, conversion of functions, dynamic memory and classes, class inheritence, input/ output and files, benefits of OOP, object oriented system development tools.

UNIT- X WEB TECHNOLOGIES

The world wide web: Browsing the Web - Web address - Web browser basics - Strong and managing(book marks) - Surfing the web with web browser - Searching the web directory - Search engines - Navigation tools.
Email: Sending - Reading - Replying - Deleting - Exiting - Sending Mail to more than one person sending folder - Forwarding a mail - Checking the spelling - Attachments.
HTML: Overview of HTML - Adding structure to a page formatting text and pages - Linking page to the world - Including picture - Clearing lists - Arranging items within tables - Getting feedback from form - Splitting a page into frames.

ENGINEERING
(DEGREE STANDARD)

SUBJECT CODE 230

UNIT- I MATHEMATICS

Matrices: Eigenvalues - Eigenvectors – Cayley–Hamilton theorem –Similar and Orthogonal transformations – Reduction of a quadratic form to Canonical form by orthogonal transformation.

Ordinary differential equations: Order and degree – Types of Equations –Higher order linear ODE with constant coefficients - Method of variation of parameters – Cauchy's and Legendre's linear equations – Simultaneous first order linear equations with constant coefficient.

Functions of several variables : Partial derivatives – Total derivatives – Euler's theorem – Implicit functions–Jacobians– Taylor's theorem – Maxima and Minima.

Integration: Techniques of integration using integration by parts and Bernoulli's formula – Line, Surface and Volume Integrals – Change of order of integration.

Vector Calculus: Vectors and scalars – Directional derivatives – Gradient, Divergence and Curl of vectors – Applications of Green's theorem, Gauss divergence theorem and Stoke's theorem.

Complex variables: Verification of Analyticity – Construction of Analytic functions – Conformal Mappings – Bilinear transformations.

Complex Integration: Cauchy's integral theorem – Cauchy's fundamental theorem – Cauchy's residue theorem – Taylor's theorem – Laurent's series–Contour integration (excluding poles on the real axis)

Laplace transform: Existence of Laplace transform – Laplace transform of elementary functions– Properties – Laplace transform of Periodic functions – Inverse Laplace transform – Convolution theorem – Solution of linear second order ODE by Laplace transform technique.

UNIT - II ENGINEERING PHYSICS

Newton's laws of motion – gravitation – work, energy and power - elasticity – moduli of elasticity and their determination-sound intensity level – reverberation – ultrasonics: production and detection - thermal conductivity and expansion - flow of heat- thermodynamics - heat engines – optical interference, anti-reflection coatings - diffraction and polarization – lasers and types - optical fibres and applications - photoelectric effect - atom models - dual nature of matter and radiation - nuclear models - radioactivity - nuclear fission and fusion - crystal structures - unit cells - packing factor – imperfections – superconductivity - magnetic and dielectric materials – semiconducting materials - nano materials.

UNIT- III ENGINEERING CHEMISTRY

Fuel –Classification of fuels - Calorific value – Solid fuel – Liquid fuel – Gaseous fuel – Octane number – Cetane Number – Fuel Cells. Lubricants – Classification – Greases – Solid Lubricants. Water – Sources – Classifications – Softening process – Desalination – RO Method – Internal treatment – Treatment of Water for Municipal purposes. Plastics – High polymer – classification – Polymerization techniques – Thermoplastics – Thermosetting resins – examples. Rubber – Types of Rubber – Vulcanisation – Properties – Unvulcanised and Vulcanised. Natural Rubber – Synthetic Rubber – examples. Refractories – Classification – Manufacture of Refractories – Magnesite – Silica – Zirconia – Chromite. Abrasives – Natural – Artificial–Abrasive paper & cloth. Corrosion: Dry and Wet corrosion – Factors affecting corrosion- Different types of corrosion. Productive coating – Hot dipping-metal cladding, electrodeposition – Organic Coatings – Paints – Varnishes. Cement and lime- setting and hardening. Explosives- classifications- characteristics-requirements for good explosives- nitrocellulose- TNT- TNB-DNB-PETN-RDX. Alloys- purpose of making alloy- types of alloys- Ferrous alloys. Electrochemistry – conductors and non conductors – Kohlrausch law – Electrochemical cell-reversible and irreversible cells – EMF- Concentration cell- polarization – over voltage, decomposition potential.

UNIT – IV ENGLISH

Grammar: Articles – Prepositions – Tenses (simple present, present continuous, simple past, past continuous, future, & perfect tenses) – Modal verbs – Clauses – Conditional clauses – Subject-Verb agreement – conjunctions – Active & passive voice – Reported speech (Direct to Indirect speech) – Error correction – Combining sentences using connectives – Cause & effect expressions (because, so, due to, on account of, etc.) – Framing questions (converting statements into questions)

Vocabulary: Synonyms & antonyms – Prefixes, suffixes & intensifying prefixes (e.g. Flammable – inflammable) – Phrasal verbs – Idioms – Fixed expressions (e.g. adhere to, lodge a complaint to, etc.) – One word substitution – Collocation – Expansion of compound nouns (e.g. keyboard)

Reading: Reading comprehension passage – Data interpretation (e.g. comprehension questions based on table /chart) – Choosing appropriate title for a given short passage – Inferential questions based on a short reading passage – Reading comprehension questions making use of scanning & skimming strategies – Jumbled Sentences.

Writing: Definitions (instrument & technical terms) – Visual interpretation (picture/photo/chart etc.) – process description – Letter writing (formal / official) – email communication (email etiquette) – essays.

UNIT – V BASICS OF COMPUTER ENGINEERING

Computer Organization - CPU and Microprocessor [ALU, Control Unit and Bus Structure] – Data Storage [Primary, Secondary and Virtual] – Input and Output Devices Systems Software – Assembler – Compiler – Loader – Linker – Operating Systems Programming Languages – Classification of Programming Language, High-Level Languages

Basic Computer Networking – Network Components [Routers, Bridges, Gateways] – ISO-OSI Reference Model – LAN – WAN – Client-Server Architecture – Internet Applications – Office Tools – Word-processor – Spreadsheet – Powerpoint – Database– E-mail – Browser

IT Enabled Services – E-Government – E-Commerce – Multimedia

UNIT - VI BASICS OF CIVIL AND MECHANICAL ENGINEERING

Introduction to Engineering mechanics – Units and Dimensions – Laws of Mechanics – Coplanar Forces – Static Equilibrium of Rigid body – Moment of a force – free body diagram – friction – laws of friction – sliding friction – wedge friction – Rolling resistance– Lader friction - Friction in screws – Screw jack – Belt friction – Properties of surfaces and solids – Centroids and centre of mass – line and areas – Rectangular, circular, triangular areas by integration – T-section, I- Section, Angle section, Hollow section – Area moment of inertia of plane areas – Parallel axis theorem – Centroid of the simple solids – Dynamics of particle – Displacement, velocity and acceleration – Different types of motion – Rectilinear , Curvilinear and Projectile motions – Newton's II-law of motion – Work Energy equation – Impulse and momentum principles.

UNIT - VII BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

Ohm's law- Kirchoff's laws - Introduction to DC and AC circuits –Power and powerfactor-single phase and three phase circuits

Operating principles of moving coil and moving iron instruments (voltmeters and ammeters)- wattmeters and energy meters

Construction and principle of operation: DC motors- DC generators-Transformers-Induction motors

Characteristics of PN junction diode-zener diode- half wave and full wave rectifiers-Bipolar junction transistor (CC,CE,CB configurations)-Amplifiers-Operational amplifiers

Binary number system- logic gates- Boolean algebra – Half and full adders- Flip-flops – registers and counters- A/D and D/A conversion

Types of analog and digital signals- Modulation and Demodulation(amplitude and frequency)

Communication systems: Radio- TV- Fax- Microwave-Satellite and optical fibre

UNIT - VIII PRINCIPLES OF MANAGEMENT

Management- Definition, Evolution- Taylor, Fayol, Elton Mayo, Peter Drucker
Planning- Types, Steps, Forecasting, MBO, MBE
Organising- Deparmentation- Line and staff, Delegation and Decentralization
Staffing- Manpower planning, Recruitment and selection, Training, Performance Appraisal
Directing- Leadership styles, Discipline, Communication in business
Controlling- Types, Control Techniques, Budgetary Control, Statistical Control

UNIT - IX TOTAL QUALITY MANAGEMENT

Quality - vision, mission and policy statement, dimensions of product and service quality, contributions of quality gurus-Deming, Juran, Crosby, Masaaki Imai, Feigenbaum, Ishikawa, Cost of Quality, continuous process improvement- PDCA, Quality Circle, 5S, Kaizen, Statistical Process Control (SPC), 7 QC Tools, new management tools, benchmarking, 6 sigma, Process Quality, Quality Function Deployment(QFD), POKA YOKE, Total Productive Maintenance (TPM), Business Process Reengineering(BPR), ISO 9004: 2000 - QMS, ISO-14000.

UNIT - X ENVIRONMENTAL SCIENCE AND ENGINEERING

Environment– Global perspective- awareness of environmental pollution- Classification of Pollutants- Air Pollution- Composition of Air – Major sources of air pollution. Gaseous Pollutants- effect of air pollution on weather, climate, atmospheric process, NOX, SO_2, CO, CO_2, Fly ash, Vehicular pollution- automobile emission- prevention- green houseeffect – chlorofluoro carbon- ozone layer -ozone depletion- smog- photochemical smog, acid rain. Water pollution- types of water pollution- Factors affecting surface water – sewage and domestic waste – BOD, COD. Industrial effluent- harmful effects of industrial pollutants- agricultural discharge – detergent and toxic metal – siltation. Thermal pollutants- effect of thermal pollution- radioactive pollutant – inorganic pollutants and its detrimental effects. Soil Pollution- sources of soil pollution- effect of carbon waste- noise pollution- sources of noises of pollution- types of noise pollution- prevention and control.

ENVIRONMENTAL SCIENCE
(DEGREE STANDARD)

SUBJECT CODE 298

UNIT – I SCOPE AND IMPORTANCE OF ENVIRONMENTAL SCIENCE

Definition; multidisciplinary nature of environmental science, scope and importance; global environmental problems; components of environment: biotic, abiotic. Atmosphere. Lithosphere: case study on major geological formations in Tamil Nadu; Hydrosphere case study on major river systems in Tamil Nadu.

UNIT- II ECOLOGICAL CONCEPTS

Ecosystem definition; structure and function; energy flow, food chain and food web; ecological pyramids, biogeochemical cycles (Carbon, Nitrogen and Phosphorus); Hydrological cycle; ecosystem types: ponds, ocean, river, cropland, wetland, desert, forests and grassland; ecological succession; primary, secondary and tertiary producers. Examples of plant and animal adaptations for arid (desert and semi-desert) and humid (rain forest) biomes.

UNIT – III ENVIRONMENTAL RESOURCES

Non-renewable resources - Mineral use and exploitation; fossil fuels. Renewable resources: water – surface and ground water, supply, demand, dams-benefits and problems; soil and land resources – Structure, formation, erosion, conservation of soil, agricultural practices, land use, land degradation, desertification; Fisheries – inland and marine fisheries, aquaculture, overharvesting. Forest resources – Timber, medicinal plants, fuel-wood, deforestation, forest management. Management of renewable and non-renewable resources; sustainable use.

UNIT- IV BIODIVERSITY AND CONSERVATION

Biodiversity - Definition; Introduction to genetic, species and ecosystem diversity; biogeographical classification of India: Forest types of Tamil Nadu: tropical dry evergreen, thorny scrub, wet evergreen forests, grasslands, sholas, dry and mixed deciduous forests, mangroves. Coral reefs. Agro-biodiversity, land races and genetic resources. Valuation of biodiversity; Consumptive, productive, cultural value. Threats to biodiversity: habitat loss, poaching, over-utilisation, invasive species. Endemic and threatened species of Tamil Nadu. In situ conservation: Mudumalai, Anamalai and Kalakad-Mundanthurai Tiger Reserves, Gulf of Mannar Marine Reserve, Pulicat and Pt. Calimere Wildlife Sanctuaries; sacred groves. Ex-situ conservation: Vandalur Zoological Park and Madras Crocodile Bank. Red data book, National Biodiversity Act, Wildlife Protection Act (1972), Tamil Nadu Forest Conservation Act.

UNIT- V HUMAN POPULATION AND ENVIRONMENT

Population growth and regulation: Age pyramids, Malthusian theory, global trends of population growth, variation among nations and zero population growth. Environmental health, Nutrition and health. Communicable diseases such as typhoid, cholera, tuberculosis, hepatitis, influenza, HIV- social issues. Non-communicable diseases such as heart disease, diabetes, asthma. Epidemics. Environmental risk factors. Human displacement and rehabilitation, tribal population and welfare schemes, women and child welfare; Human rights, Intellectual Property Rights.

UNIT- VI NATURAL CATASTROPHIES AND DISASTER MANAGEMENT

Causes and effects of natural catastrophies – Earthquakes, floods, cyclones, hurricanes, storms, landslides, drought, famine, tsunami; pre-disaster and post -disaster management, risk assessment, early warning systems and forecasting. Role of administrators, scientists, planners, volunteers.

UNIT- VII ENVIRONMENTAL POLLUTION

Definition of pollution and pollutants; types of pollution - Air, water, soil, noise, thermal, nuclear; causes of pollution, effects of pollution and control measures; liquid and solid waste management, nuclear holocausts. Case studies: leather industry, fly ash, thermal stations, nuclear power plants.

UNIT- VIII ENVIRONMENTAL MANAGEMENT AND LEGISLATION

Environmental Impact Assessment (EIA) : Objectives, Principles of Process, screening of projects, methodologies, checklist and documentation, prediction methodologies, public participation, limitation of EIA ; Environmental Protection Acts in India : air, water. Lake and River action programmes; coastal zone management; pollution control boards, Management plans using Geographic Information System (GIS) and Remote Sensing (RS) tools.

UNIT – IX ENVIRONMENTAL ORGANISATIONS AND AGENCIES

International Organisations: United Nations Environment Programme (UNEP), International Union for Conservation of Nature and Natural Resources (IUCN), International Panel on Climate Change (IPCC), International Panel on Oceans (IPO), Earth Summit, Convention on Biological Diversity (CBD), World Wide Fund for Nature (WWF), Man and Biosphere Programme (MAB), India: Ministry of Environment, Forests and Climate Change (MoEFCC), Ministry of Earth Sciences (MoES), NGO’s.

UNIT- X GLOBAL CLIMATE CHANGE

Introduction to climate change, past climatic fluctuations. Current climate and weather – Wind, monsoon, cyclones. Global ocean circulation. Global warming and greenhouses gases – Carbon dioxide, methane, nitrous oxide, ozone. Sources of green house gases – Fossil fuel use, vehicle emissions, industry; agricultural practices, deforestation. Role of UNFCC (United Nation Framework Convention on Climate Change) in monitoring green house gas emissions. International treaties: Kyoto protocol, Paris agreement. Acid rain, source, impacts and management. Ozone layer depletion: causes, impacts and remediation.

FORESTRY
(DEGREE STANDARD)

SUBJECT CODE 283

UNIT- I SILVICULTURE

Forests - definition. Extent of forests in India and other countries. Forest types of India and Tamil Nadu - revised classification - pure and mixed stands - even and uneven aged stands. Role of forests. Factors of locality - climatic - edaphic - topographic - biotic - interaction of forest with the environment. Silviculture - objectives - scope - general principles. Regeneration - natural and artificial. Nursery techniques - containerised seedling production - techniques and methods. Vegetative and clonal propagation techniques and methods - macro and micro propagation techniques. Plantation forestry - reforestation and afforestation - maintenance of plantations - enrichment planting. Tending operations - weeding, cleaning, thinning, pruning, after care techniques; cultural operations - soil working. Silvicultural systems - clear felling, shelter wood, selection and coppice systems - improvement felling. Silviculture techniques for some important species - Tropical Species - Acacia spp (indigenous and exotics), Albizia lebbeck, Albizia falcataria, Ailanthus excelsa, Azadirachta indica, Bambusa bambos, B. balcooa, B. vulgaris, Casuarina equisetifolia, C.junghuhniana, Ceiba pentandra, Dalbergia latifolia, D. sissoo, Dendrocalamus strictus, Eucalyptus spp (E. tereticornis, E.camaldulensis, E. grandis, E. globulus), Grevillea robusta, Hardwickia binata, Leucaena leucocephala, Melia dubia, Pongamia pinnata, Populus deltoides, Prosopis juliflora, Pterocarpus santalinus, Santalum album, Syzygium cuminii, Shorea robusta, Tectona grandis, Terminalia spp.(T.chebula, T.bellerica, T.paniculata, T.tomentosa), Tamarindus indica. Temperate Species - Alnus nepalensis, Cedrus deodara, Pinus roxburghii, P. wallichiana, P. patula.

UNIT – II FOREST MENSURATION AND MANAGEMENT

Forest Mensuration - Definition and objectives. Measurement of diameter, girth, height, crown and volume of trees - methods and principles - tree stem form - form factor. Volume estimation of stand - age - basal area determinations Stem and Stump Analysis. Forest inventory - sampling techniques and methods - measurement of crops - sample plots. Yield calculation - CAI and MAI - volume, yield and stand tables preparation. Forest management - objectives and principles. Forest organisation. Sustainable Forest Management (SFM) - criteria and indicators of SFM - sustained yield - concept and management - arguments for and against sustained yield - Forest Certification - Standards, Procedures and agencies. Rotation - normal forest - increment - growth stock determination. Yield regulation - principles and concepts - Von Montel's formula and its modifications - yield regulation in regular and irregular forests. Working plan - objectives and scope - constitution of working plan division. Enumeration and sampling. Regeneration survey - Plantation journal - divisional working plans - annual plan of operations. Joint forest management. Aerial photography and remote sensing - methods and techniques - GIS for forest management and modelling.

UNIT- III FOREST UTILISATION AND WOOD TECHNOLOGY

Logging - extraction of timber - felling rules and methods - conversion methods - conversion season. Implements used - cross cutting system - sawing - different types - extraction methods. Grading of timbers. Transportation of timbers - major and minor transportation methods Storage and sales of logs - sales depot - management of depots. Recent trends in logging - Ergonomics and RIL. Forest products - Timber - timber, fuel, pulp, paper, rayon and match. Wood Composites - plywood, particle board, fiber boards, MDF, hardboard, insulation boards - production technology. Non timber forest products (NTFP) - collection - processing and storage of NTFP - fibres and flosses - bamboos and canes - katha and bidi leaves - essential oils and oil seeds - gums and resins - tans and dyes - drugs - insecticides - lac and shellac - tassar silk - role of tribal co-operative societies. Wood Science - Macroscopic character of wood - three dimensional structures - structure of heartwood and sapwood - hard wood and soft wood. Composition and structure of wood - chemical components and cell wall structure and formation. Anatomical structures of heartwood and softwood - reaction wood - wood and water relations. Properties of wood - physical properties - specific gravity, density of wood - mechanical properties - gross features of wood. Defects in wood - natural defects. Seasoning of wood - principles and objectives of seasoning - seasoning methods - air and kiln seasoning - seasoning defects. Wood preservation - principles and methods - wood preservatives - definition - kinds of preservatives - method of preservative application - pressure and non-pressure processes - classification of wood based on seasoning behaviour.

UNIT- IV FOREST SURVEYING AND ENGINEERING

Surveying - principles of surveying - errors in surveying - scope of surveying in forestry. Scales - linear measurement. Different methods of surveying - chain, prismatic, compass, plain table and topographic survey. Area calculation - instruments and principles - maps and map reading. Principles of forest engineering - levelling instruments - building materials and construction. Forest roads - objectives - principles and types of forest roads. Causeways and culverts. Bridges - construction of bridges - construction of timber, RCC, steel and suspension bridges - cable roadways and winches.

UNIT - V FOREST SOILS AND SOIL CONSERVATION AND WATERSHED MANAGEMENT

Forest soils - Classification - Factors affecting soil formation - podzolisation and laterization. Physical, chemical and biological properties of forest soils. Problem soils - classification of waste lands - extent of waste lands in India - reclamation of alkaline, saline, water logged and other waste lands - sand dune stabilisation - wind breaks and shelter belts. Soil conservation - definition - objectives - problems - programmes and achievements. Erosion - types and causes - wind, water - management of eroded region. Role of micro organisms in soil amelioration - Use of bio-inoculants Azospirillum, Azotobacter, Phosphobacteria, Rhizobium, VAM, Frankia, and Vermicompost. Soil and water conservation measures. Watershed management - concept and methods - forest treatments - stream flow - water harvesting and conservation - ground water recharge - impact on water yield and quality.

UNIT- VI FOREST ECONOMICS, POLICIES AND LEGISLATIONS

Fundamental principles of forest economics - cost benefit analysis - NPV, IRR analysis - demand and supply estimation. Socio-economic analysis of forest productivity - attitudes and analysis of trends in national and international markets - assessment of market structure. Forest valuation - direct and indirect valuation -stumpage valuing, price size gradients - devastation value - risk management. Project formulation - project monitoring - evaluation - elements of time series analysis and forecasting - role of corporate financing. Forest policies - Necessity - Formulation of National Forest Policy. History of forest development in India - Indian Forest Policy of 1894, 1952 and 1988. NCA report on forestry - role of ICAR and ICFRE in forest research and education. National Mission on Wasteland Development. Forest Organizations and Institutes - National - FRI, IGNFA, FSI, WII, IIFM, IWST, IFGTB, SACON etc. - International - ICRAF, ITTO. Forest laws - necessity - general principles - Indian Forest Act 1927, Forest Conservation Act 1980, Wildlife Protection Act, 1972, Tamil Nadu Forest Act, 1882, Tamil Nadu Timber Transit Rules, 1968, Tamil Nadu Hill Act, 1985 - application of IPC to forests. Recent Policies and Acts - Tribal Bill, 2007, Biodiversity Bill, 2002, National Agroforestry Policy 2014. ITTO, GATT and its relevance to timber export - Rio summit and Kyoto Protocol and its relevance to timber export.

UNIT- VII FOREST BIOLOGY AND BOTANY

Forest ecology - definition - biotic and abiotic components - forest ecosystem - forest community - concepts - succession - primary productivity - nutrient cycling. Composition of forest types in India - classification of India's forests - species composition - association and diversity. Restoration ecology - global warming - green house effects - ozone layer depletion - acid rain - role of trees in environmental conservation. Biodiversity - Definition, origin, types - factors endangering biodiversity - biodiversity hotspots - endemism - Red Data Book. Biodiversity assessments - principles and methods. Forms of trees - structure and function - physiology and reproduction of trees - water relation - physiology in stress environments (drought, water logging, alkalinity and salinity). Seed and its importance. Characters of good quality seeds. Seed dormancy - types and causes - dormancy breaking. Seed collection- physiological maturity - Seed extraction - seed processing. Seed grading and upgrading of seed lots. Seed treatments - principles and methods - seed pelleting. Seed sampling - procedure. Seed testing - purity analysis - moisture estimation - seed germination test - quick viability test. Seed storage - orthodox and recalcitrant seeds - causes of deterioration - seed storage containers. Seed certification procedure - Seed Act and Rules - Quality control and legislation. Forest Botany - Importance of botany - taxonomic classification of plant species - identification of species - composition and association. Dendrology - principles and establishment of herbaria and arboreta. Tree Improvement - Forest Genetics and Tree Breeding - Definition and concepts - Steps in tree improvement - Variation and selection - Progeny Evaluation Test (PET) - Candidate Tree, Plus Tree, Elite trees - use of provenances and seed sources - heritability and genetic gains - hybrids in tree improvement - heterosis exploitation. Seed production Area and seed orchards - types and establishment. *In situ* and *ex situ* gene conservation. Exotics - role of exotic forest trees in India - application of biotechnological methods in forestry.

UNIT – VIII WILDLIFE BIOLOGY AND MANAGEMENT

Wildlife and wild animals - food chain - prey and predator relationship. Introduction to wildlife management. Ecology and biology of wildlife - principles and techniques of management - Man and Biosphere (MAB) programme - wildlife habitats. Census - methods and application - land tenure system. Major wildlife species in India and their broad study. Wildlife conservation - policies and legal measures - sanctuaries - national parks - biosphere reserves. Ornithology - bird habitats - bird species of India - avian extinction - causes and management. Role of NGOs and others in avian fauna conservation - beneficial and harmful roles of birds. Herpatology - definition and uses. Man and animal interaction - Impact and management. Ecotourism and Recreation Forestry. Management of captive wildlife - captive breeding - diseases of wildlife and their management.

UNIT- IX FOREST PROTECTION

Role of forest protection in Indian forestry. Injuries caused by various agencies - by human beings, plants, animals, insects, birds, adverse climatic factors. Forest fire - beneficial and adverse causes - fire protection methods and rehabitation. Pests and diseases of economic trees - control measures for pests and diseases for major tree species - biological, chemical and integrated pest and disease management methods. Termites - types and their management. Alien or invasive weeds and their management - forest encroachments and grazing.

UNIT – X AGROFORESTRY AND SOCIAL FORESTRY

Agroforestry - definition, concept and objectives. Classification of agroforestry systems - primary systems and subsystems - inheritance effects. Tree-crop interactions - above and below ground - competition for space, water, light and nutrients. Microclimatic modifications - nutrient cycling and soil fertility improvement - Allelopathy and allelochemicals. - Ecological aspects of agroforestry - benefits and limitations of agroforestry. Agroforestry practices for different agro-climatic zones of Tamil Nadu. Agroforestry practices for wasteland reclamation. Social forestry - objectives and scope and necessity - its components and implementation in local and national levels - social attitudes and community participation. JFM - principles, objectives and methodology - choice of species for agro forestry and social forestry. Urban Forestry - definition and scope - benefits - choice of tree species - planting techiques and management.

GEOLOGY
(DEGREE STANDARD)

SUBJECT CODE 239

UNIT - I GENERAL GEOLOGY

Origin, Interior and Age of the Earth - Weathering - Types and products - Geological work of Wind, River, Sea and Groundwater - Volcanoes - Earthquakes - causes and effects - Seismic zonation - Richter Scale - Principles of Plate Tectonics – fundamental and geomorphology.

UNIT - II STRATIGRAPHY

Principles of Stratigraphy - Correlation - Geological Time Scale - General characteristics, descriptive and economic importance of Archean, Cuddapah, Vindhyan and Gondwana systems of Peninsular India -Cretaceous system of Tamil Nadu.

UNIT - III STRUCTURAL GEOLOGY

Folds - Faults - Joints - Unconformities - Recognition of overturned beds –Stress and strain relationship – Attitude of beds – Measurement of dip, apparent dip, strike using Cino and Brunton Compass .

UNIT - IV PALAEONTOLOGY

Fossils – Definitions, Conditions, mode of preservation, uses of Fossils – General morphology and classification of Graptolites, Mollusca, Coelenterata, Brachiopod, Trilobita, Echinoids and Foraminifera.

UNIT - V CRYSTALLOGRAPHY

Definition of crystals – Inter facial angles – Goniometer -Symmetry Elements - Study of Normal Classes of Isometric, Tetragonal, Hexagonal, Orthorhombic, Monoclinic and Triclinic systems - Twin crystals.

UNIT- VI MINERALOGY

Physical properties of minerals - Petrologcal Microscope and its parts, accessory plates and uses – optical properties - Isotropic and Anisotropic Minerals - Descriptive study of quartz and its varieties - Feldspar Group - Pyroxene Group - Amphibole Group - Mica Group - Garnet Group - Descriptive study of Calcite, Dolomite, Tourmaline, Topaz, Staurolite, Chlorite and Zircon.

UNIT - VII IGNEOUS PETROLOGY

Definition of magma - Composition and constitution of magma - Forms and structures of Igneous Rocks, Textures and Micro structures - classification of Igneous rocks - Bowen's Reaction principle - Descriptive Study of Granite - Syenite - Diorite - Gabbro – Dolerite - Ultramafics (Dunite,Peridotite, Pyroxenite and Anorthosite) - Differentiation - Assimilation.

UNIT - VIII SEDIMENTARY AND METAMORPHIC PETROLOGY

Classification - Texture and structures of sedimentary rocks - Descriptive study of Residual, Clastic, Chemical and organic deposits - Metamorphism - Agents and kinds of metamorphism - classification of metamorphic rocks - Textures and structure - Different facies - Marble – Schist and Gneiss - Amphibolite - Granulite (Charnockite).

UNIT- IX ECONOMIC GEOLOGY

Definition of Ore - Tenor - Gangue - Lindgren and Bateman's classification of ore deposits - Ore forming processes - Magmatic concentration – Hydrothermal Process Oxidation and Supergene Enrichment – Evaporation - Sedimentation – Placer deposits. Important ores, their composition, physical properties, mode of occurrence, distribution in India and uses of Gold, Iron, Aluminium, Manganese, Copper, Magnesium and Led and Zinc - Lignite, Coal and Petroleum - their occurrence in India - Building Stones, their characters, distribution and mode of occurrence in India - Mineral Wealth of Tamil Nadu.

UNIT- X APPLIED GEOLOGY

Principles of Geological mapping - Field Techniques - Drilling methods - Borehole problems from borehole data – Geological investigation and conditions for dams, tunnels and roads - Landslides – Mining methods, role of geology - problems in mines including groundwater – Application of Remote sensing in Geology.

HORTICULTURE
(DEGREE STANDARD)

SUBJECT CODE 278

UNIT- I FUNDAMENTALS OF HORTICULTURE

Scope and importance – State, National and Global scenario of horticultural crops – Area and production – Import and export – Nutritive value of horticultural crops – Horticultural zones of Tamil Nadu and India – National and regional agencies involved in promotion of horticultural Industry in India (NHB, APEDA and Commodity Boards) – Classification of horticultural crops – Factors limiting horticultural crop production – Role of season – Soil and climate requirements - Physical and chemical properties of soil - Climatic factors – Light, temperature, photoperiod, relative humidity, rainfall, altitude, microclimate - Kitchen gardening -Nutrition gardening – Truck gardening – Market gardening - Vegetable forcing - Protected and precision horticulture – Hydroponics, Aeroponics – Nutrient Film Technique - Horticulture therapy.

UNIT – II GROWTH AND DEVELOPMENT OF HORTICULTURAL CROPS

Important phases of growth and development - Bearing habits – Classification of horticultural crops based on life cycle – Annual, biennial perennial (woody and herbaceous perennials) – Fruitfulness and unfruitfulness - External and internal factors associated with unfruitfulness – Physiology of flowering, fruit set, ripening and senescence – Fruitdrop - Causes and control measures - Plant growth regulators – Functions and role in horticultural crops - Bud dormancy – Dormancy breaking – Parthenocarpy – Parthenogenesis – Polyembryony – Stenospermocarpy – Vivipary - Apomixis.

UNIT – III PROPAGATION OF HORTICULTURAL CROPS

Propagation – Definition – Establishment of nursery – Site selection - Tools and implements propagation structures - Mist chamber, phytotron - Humidifiers – Greenhouse – Glasshouse – Polyhouse - Shade net, glass house, poly tunnels, cold frames and hotbeds, pit nursery - Media and containers – Soil sterilization - Sexual propagation – Merits and demerits – Crops propagated through seeds - Seed viability, longevity, dormancy, germination – Pre-sowing treatment – stratification, scarification, seed priming, seedling vigour – Raised seed bed and pro-tray nursery – Asexual propagation – Merits and demerits – Methods of vegetative propagation – Identification of plus trees – Mother block, scion bank – Clonal nursery – Cutting – Layering – Grafting, budding types – Anatomical and physiological basis of grafting – Stock scion relationship, graft compatibility -Budwood selection and certification – Propagation through specialized plant parts (bulbs, tubers, offsets, runners, suckers, slip, crown, rhizomes, corms) – Quality management and nursery certification – Micro propagation – Application – infrastructure requirements – Types of media – Stages of micro propagation – Micro grafting – *in vitro* propagation of important horticultural crops.

UNIT – IV MANAGEMENT TECHNIQUES FOR HORTICULTURAL CROPS

Planning – Layout and management of orchards – Fencing – Wind breaks and shelter beds – Spacing – Planting system – Physical and chemical properties – Soil reaction – acid, saline and alkaline soils – Soil fertility - Essential elements –Functions - Organic manures and inorganic fertilizers, bio-fertilizers, vermi-composting - Applications and management – Nutrient deficiencies and corrective measures - Physiological disorders and remedies - Irrigation – Critical stages of water requirement – Effect of water stress on crop yield – Anti-transpirants – management of irrigation water quality - Conventional and micro irrigation – Fertigation - Mulching – Sod culture – Weed management – Application growth regulators – Training and pruning principles and methods - Rejuvenation of senile and old orchards – Cropping systems - Cover cropping - Multitier cropping – Intercropping – Special horticultural techniques (pinching, thinning, disbudding, blanching, smudging, notching, ringing) - Principles of organic horticulture – GAP and GMP.

UNIT – V PRODUCTION TECHNOLOGY OF FRUIT CROPS

Scope and importance of fruit crops - Composition and uses - Origin and distribution – Species – Season - Climate and soil requirement – Varieties and hybrids – Propagation techniques - Planting systems and planting density -Including High density planting (HDP) and ultra high-density planting (UHDP) –spacing – Water and nutrient management – Fertigation - Weed management - Canopy management - Training and pruning – Intercultural practices - Off season production - Special horticultural techniques – Use of plant growth regulators – Maturity indices - Harvest and yield – Nutrient deficiencies and physiological disorders and its corrective measures and management of important pest and diseases of important fruit crops **:-** Mango, Banana, Acidlime, Sweet orange, Mandarin, Grapes, Papaya, Guava, Sapota, Pineapple, Jackfruit, Pomegranate, Aonla, Annona, Ber, Apple, Pear, Plum, Peach, Strawberry, Litchi, Avocado, Walnut and Almond and minor tropical, arid and temperate fruit crops.

UNIT- VI PRODUCTION TECHNOLOGY OF VEGETABLE CROPS

Scope and importance of vegetable crops - Composition and uses - Origin and distribution – Area and production - Soil and climatic requirements - Varieties and hybrids – Propagation methods - Seed rate – Sowing and nursery practises – Containerized seedling production - Season – Planting methods – Water, nutrient and weed management – Fertigation – Training for vegetables – Intercultural practices - Maturity indices – Harvest and yield – Nutrient deficiencies and physiological disorder and its corrective measures of important vegetable crops**:** Tomato, Brinjal, Chilli and Capsicum (Sweet Pepper), Bhendi, Leguminous vegetables (Beans, Peas, Cluster beans, Cowpea, Dolichos bean)**;** Bulbous vegetables (Onion, Garlic)**;** Tuber crops - (Potato, Tapioca, Sweet potato, Elephant footyam, Colacassia)**;** Cucurbitaceous vegetables (Cucumber, Bittergourd, Snakegourd, Ridgegourd, Ashgourd, Muskmelon, Watermelon, Pumpkin) - Cruciferous vegetables (Cabbage, Cauliflower and Knolkhol)**;** Root vegetables (Carrot, Radish, Beetroot, Turnip) - Leafy vegetables (Spinach, Lettuce, Palak, Amaranthus) – Perennial vegetables (Drumstick, Coccinea) – Protected cultivation of vegetable crops - Precision farming of important vegetable crops and seed production.

UNIT – VII FLORICULTURE & LANDSCAPE GARDENING

Scope and importance of flower crops production - Uses - Origin and distribution – Area and production - Climate and soil requirement - Species and varieties - Propagation, season - Spacing and planting methods - Irrigation, nutrient management – Fertigation – Weed management - Training and pruning – Intercultural operations – Special horticultural techniques – Growth regulators – Off season production - Maturity indices – Harvest and yield and management of important pest and diseases for important loose flower crops**:** Jasmine, Rose, Tuberose, Chrysanthemum, Marigold, Nerium and Crossandra - Cut flowers - Rose, Carnation, Anthurium, Orchid and Gerbera – Cutfoliage and fillers. Principles of Landscape designing – Styles of gardening - Types of gardening *viz*.,Hindu, English, Mughal, Japanese, Persian, Italian, French gardening -Garden components – Trees foliage flowering and avenue trees – Burlapping –Shrubs – Flowering annuals creepers and Climbers - Cacti and succulents -Lawn – Astroturf - Types of grasses – Layout, planting and maintenance of lawn – Hedge and edge plants - Indoor plants and interior scaping – Garden adornments - Principles and styles of flower arrangements – Bonsai styles and culture – Industrial, Institutional, Public and Private landscaping - Special types of gardening – Bog garden, dish, terrarium, bottle, roof, vertical gardening and green wall.

UNIT – VIII PRODUCTION TECHNOLOGY OF SPICES AND PLANTATION CROPS

Scope and Importance of spices and plantation crops - Composition and uses - Origin and distribution – Area and production – Climate and soil requirements - Species and varieties - Season, seed rate / propagation methods –Spacing - Planting system – High density planting – Irrigation and nutrient management – Fertigation and weed management – Training and pruning – Cropping systems – Multitier cropping – Cover cropping – Inter cropping - Growth regulators – Mulching - Shade and canopy regulation – Maturity indices, harvest, yield and management of important pest and diseases and processing methods of important plantation and spice crops**:** Major, seed, tree, herbal spices and minor spices - Black Pepper, Cardamom, Turmeric, Ginger, Curry leaf, Clove, Nutmeg, Cinnamon, Coriander, Fenugreek, Cumin, Tamarind, all spice and vanilla – Plantation crops - Tea, Coffee, Rubber, Cocoa, Coconut, Oilpalm, Cashew, Palmyrah, Arecanut.

UNIT – IX PRODUCTION TECHNOLOGY OF MEDICINAL AND AROMATIC CROPS

Scope and importance of medicinal and aromatic crops - Composition and uses - Origin and distribution – Area and production - *Ex situ* and *insitu* conservation – Classification of medicinal and aromatic crops – Constraints in medicinal plant cultivation - Climate and soil – Varieties – Propagation - Nursery practices - Planting methods - Cropping systems – Manures & fertilizers – Irrigation – Intercultural operations – Harvest indices – Harvest & yield and management of important pest and diseases - Production systems - Contract farming – GAP – GCP – GMP - Organic production and certification – Classification and distillation methods of essential oils – Secondary metabolite production - Value addition - Organisational support for promotion of medicinal and aromatic crops - Medicinal crops**:** Senna, Periwinkle, Glory lily, Aswagandha, Medicinal coleus and Solanum, Sweet flag, Aloe, Isabgol, *Phyllanthus*, *Stevia*, Opium poppy. Aromatic crops**:** Lemon grass, Citronella, Vetiver, Ocimum, Davana, Mint, Geranium, Patchouli and Eucalyptus.

UNIT – X POST- HARVEST TECHNOLOGY OF HORTICULTURAL CROPS

Importance of post-harvest handling in horticultural crops – Maturity indices – Post-harvest handling methods – Washing – Grading - Waxing – Grades and standards – Methods of packing - Types of containers and their advantages and disadvantages – Storage - Principles and methods of refrigerated and gas storage - Storage methods - Pre-cooling - Controlled atmospheric storage, Modified atmospheric storage – Low pressure storage and cold chain concept - Importance and scope of processing industry in India, general principles of fruit and vegetable preservation like canning, dehydration, freezing, fermentation - Use of chemicals(preservatives) and irradiation – GMP – Food safety and quality control.

MARINE BIOLOGY
(DEGREE STANDARD)

SUBJECT CODE 293

UNIT- I PHYSICAL OCEANOGRAPHY

Major divisions of marine environment; Physical properties of seawater - Thermal properties of seawater; properties of Waves: Types of waves and properties of ocean waves; Tides - Origin of the tides; Wind and Ocean circulation – Types of currents.

UNIT – II CHEMICAL OCEANOGRAPHY

Chemical properties of seawater : Concept of chlorinity and salinity of seawater; Solubility of gases in seawater: Non reactive gases - Minor reactive gases; Organic matter: Dissolved and Particulate organic matter - Sources and classification; Origin, distribution of nutrients cycle and their significance.

UNIT – III BIOLOGICAL OCEANOGRAPHY

Primary and Secondary Productivity of the coastal environment; Phytoplankton and Zooplankton: Classification, distribution, their role in coastal ecosystems and adaptations. Primary production and factors affecting primary production.

UNIT – IV MARINE ECOLOGY AND POLLUTION

Community ecology; Intertidal ecology - Benthic, pelagic and deep sea ecology - Food Chain and food web; Food pyramid; Animal association in the marine environment. Types of marine pollution, source and their biological effects.

UNIT – V BIODIVERSITY

Biodiversity - Genetic diversity - Species diversity - Ecosystems diversity - Biodiversity changes in time and space - Need for conservation and conservation strategies; IUCN categorization ; Biosphere reserves and National parks; Climate Change and Global warming.

UNIT – VI COASTAL VEGETATION

Coastal vegetation : Intertidal and sublittoral; seaweeds, seagrass and saltmarshes; mangroves – Distribution and adaptations; Economic importance of mangroves.

UNIT – VII MARINE MICROBIOLOGY

Marine microbial environment – Benthic & littoral zone, saltpan, mangroves and estuarine microbes, microbial loop in ocean food webs – Marine microbial community - Bacteria, Fungi, Protozoa. Marine Extremophiles.

UNIT – VIII INVERETEBRATES, PROCHORDATES AND VERTEBRATES

Principles and classification; Marine invertebrates and vertebrates - Their biology - Physiology, locomotion, nutrition and reproduction. Adaptive radiations of bony fishes and elasmobranches. Seaturtles and Mammals.

UNIT – IX CAPTURE FISHERY

Commercial marine fishery resources of India and Tamilnadu - Finfishes (Elasmobranch - Oil Sardine, Mackerel, Bombay duck), crustaceans (shrimp, lobster and crab) and molluscs.

UNIT – X MARICULTURE

Importance of Coastal aquaculture- Present status - Different culture methods; Open sea farming: Cages, pens - Raft – Raceways. Potentialities and socio-economic problems of aquaculture.

MATHEMATICS
(DEGREE STANDARD)

SUBJECT CODE 276

UNIT - I ALGEBRA AND TRIGONOMETRY

Theory of Equations: Polynomial equations; Imaginary and irrational roots; Symmetric functions of roots in terms of coefficient; Sum of rth powers of roots; Reciprocal equations; Transformations of equations.

Descrates' rule of signs: Approximate solutions of roots of polynomials by Newton - Raphson Method - Horner's method; Cardan's method of solution of a cubic polynomial.

Summation of Series: Binomial, Exponential and Logarithmic series theorems; Summation of finite series using method of differences - simple problems.

Expansions of sin x, cos x, tan x in terms of x; sin nx, cos nx, tan nx, sin nx, cos nx , tan nx, hyperbolic and inverse hyperbolic functions - simple problems.

Symmetric; Skew Symmetric; Hermitian; Skew Hermitian; Orthogonal and Unitary Matrices; Rank of a matrix; Consistency and solutions of Linear Equations; Cayley Hamilton Theorem; Eigen values; Eigen Vectors; Similar matrices; Diagonalization of a matrix.

Equivalence relations; Groups; subgroups – cyclic groups and properties of cyclic groups - simple problems; Lagrange's theorem; Prime number; Composite number;. decomposition of a composite number as a product of primes uniquely (without proof); divisors of a positive integer n; congurence modulo n; Euler function; highest power of a prime number p contained in n!; Fermat's and Wilson's theroems - simple problems.

Sums of sines and cosines of n angles which are in A.P.; Summation of trigonometric series using telescopic method, C + i S method.

UNIT - II CALCULUS, COORDINATE GEOMETRY OF 2 DIMENSIONS AND DIFFERENTIAL GEOMETRY

nth derivative; Leibnitz's theorem and its applications; Partial differentiation. Total differentials; Jacobians; Maxima and Minima of functions of 2 and 3 independent variables - necessary and sufficient conditions; Lagrange's method – simple problems on these concepts.

Methods of integration; Properties of definite integrals; Reduction formulae - Simple problems.

Conics - Parabola, ellipse, hyperbola and rectangular hyperbola - pole, polar, co-normal points, con-cyclic points, conjugate diameters, asymptotes and conjugate hyperbola.

Curvature; radius of curvature in Cartesian coordinates; polar coordinates; equation of a straight line, circle and conic; radius of curvature in polar coordinates; p-r equations; evolutes; envelopes.

Methods of finding asymptotes of rational algebraic curves with special cases. Beta and Gamma functions, properties and simple problems. Double Integrals; change of order of integration; triple integrals; applications to area, surface are volume.

UNIT - III DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS

First order but of higher degree equations – solvable for p, solvable for x, solvable for y, clairaut's form – simple problems.

Second order differential equations with constant coefficients with particular integrals for e^{ax}, x^m, $e^{ax}\sin mx$, $e^{ax}\cos mx$

Second order differential equations with variable coefficients $ax^2\frac{d^2y}{dx^2}+bx\frac{dy}{dx}+cy=q(x)$;

Method of variation of parameters; Total differential equations, simple problems.

Partial Differential equations : Formation of P.D.E by eliminating arbitrary constants and arbitrary functions; complete integral; Singular integral ; general integral; Charpit's method and standard types f(p,q)=0, f(x,p,q)=0, f(y,p,q)=0, f(z,p,q)=0, f(x,p)= f(y,q); Clairaut's form and Lagrange's equations Pp+Qq=R – simple problems.

Laplace transform; inverse Laplace transform(usual types); applications of Laplace transform to solution of first and second order linear differential equations (constant coefficients) and simultaneous linear differential equations – simple problems.

UNIT - IV VECTOR CALCULUS, FOURIER SERIES AND FOURIER TRANSFORMS

Vector Differentiation : Gradient, divergence, curl, directional derivative, unit normal to a surface.

Vector integration: line, surface and volume integrals; theorems of Gauss, Stokes and Green – simple problems.

Fourier Series: Expansions of periodic function of period 2π ; expansion of even and odd functions; half range series.

Fourier Transform: Infinite Fourier transform (Complex form, no derivation); sine and cosine transforms; simple properties of Fourier Transforms; Convolution theorem; Parseval's identity.

UNIT - V ALGEBRAIC STRUCTURES

Groups: Subgroups, cyclic groups and properties of cyclic groups – simple problems; Lagrange's Theorem; Normal subgroups; Homomorphism; Automorphism ; Cayley's Theorem, Permutation groups.

Rings: Definition and examples, Integral domain, homomorphism of rings, Ideals and quotient Rings, Prime ideal and maximum ideal; the field and quotients of an integral domain, Euclidean Rings.

Vector Spaces: Definition and examples, linear dependence and independence, dual spaces, inner product spaces.

Linear Transformations: Algebra of linear transformations, characteristic roots, matrices, canonical forms, triangular forms.

UNIT - VI REAL ANALYSIS

Sets and Functions: Sets and elements; Operations on sets; functions; real valued functions; equivalence; countability; real numbers; least upper bounds.

Sequences of Real Numbers: Definition of a sequence and subsequence; limit of a sequence; convergent sequences; divergent sequences; bounded sequences; monotone

sequences; operations on convergent sequences; operations on divergent sequences; limit superior and limit inferior; Cauchy sequences.
Series of Real Numbers: Convergence and divergence; series with non-negative numbers; alternating series; conditional convergence and absolute convergence; tests for absolute convergence; series whose terms form a non-increasing sequence; the class l^2.
Limits and metric spaces: Limit of a function on a real line; metric spaces; limits in metric spaces.
Continuous functions on Metric Spaces: Functions continuous at a point on the real line, reformulation, functions continuous on a metric space, open sets, closed sets, discontinuous functions on the real line.
Connectedness Completeness and compactness: More about open sets, connected sets, bounded sets and totally bounded sets, complete metric spaces, compact metric spaces, continuous functions on a compact metric space, continuity of inverse functions, uniform continuity.
Calculus: Sets of measure zero, definition of the Riemann integral, existence of the Riemann integral properties of Riemann integral, derivatives, Rolle's theorem, Law of mean, Fundamental theorems of calculus, Taylor's theorem.
Sequences and Series of Functions. Pointwise convergence of sequences of functions, uniform convergence of sequences of functions.

UNIT - VII COMPLEX ANALYSIS

Complex numbers: Point at infinity , Stereographic projection
Analytic functions: Functions of a complex variable , mappings, limits , theorems of limits, continuity, derivatives, differentiation formula, Cauchy-Riemann equations, sufficient conditions Cauchy-Riemann equations in polar form, analytic functions, harmonic functions.
Mappings by elementary functions: linear functions, the function 1/z, linear fractional transformations , the functions $w=z^n$, $w=e^z$, special linear fractional transformations.
Integrals: definite integrals, contours , line integrals, Cauchy-Goursat theorem, Cauchy integral formula, derivatives of analytic functions, maximum moduli of functions.
Series: convergence of sequences and series,Taylor's series, Laurent's series, zero's of analytic functions.
Residues and poles: residues, the residue theorem, the principal part of functions, poles, evaluation of improper real integrals, improper integrals, integrals involving trigonometric functions, definite integrals of trigonometric functions

UNIT - VIII DYNAMICS AND STATICS

DYNAMICS: kinematics of a particle, velocity, acceleration, relative velocity, angular velocity, Newton's laws of motion, equation of motion, rectilinear motion under constant acceleration, simple harmonic motion.
Projectiles : Time of flight, horizontal range, range in an inclined plane. Impulse and impulsive motion, collision of two smooth spheres, direct and oblique impact-simple problems.
Central forces : Central orbit as plane curve, p-r equation of a central orbit, finding law of force and speed for a given central orbit, finding the central orbit for a given law of force.

Moment of inertia : Moment of inertia of simple bodies, theorems of parallel and perpendicular axes, moment of inertia of triangular lamina, circular lamina, circular ring, right circular cone, sphere (hollow and solid).

STATICS: Types of forces, Magnitude and direction of the resultant of the forces acting on a particle, Lami's Theorem, equilibrium of a particle under several coplanar forces, parallel forces, moments, couples-simple problems.

Friction: Laws of friction, angle of friction, equilibrium of a body on a rough inclined plane acted on by several forces, centre of gravity of simple uniform bodies, triangular lamina, rods forming a triangle, trapezium, centre of gravity of a circular arc, elliptic quadrant, solid and hollow hemisphere, solid and hollow cone, catenary-simple problems.

UNIT - IX OPERATIONS RESEARCH

Linear programming – formulation – graphical solution – simplex method

Big-M method – Two-phase method-duality- primal-dual relation – dual simplex method – revised simplex method – Sensitivity analysis.

Transportation problem – assignment problem.

Sequencing problem – n jobs through 2 machines – n jobs through 3 machines – two jobs through m machines – n jobs through m machines

PERT and CPM : project network diagram – Critical path (crashing excluded) – PERT computations.

Queuing theory – Basic concepts – Steady state analysis of M/M/1 and M/M/systems with infinite and finite capacities.

Inventory models : Basic concepts - EOQ models : (a) Uniform demand rate infinite production rate with no shortages (b) Uniform demand rate Finite production rate with no shortages – Classical newspaper boy problem with discrete demand – purchase inventory model with one price break.

Game theory : Two-person Zero-sum game with saddle point – without saddle point – dominance – solving 2 x n or m x 2 game by graphical method.

Integer programming : Branch and bound method.

UNIT – X MATHEMATICAL STATISTICS

Statistics – Definition – functions – applications – complete enumeration – sampling methods – measures of central tendency – measures of dispersion – skewness-kurtosis.

Sample space – Events, Definition of probability (Classical, Statistical & Axiomatic) – Addition and multiplication laws of probability – Independence – Conditional probability – Bayes theorem – simple problems.

Random Variables (Discrete and continuous), Distribution function – Expected values & moments – Moment generating function – probability generating function – Examples. Characteristic function – Uniqueness and inversion theorems – Cumulants, Chebychev's inequality – Simple problems.

Concepts of bivariate distribution – Correlation : Rank correlation coefficient – Concepts of partial and multiple correlation coefficients – Regression : Method of Least squares for fitting Linear, Quadratic and exponential curves - simple problems.

Standard distributions – Binomial, Hyper geometric, Poission, Normal and Uniform distributions – Geometric, Exponential, Gamma and Beta distributions, Inter-relationship among distributions.

Sampling Theory – sampling distributions – concept of standard error-sampling distribution based on Normal distribution : t, chi-square and F distribution.

Point estimation-concepts of unbiasedness, consistency, efficiency and sufficiency-Cramer Rao inequality-methods of estimation : Maximum likelihood, moments and minimum chi-square and their properties.

Test of Significance-standard error-large sample tests. Exact tests based on Normal, t, chi-square and F distributions with respect to population mean/means, proportion/proportions variances and correlation co-efficient. Theory of attributes – tests of independence of attributes based on contingency tables – goodness of fit tests based on Chi-square.

Analysis of variance : One way, two-way classification – Concepts and problems, interval estimation – confidence intervals for population mean/means, proportion/proportions and variances based on Normal, t, chi-square and F.

Tests of hypothesis : Type I and Type II errors – power of test-Neyman Pearson Lemma – Likelihood ratio tests – concepts of most powerful test –simple problems

PHYSICS
(DEGREE STANDARD)

SUBJECT CODE 241

UNIT – I MECHANICS AND RELATIVITY

Gravitation- Kepler's law- Gravitational constant and their determination variation of 'g' - Centre of gravity - Centre of gravity of a solid hemisphere - Hollow hemisphere - Tetrahedron and solid cone - Friction – Lubricants - Laws of friction - Cone of friction - angle of friction - Equilibrium of a body in a inclined plane - Impulse – Impact- Laws of Impact - Direct and oblique impact - Impact between two spheres - Loss of Kinetic energy – Moment of Inertia - Angular momentum and Kinetic energy of a revolving body - Moment of inertia of a sphere, shell and cylinder - Compound pendulum - Newton's laws and their limitations - postulates of special theory of relativity - Lorentz transformation equations and its applications - variation of Mass with Velocity - Mass - energy equivalence – Physical significance

UNIT – II PROPERTIES OF MATTER

Elastic moduli - Relations - Couple per unit twist - Torsional oscillations - Bending of beams - Uniform and Non uniform bending - Elastic constants and their determinations - Viscosity of liquids - Highly viscous liquids – Stoke's and Searle's method- Surface Tension - Capillary rise - Method of drops - Surface tension of mercury - Quincke's Method - Laws of osmotic pressure and experimental determination of osmotic pressure- Fick's laws of diffusion - Determination of diffusivity – Applications

UNIT - III HEAT AND THERMODYNAMICS

Specific heat capacity – Determination of specific heat capacity by Newton's law of cooling- Debye's theory- Mayer's relation - Vanderwaal's equation - Critical constants and Vanderwaal's constant - J K effect - Theory and experiment – Liquefaction of gasses – Hydrogen - Helium - Thermal conductivity - Forbe's method - Stefan's law - Experimental determination of Stefan's constant- Solar constant - Temperature of the sun

Zeroth, first law and second laws of thermodynamics - Isothermal and adiabatic change - Reversible and irreversible process - Carnot's theorem- Carnot engine - Carnot cycle - Entropy - Maxwell's thermo dynamical relations and its applications - Third law of thermodynamics

UNIT- IV SOUND

Simple harmonic motion - Composition of two SHMs along a straight line and at right angles - Lissajou's figures - Laws of transverse vibrations - verification by sonometer and Melde's string - Forced vibrations and resonance - Beats - Doppler effect - Velocity of sound in solids and gases – Theory and experiment - Ultrasonics - production, properties and applications - Acoustics of buildings

UNIT- V OPTICS AND SPECTROSCOPY

Spherical aberration - Chromatic aberration and their rectifications – Coma- Eyepiece - Ramsden's and Huygen's eyepieces - Interference - Colours of thin films - Newton's rings - Theory and experiment - diffraction – Fresnel's and Fraunhofer types - Zone plate - Diffraction grating – Prism- Grating spectra - dispersive and resolving power of a grating - Double refraction - Huygen's explanation – Nicol's prism - Quarter and half wave plates - Production and detection of plane, circular and elliptically polarized light - optical activity - Determination of specific rotatory power – Polarimeter

UV and IR Spectroscopy - Principle and application - Raman effect - Explanation of Raman effect on the basis of quantum theory - Applications of Raman effect - Optical fiber - Fiber optic sensors - Fiber optic communication systems and their advantages - Lasers - Population inversion - Ruby and Helium Neon Lasers and applications

UNIT - VI WAVE MECHANICS

De Broglie concept of wave theory- Wave velocity and group velocity- De Broglie relations – Heisenberg's uncertainty principle – Basic postulates of wave mechanics- Schrodinger's Wave equation - Eigen function and Eigen values- Particle in a box – Linear harmonic oscillator (one dimension only)

UNIT - VII ELECTRICITY AND MAGNETISM

Coulomb's law - Permitivity of free space - Relative permitivity - Electric field - Intensity of field due to a point charge - Gauss theorem and its application - Electric potential - Relation between potential and intensity - Electric dipole moment - potential and intensity due to a dipole- Capacitance - Capacity of a spherical, parallel and cylindrical capacitors - Energy of a charge capacitor - Dielectric constant - Ohm's law - Resistivity and conductivity - Internal resistance of a cell - EMF and Potential difference - Thermo Electricity - Peltier and Thomson Co Efficients - Laws of Electrolysis - Conductivity of an electrolyte Arrheinius theory of electrolytic conduction - Calculation of emf of Daneil cell as reversible cell

Magnetic field around a current carrying conductor - Biot and Savart's law - Ampere's law of magnetic force due to a current - Force between two current carrying parallel conductors- Force on an electron moving in a magnetic field - Faraday's laws of electromagnetic induction - Self and mutual inductance - Induction coils and its uses - Eddy currents - Transformers - Energy losses - Skin effect - Advantages of AC distribution over DC - Dynamos and motors -

Magnetic poles - Magnetic moments - Susceptibility - Relation between susceptibility and permeability - Hysteresis - Dia, para, ferro magnetism - Electromagnetic waves in free space.

UNIT- VIII ELECTRICAL CIRCUITS AND ELECTRONICS

Kirchoff's laws for a loop and a junction - Measurements of circuit parameters (R,L and C) - AC circuits - Complex impedance and phase diagram – LCR Circuits - Series and parallel resonant circuits - Sharpness of resonance q factor.

Semiconductors - Energy band theory of solid - Insulators - Conductors and Semiconductors - Intrinsic and extrinsic semiconductors - Electrons and holes as charge carriers - P-type and N-type semiconductors - Junction diodes - Characteristics of a diode - Diode applications - Junction transistors - characteristic of transistors - Rectifier, Amplifier and oscillator circuits - AM and FM transmission with block diagrams - Basic principles of super heterodyne receiver with block diagram - Photo conductive cell - Photo diode - Solar cell - LED and LCD - construction and working T.V Camera - Vertical and Horizontal scanning - T.V Transmission and reception with block diagrams - T.V Antenna (Yogi type) - Colour TV - Three colour theory - Radar - Uses of radar.

Logic circuits - AND, OR, NOT NAND, NOR and EX-OR gates - Truth tables - Multivibrators - Astable multivibrators - Flip flop circuits (RS and JK flip flops)

UNIT - IX MODERN PHYSICS

Canal rays - e/m of positive ions - Thomson's parabola method - Aston's mass spectrograph - Plank's quantum theory of black body radiation - Photoelectric effect - photo electric multipliers - Einstein’s equation for photo electric effect - Millikan's experiment - Determination of Plank's constant.

Bohr's theory of hydrogen atom - Spectra of Hydrogen and Hydrogen like atoms - Rydberg's constant - Spatial quantization - Sommerfeld atom model – Vector atom model- Seven quantum numbers - Pauli’s exclusion principle - Examples of electronic configuration – Magnetic moment due to orbital motion and electron spin - Bohr magnetron - Experimental verification - Fine structure of sodium D Line - Zeeman effect - Anomalous Zeeman effect - Theoretical explanation

UNIT- X NUCLEAR AND SOLID STATE PHYSICS

Properties of nucleus - size, charge, mass and spin - Nuclear magnetic dipole moment - Binding energy - Packing fractions - Nuclear forces - Nuclear models - Shell model and liquid drop model - Nuclear reactions – Radio activity and induced radio activity- Artificial transmutation Techniques - Application of Radio isotopes - Discovery, Production and detection of neutron - Accelerators - Betatron - Proton Synchrotron - Particle Detectors - Ionization chamber - GM counter - Elementary particle – Baryons and Leptons – Cosmic rays

Structure of crystals - Periodicity and plane in crystal - Symmetry elements and symmetry groups - Classification of crystals - Unit cell and crystal types Bonding - ionic, covalent, metallic and Vander wall’s- X-rays - Bragg's law and absorption of X rays - Mosley's law - Compton effect

STATISTICS
(DEGREE STANDARD)

SUBJECT CODE 274

UNIT- I

Uses, Scope and limitation of Statistics, Collection, Classification and Tabulation of data, Diagramatic and Graphical representation, Measures of location, dispersion, Skewness and Kurtosis – Correlation and regression – Curve Fitting – Linear and Quadratic equation by the method of least squares.

UNIT - II

Probability - Addition, Multiplication and Baye's Theorems and their application. Tchebychev's inequality. Random variables – Univariate and Bivariate – Probability distributions – Marginal and conditional distributions – Expectations – Moments and cumulants generating functions.

UNIT - III

Probability distributions – Binomial, Poisson, Geometric and Hypergeometric. Continuous distributions – Uniform, exponential and normal. Sampling distributions and standard error, student's 't', Chi-square and F statistic – distributions and their applications.

UNIT - IV

Estimation – Point estimation – properties of estimates Neyman – Fisher Factorization theorem(without proof) Cramer – Rao inequality, Rao – Blackwell theorem – MLE and method of Moments estimation – Interval estimation – for population mean and variance based on small and large samples.

UNIT - V

Tests of Hypothesis – Null and Alternative – Types of errors – Power of test, Neyman – Pearson lemma, UMP and Likelihood ratio tests, Test procedures for large and small samples – Independence of attributes, Chi-square test – Goodness of fit

UNIT - VI

Simple random sample – stratified, systematic, Cluster (Single stage) Estimation of mean and variance in SKS – Sample Survey – Organisation – CSO and NSSO – Sampling and Non-Sampling errors.
Analysis of Variance – Principles of design CRD, RBD and LSD – Factorial experiments 2^2, 2^3 and 3^2 (Without confounding) Missing plot techniques.

UNIT- VII

Concept of SQC – Control Charts – X, R, p and charts Acceptance sampling plan – single and double – OC curves Attributes and Variables plan.
OR Models – Linear Programming problems – Simplex method Dual – Primal, Assignment problems, Net work – CPM and PERT

UNIT- VIII

Time series – Different components – Trend and Seasonal Variations – Determination and elimination

UNIT - IX

Index Numbers – Construction and uses – Different kinds of simple and weighted index numbers – Reversal tests – construction and use of cost of living index numbers – Birth and death rates – Crude and standard death rates, Fertility rates – Life table construction and uses.

UNIT - X

Statistical Computing using Excel – Understanding on the usage of Statistical Packages including SPSS, MINITAB and SAS.

WILDLIFE BIOLOGY
(DEGREE STANDARD)

SUBJECT CODE 291

UNIT - I SCOPE AND IMPORTANCE OF WILDLIFE OF INDIA

Definition of Wildlife: Causes of wildlife depletion; Economic importance of wildlife; need for wildlife conservation; rare, endangered, threatened and endemic species of fishes, amphibians, reptiles, birds and mammals in India- India as a mega wildlife diversity country.

UNIT - II FORESTRY, SILVICULTURE AND FOREST ENTOMOLOGY

Forest types in India- identification, dendrology; Deforestation & Impacts; Forest Inventory; Natural and artificial regeneration of forests; nursery techniques-seed-technology-Collection, storage, pretreatment and germination, establishment and tendings; Sylvicultural systems – Clear felling, uniform, shelter – selection, Coppice and conversion system; Agro forestry systems - Social/Urban Forestry- Joint Forest Management-Indian Forest Act 1927, Forest Conservation Act 1980; Harmful Insects and their role in forest economy: Insect pests of important trees of India -Teak, Sal and Bamboo; Beneficial Insects and their role in forest economy: Scavenger insects- dung beetles; Pollinators, Predatory insects, and parasitic insects on insect pests; control of forest insects.

UNIT – III BEHAVIOUR OF WILDLIFE

Instinctive behaviour-classical and modern concepts-fixed action pattern and ritualization; Learning-Imprinting-habituation. Analysis of behaviour pattern- taxis, kinesis and reflexes; Biological rhythms and bird migration; Types of animal communications; Courtship, display, sexual selection and parental care in mammals and birds; Social behaviour in animals - Honey bees, Elephants.

UNIT – IV WILDLIFE MANAGEMENT TECHNIQUES

Vegetative analyses – Point Centered Quadrat, Quadrat, Strip transect; GIS and Remote sensing in wildlife habitat surveys-Habitat manipulation: food, water, shade improvement; impact and removal of invasive alien species; Making observations and records: field notes, datasheets; Wildlife Photography - Types of cameras, camera traps; Field equipments-altimeter, pedometer, field compass, binoculars; radio collaring; GPS; GIS; Remote sensing in Wildlife management.

UNIT - V WILDLIFE CENSUS TECHNIQUES

Planning census – Total counts - Sample counts – Basic concepts and applications - Direct count (block count, transect methods, Point counts, visual encounter survey, waterhole survey); Indirect count (Call count, track and signs, pellet count, pugmark, camera trap)-Identifying animals based on indirect signs; Capture-recapture techniques.

UNIT – VI HUMAN WILDLIFE CONFLICTS

Basic concepts, reasons for conflicts, Identification of damages caused by wild animals and control measures; Case studies – Elephant, gaur, wild boar, monkey, tiger and leopard; Translocation of Wild animals – Principles, Methods and applications.

UNIT – VII HEALTH CARE OF WILDLIFE

Infectious wildlife diseases: Viral diseases: Rabies-Rinderpest-Foot and Mouth -Viral encephalitis-Yellow fever- Bacterial disease: Anthrax-Brucellosis – Clostridiosis -Listeriosis. Protozoan disease: Trypanosomiasis -Toxoplasmosis-Babesiosis - Coccidiosis.
Helminth disease: Fasciolopsis – Schistosomiasis – Taeniosis - Hydatidosis
Non-infectious diseases of wild animals: Diseases of the digestive system: Stomatitis-catarrhal, gastroenteritis-haemorrhagic gastroenteritis; Respiratory system: Catarrhal, bronchopneumonia-exudative pleurisy; Excretory system: Paralysis of urinary bladder-urolithiasis;

UNIT – VIII CONSERVATION OF WILDLIFE

in-situ and *ex-situ* conservation: Wildlife Sanctuaries, National Parks, Tiger Reserves and Biosphere reserves: Definition, formation, management and administration; Wildlife Projects: Tiger, Elephant, Lion and Hangul; Zoos and Zoological Parks: Definition- Aims of Zoos- Formation and Management of Zoos and Zoological Parks - Central Zoo Authority of India; Captive breeding: Aims, Principles, methods; Role of Government and Non-Governmental organizations in conservation;

UNIT IX MODERN CONCEPTS IN WILDLIFE CONSERVATION

Wildlife Crimes: Wildlife forensics and its applications in detecting wildlife crimes; Wildlife Toxicology: Types of contaminants, methods of toxicity evaluation, bioconcentration-bioaccumulation and biomagnifications; impacts of pesticides and heavy metals on birds and mammals; CAMP and PHVA – Analyses and Reports; Environmental Impact Assessment (EIA) methods and their role in wildlife conservation.

UNIT – X WILDLIFE ADMINISTRATION AND LEGISLATION:

Administrative set up - Advisory bodies- National Board for Wildlife –Wildlife (Protection) Act, 1972 and its Amendments; Wildlife trade and regulations; Biodiversity Act 2000; Eco-Development, Eco- Restoration and Ecotourism programmes; Anti poaching operations – Village Forest Council (VFC).

ZOOLOGY
(DEGREE STANDARD)

SUBJECT CODE 270

UNIT - I

Non-Chordata: General organisation - Classification with diagnostic features upto classes. Evalutionary relationship among taxa, symmetry.

Protozoa: Structure, reproduction and life history of Amoeba, Paramecium, Trypanosoma, Plasmodium, Monocystis, Leishmania - locomotion, nutrition, economic importance. Porifera: Sponges canal system, skeleton, reproduction and economic importance.

Coelenterata: Diploblastic organization - life history of obelia and Aurelia, Metagenesis - Polymorphism in Hydrozoa. Corals and Coral formation - relationships of Cnidaria and Acnidaria. Helminthes: Structure and life history of Planaria, Fasciola, Teania, Ascaris and Wucheriria - parasitic adaptations - Helminthes in relation to man.

Annelida: Nereis, earthworm and leech - Coelom and metamerism - modes of life in polychactes. Onychophora: Structure, affinities and distribution of Peripatus.

Arthropoda: Prawn, Scorpion and Cockroach - Larval forms and parasitism in Crustacea - Mouth parts, vision, respiration and excretion. Metamorphosis and social life in insects.

Mollusca: Freshwater mussel, pila, sepia. Echinodermata: General organisation - Water vascular system. Larval forms and affinities.

UNIT - II

Prochordata: Amphioxus, Balanoglossus - Ascidian retrogressive Metamorphosis, neoteny and affinities.

Chordata: General Organisation - Characters, Outline, classification upto class level.

Pisces: Locomotion, migration, respiration, Parental care, economic importance; structure and affinities of dipnoi.

Amphibia: Origin of amphibians – Respiration, Parental care - South Indian amphibians.

Reptiles: Origin - Conquest of land - adaptations to live on land, adaptive radiation - Temporal Vacuities - identification of poisonous and non-poisonous snakes - poison apparatus – South Indian snakes.

Birds: Origin - flight adaptations - mechanism of flight - double respiration - migration - Flightless birds.

Mammals: Dentition, skin derivatives - distribution - adaptive radiation. Protothria, Metatheria, eutheria and their Phylogenetic relationships.

UNIT - III

Cell and Molecular Biology: Cellular Organelles - Structure and function - Plasma membrane, Mitochondria, Golgi bodies, Endoplasmic reticulum and Ribosomes – Nucleus and Nucleolus. Cell division, cell cycle; Chromosomes - DNA structure and function, replication of DNA, Genetic code - RNA and protein synthesis. Gene expression, regulation of gene expression in prokaryotes and Eukaryotes. Recombinant DNA - Genetic engineering, its uses in agriculture, industries and medicine.

UNIT- IV

Genetics: Mendelian concepts, multiple alleles, blood groups, Rh-factor. Linkage, crossing over - mutation (Natural and induced); Sex chromosomes, Sex determination and Sex Linked inheritance - Chromosome number and form ploidy - cytoplasmic inheritance – Karyo types – chromosome mapping, Normal and abnormal genetic disorders; Bio-chemical genetics – Eugenics. Human genome Project. Bio-statistics: Mean, Median and standard deviation. Bio-informatics: DNA and Protein sequence analysis, Prediction functional structure, protein folding, Phylogenetic tree construction.

UNIT - V

Bio Chemistry: Bio-molecules, Structure and role of carbohydrates, lipids, proteins and amino acids - Glycolysis and kreb's cycle - oxidation, reduction - oxidative phosphorylation - energy conservation and release, cyclic AMP, ATP; enzymes – mechanism; Hormones-classification biosynthesis and function.

Physiology: With reference to mammals, digestion, nutrition, balanced diet - assimilation, intermediary/metabolism. Composition of blood - Coagulation, Transport of oxygen, Carbon dioxide, Blood pigments, Mechanism of respiration. Muscles, mechanism of muscle contraction. Temperature regulation, Acid base balance and homeostasis, Nerve impulses and conduction, neurotransmitters.

Receptors- photo, phono and chemo reception. Nephron and urine formation. Endocrine glands, testis, ovary and pituitary organs and their inter relationship. Physiology of reproduction in humans, Hormonal development in insects, pheromones and their uses. Bioluminescence. Biological clock. Physiology of immune response- Antigens – Immuno globulins - humoral and cell mediated immunity. T and B cells, mechanism of antibody formation - Immunodeficiency diseases; vaccination.

UNIT - VI

Development Biology: Gametogenesis – fertilization, Pathenogenesis, type of eggs – blastulation, cleavage and gastrulation in frog and chick. Morphogenetic movements – organizer, potency, organogenesis with reference to ear, eye, kidney, brain. Formation and fate of extra embryonic membranes in chick.

Plancentation- types, functions. - metamorphosis in Frog – Regeneration. Stem cells-sources, types and their uses in human welfare, IVF, embryo transfer and cloning - Aging and senescence.

UNIT - VII

Environmental Biology: Biotic and abiotic factors, their role, Intra and inter specific association. Biogeochemical cycles. Ecosystem- structure and function of ecosystems, types of ecosystems. Ecological succession, Community structure - Stratification. Population and Population dynamic - Habitat ecology. Wild life, need for conservation management and methods of conservation. Sanctuaries with special reference to Tamil Nadu. Pollution - air, water and land - Perspective policy planning for the environment.

UNIT - VIII

Evolution: Origin of life - Evolutionary theories - Contributions of Lamarck, Darwin and De Vries - present status of Darwinism and Lamarkism - modern synthetic concept - Hardy Weinberg Law - Polymorphism and mimicry in evolution. Speciation: evolutionary species concept – Isolation, mechanisms and their role, role of hybridization in evolution. Fossils and Fossilization, Indian fossils, Geological time scale. Origin and evolution of horse and man - Culture evolution and Biochemical evolution.
Animal distribution: Zoogeographical distribution - Continental and island fauna - Continental drift - Discontinuous distribution, adaptive radiation. Natural resources and their conservation. Alternative sources of energy.

UNIT - IX

Economic Zoology: Parasitism and Commensalism - Protozoan Parasites and diseases, helminthes parasites and diseases of man and domestic animals; Beneficial and harmful insects. Insect pests on crops and stored products - Control methods. IPM. Sericulture, apiculture, lac culture, seaweed culture, vermiculture, - oyster culture and pearl formation, poultry, pisciculture and induced breeding, Shell fisheries, Aquaculture practices in Tamil Nadu and their impact on the environment and on agriculture.

UNIT - X

Instrumentation and Bio-techniques: Microscopy-Phase contrast, fluorescent, TEM, SEM. Colorimetric techniques, Centrifugation techniques. Fixation, staining techniques. Electrophoretic techniques: Principles, AGE and PAGE. DNA finger printing, RFLP, RAPD and AFLP.

ANNEXURE – III / பிற்சேர்க்கை – III

List of Documents to be uploaded

(Not less than 200KB in PDF) (single or multiple page in 200 KB in PDF)

1.	SSLC Mark Sheet
2.	HSC Mark Sheet or its equivalent
3.	Educational qualification: UG Degree/ PG Degree/ IPG Degree/ M.Phil./ Ph.D., Certificates/ Consolidated Mark Sheet
4.	G.O. for Equivalence of qualification to the prescribed qualification (if applicable)
5.	PSTM Certificate up to prescribed entire qualification (if applicable)
6.	Community Certificate
7.	Differently Abled Certificate obtained from the Medical Board / Differently Abled book (if applicable)
8.	Destitute Widow Certificate (if applicable)
9.	Ex - servicemen (if applicable)
10.	Transgender ID Card with Gender (if applicable)
11.	Gazette copy for name change (if applicable)
12.	No Objection Certificate (if applicable)
13.	Documents / Court Orders proving Acquittal / Conviction or FIR in case of pending cases for Criminal cases registered (if applicable)
14.	Certificate of Physical Measurement (in support of Physical Qualification)
15.	Other Documents (if any)

For further details refer para 2W of “Instructions to Applicants”

APPENDIX-I

Certificate regarding physical limitation in an examinee to write

This is certify that I have examined Mr./Ms./Mrs._____

_____ (Name of the candidate with disability) a person with

_____ (Nature and percentage of disability as mentioned in the

certificate of disability), S/o/D/o _____ a resident of

_____ (Village / District / State and to state that He / She has physical

limitation which hampers his / her writing capabilities owning to his / her disability.

Due to the above mentioned disability following concession may be given:-

1. Exemption from Tamil / Second Language.
2. Extra _____ hours for writing theory exam.
3. Allocation of a scribe.
4. Overlooking spelling mistakes and grammatical errors.
5. Using calculator / assistive devices
6. _____ (Any other assistive devices or concessions).

***strike out the non applicable.**

Signature
(Name of Government Hospital / Civil Surgeon / Medical Superintendent / Signature of the notified Medical Authority of a Government Health Care Institution)

Name & Designation

Name of Government Hospital / Health Care Centre / The Notified Medical Authority

Place:
Date:

(Photo of the Differently Abled Person and Stamp to be fixed here)

Signature / Thumb impression
of the Differently Abled Person

Note:
Certificate should be given by a specialist of the relevant stream / disability
(e.g. Visual Impairment – Ophthalmologist, Locomotor disability – Orthopedic Specialist / PMR etc.)

சுருக்கம்

தெரிவுகள் – தமிழ்நாட்டில் உள்ள அனைத்து தெரிவு முகமைகளால் நடத்தப்படும் போட்டித் தேர்வுகளில் தமிழ் மொழித் தகுதித் தேர்வினை எழுதுவதிலிருந்து மாற்றுத்திறனாளி தேர்வர்களுக்கு விலக்களித்தல் – ஆணைகள் வெளியிடப்படுகின்றன.

மனிதவள மேலாண்மை (எம்)த் துறை

அரசாணை (நிலை) எண்.49

நாள்: 23.05.2022
சுபகிருது வருடம், வைகாசி – 09,
திருவள்ளுவர் ஆண்டு 2053

படிக்கப்பட்டது:

1. அரசாணை (நிலை) எண்.133, மனிதவள மேலாண்மை (எம்) துறை, நாள் 01.12.2021.
2. செவித்திறன் குறைபாடு உள்ளவர்களின் பெற்றோர் சங்கத்தின் செயலாளரின், 01.03.2022-ம் நாளிட்ட மனு
3. செயலாளர், தமிழ்நாடு அரசுப் பணியாளர் தேர்வாணையம், கடித எண்.5476/RND-E/2018, நாள் 05.05.2022

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ஆணை :

மேலே படிக்கப்பட்ட அரசாணை (நிலை) எண்.133, மனிதவள மேலாண்மை (எம்) துறை, நாள் 01.12.2021-ல் அரசுத் துறைகளில் உள்ள பணியிடங்கள் அனைத்திலும் தமிழக இளைஞர்கள் பெருமளவில் நியமனம் பெற ஏதுவாக, மாநிலத்தின் தெரிவு முகமைகளால் நடத்தப்படும் அனைத்துப் போட்டித் தேர்வுகளிலும் தமிழ்மொழி தகுதித்தாள் கட்டாயமாக்கப்பட்டு ஆணைகள் வெளியிடப்பட்டன. அவ்வரசாணைக்கிணங்க, தமிழ்நாடு அரசுப் பணியாளர் தேர்வாணையம், போட்டித் தேர்வுகளில் தமிழ் மொழித் தாளினை கட்டாயத்தாளாக இணைத்து, அதற்கேற்ப அறிவிக்கைகளை வெளியிட்டு தெரிவு நடவடிக்கையினை மேற்கொண்டுவருகிறது.

2. மேலே இரண்டாவதாகப் படிக்கப்பட்ட, செவித்திறன் குறைபாடு உள்ளவர்களின் பெற்றோர் சங்கத்தின் மனுவில், காது கேளாத மற்றும் வாய்பேச

இயலாத மாற்றுத்திறனாளிகள், இரண்டு அல்லது அதற்கு மேற்பட்ட மொழிகளைக் கற்க சிரமப்படுவார்கள் என்றும், இம்மாணவ மாணவியர்கள் சிலர் முன்பருவபள்ளி முதல் பட்டப்படிப்பு வரை முழுமையாக ஆங்கில வழிக் கல்வியில் மட்டுமே கல்வி கற்றிருப்பார்கள் எனத் தெரிவித்து தமிழ்நாடு அரசுப் பணியாளர் தேர்வாணையத்தால் நடத்தப்படுகின்ற தொகுதி-IV பதவிகளுக்கான போட்டித் தேர்வில் இத்தேர்வர்களுக்கு தமிழ் மொழித் தகுதித் தேர்வு எழுதுவதிலிருந்து விலக்களித்து அவர்களுக்கென தனியாக பொது ஆங்கில தாளினை நடத்த கோரியுள்ளனர்.

3. மேற்காணும் கோரிக்கை குறித்து மாற்றுத்திறனாளிகள் நலத்துறையுடன் கலந்தாலோசிக்கப்பட்டது. மேலும், இது குறித்து மேலே மூன்றாவதாகப் படிக்கப்பட்ட கடிதத்தில் தமிழ்நாடு அரசுப் பணியாளர் தேர்வாணையச் செயலாளர் வழங்கியுள்ள குறிப்புரையினை ஏற்று, அரசாணை (நிலை) எண்.133, மனிதவள மேலாண்மை (எம்) துறை, நாள் 01.12.2021-ல் ஆணையிடப்பட்டுள்ள கட்டாய தமிழ்மொழி தகுதித் தேர்வினை எழுதுவதற்கு மாற்றுத் திறனாளிகளுக்கு விலக்களித்து அரசு பின்வருமாறு ஆணையிடுகிறது:-

(அ) தமிழ்நாடு அரசுப் பணியாளர் தேர்வாணையத்தால், நடத்தப்படும் தொகுதி - I, II, II-A போன்ற இரண்டு நிலைகளைக் கொண்ட தேர்வுகளில், முதன்மை எழுத்துத்தேர்வில் (Main Written exam) கட்டாய தமிழ்மொழித்தாளானது தகுதி தேர்வாக (Tamil eligibility Test) நடத்தப்படுகிறது. இதுபோன்ற தேர்வுகளில் கட்டாயத் தமிழ்மொழி தகுதித் தாளினை எழுதுவதிலிருந்து மாற்றுத் திறனாளிகளுக்கு விலக்களிக்கப்படுகிறது.

(ஆ) தமிழ்நாடு அரசுப் பணியாளர் தேர்வாணையத்தால், நடத்தப்படும் தொகுதி-III, IV, VII-B, VIII, போன்ற ஒரே நிலை கொண்ட தேர்வுகளில் தமிழ் மொழித்தாளானது, தகுதி மற்றும் மதிப்பீட்டுத் தேர்வாக (Tamil Eligibility-cum-Scoring Test) நடத்தப்படுகிறது. இத்தேர்வுகளில், Board / University-ல் ஆங்கில மொழிப் பாடம் மட்டுமே படித்த மாற்றுத்திறனாளிகளுக்கு, தமிழ் மொழித்தாள் எழுதுவதிலிருந்து விலக்களிக்கப்படுகிறது. அதற்குபதில், ranking மதிப்பீடு செய்வதற்காக, அவர்களுக்கென்று தனியாக பொது ஆங்கிலத்தேர்வு (SSLC standard-ல்) நடத்தப்படும். (இத்தேர்வுகளில் மொழி பெயர்ப்புப்பகுதி இடம் பெறாது).

(இ) அரசாணை (நிலை) எண்.133, மனிதவள மேலாண்மை (எம்) துறை, நாள் 01.12.2021-ல் ஆணையிடப்பட்டுள்ள கட்டாய தமிழ் மொழித் தாளிலிருந்து மாற்றுத்திறனாளிகளுக்கான விலக்கு, தமிழ்நாடு அரசுப் பணியாளர் தேர்வாணையம் மட்டுமல்லாமல், மாநிலத்தின் மற்ற தெரிவு முகமைகளால் நடத்தப்படும் அனைத்து போட்டித் தேர்வுகளுக்கும் மற்றும் நியமன அலுவலர்களால் தேவைப்படும் நேர்வுகளில் நடத்தப்படும் எழுத்துத் தேர்வுகளுக்கும் பொருந்தும்.

(ஈ) இவ்வாறான விலக்கு, அரசாணை (நிலை) எண்.62, பள்ளிக் கல்வித்துறை, நாள் 25.03.2022ல் குறிப்பிடப்பட்டுள்ள மாற்றுத் திறனாளிகளுக்குப்

பொருந்தும். மேற்காண் அரசாணையில் குறிப்பிடப்பட்டுள்ள மாற்றுத்திறனாளிகளின் தொடர்பான விவரப் பட்டியல் கீழ்கண்டவாறு:-

(1)	உடல்குறைபாடு - உடல் இயக்கக் குறைபாடு	Physical disability - Locomotor disability, Leprosy cured, Cerebral palsy, Dwarfism, Muscular Dystrophy, Acid Attack victims.
(2)	உடல் குறைபாடு - பார்வைக் குறைபாடு	Physical disability - Visual Impairment - Blindness, Low Vision
(3)	உடல் குறைபாடு - செவித்திறன் குறைபாடு	Physical disability - Hearing Impairment - Deafness, Hard of hearing
(4)	உடல் குறைபாடு - பேச்சு மற்றும் மொழித்திறன் குறைபாடு	Physical disability - Speech and Language disability
(5)	அறிவுசார் குறைபாடு	Intellectual disability, Specific Learning disability (Dyslexia, Dysgraphia, Dyscalculia, Dysprasia), Developmental Aphasia, Autism Spectrum Disorder
(6)	மன நலம் சார்ந்த குறைபாடு - மனநலம் பாதிப்பு	Mental Behaviour - Mental illness
(7)	நாள் பட்ட நரம்பியல் குறைபாடுகள்	Disability caused due to Chronic Neurological conditions, Multiple Sclerosis, Parkinson's disease, Haemophilia, Thalassemia, Sickle Cell disease
(8)	பன்முகக் குறைபாடுகள் (பார்வையின்மையோடு செவித்திறன் குறைபாடு உட்பட)	Multiple Disabilities including deaf, blindness

இவ்விலக்கு 40 சதவிதத்திற்கும் குறைவான குறைபாடுகளைக் கொண்ட மாற்றுத் திறனாளிகளுக்கும் பொருந்தும்.

(உ) இவ்விலக்கினை பெறவிரும்பும் மாற்றுத்திறனாளிகள் உரிய மாற்றுத்திறனாளி சான்றிதழ் (Disability Certificate) சமர்ப்பித்தல் வேண்டும்.

(ஆளுநரின் ஆணைப்படி)

மைதிலி கே.ராஜேந்திரன்
அரசு செயலாளர்

பெறுநர்

செயலாளர், தமிழ்நாடு அரசுப் பணியாளர் தேர்வாணையம், சென்னை - 600 003.
அரசுக் கூடுதல் தலைமைச் செயலாளர், உள், மதுவிலக்கு மற்றும்
ஆயத்தீர்வை துறை, சென்னை - 600 009.

(த.பி.பா.)

அரசு கூடுதல் தலைமைச் செயலாளர், நிதித்துறை, சென்னை – 600 009.
அரசு முதன்மை செயலாளர், பள்ளிக் கல்வி துறை, சென்னை – 600 009.
அரசு முதன்மை செயலாளர், உயர்க் கல்வி துறை, சென்னை – 600 009.
அரசு முதன்மை செயலாளர், மருத்துவம் - மக்கள் நல்வாழ்வுத் துறை, சென்னை - 600 009.
அரசு முதன்மை செயலாளர், சுற்றுச்சூழல், காலநிலை மாற்றம் மற்றும் வனத்துறை, சென்னை - 600 009.
அரசு செயலாளர், மாற்றுத் திறனாளிகள் நலத்துறை, சென்னை – 600 009.
அனைத்து துறைச் செயலாளர்கள், சென்னை – 600 009.
அனைத்து துறைத் தலைவர்கள்.
தலைவர், ஆசிரியர் தேர்வு வாரியம், கல்லூரிச் சாலை, சென்னை – 600 006.
தலைவர், மருத்துவப் பணியாளர் தேர்வு வாரியம், சென்னை – 600 018.
தலைவர், தமிழ்நாடு சீருடைப்பணியாளர் தேர்வு வாரியம், சென்னை – 600 002.
உறுப்பினர் செயலர், தமிழ்நாடு வனச் சீருடைப் பணியாளர் தேர்வுக் குழுமம், சென்னை – 600015.
இயக்குநர், வேலை வாய்ப்பு மற்றும் பயிற்சி, சென்னை – 600 032.
நிதி (பொ.நி.மா.க) துறை, சென்னை – 600 009.

நகல்:

மாண்புமிகு முதலமைச்சர் அவர்களின் செயலாளர் –III, முதலமைச்சர் அலுவலகம், சென்னை – 600 009.
மாண்புமிகு அமைச்சர் (நிதி மற்றும் மனிதவள மேலாண்மை) அவர்களின் சிறப்புநிலை நேர்முக உதவியாளர், சென்னை– 600 009.
தலைமைச் செயலாளரின் முதன்மை தனிச்செயலர், சென்னை – 600 009.
மாற்றுத்திறனாளிகள் நலத்துறை இயக்குநர், சென்னை – 600 005.
மனிதவள மேலாண்மைத் துறைச் செயலாளரின் முதன்மை தனிச் செயலாளர், சென்னை - 600 009.
மனிதவள மேலாண்மை (நி.சீ.II) துறை, சென்னை– 600 009. (3 படிகள்)
(தமிழ்நாடு அரசு இணையதளத்தில் வெளியிடுதல் குறித்து)
இருப்புக் கோப்பு / உதிரி நகல்.

//ஆணைப்படி அனுப்பப்படுகிறது//

23/5/22
பிரிவு அலுவலர்

23/05/22

Annexure – IV / பிற்சேர்க்கை –IV

CERTIFICATE OF PHYSICAL FITNESS BY A SINGLE MEDICAL OFFICER / THE CIVIL MEDICAL BOARD

Signature of Candidate_____

I/We do hereby certify that I/We have examined (full name) Thiru / Thirumathi / Selvan / Selvi _____ a Candidate _____ for employment under the Government as _____ in the _____ Office in the _____ Department and whose signature is given above and cannot discover that he / she has any disease, communicable or otherwise, constitutional affliction or bodily infirmity / except that his / her weight is in excess of / below the standard prescribed, or except

I / We do not consider this a disqualification of the employment he / she seeks.

His / Her age is according to his / her own statement _____ years and by appearance about ___ / ___ years.

I/We also certify that he / she has marks of Small Pox / Vaccination.

Chest measurement in Inches	On full Inspiration
	On full expiration
	Difference expansion

Height in ft.
Weight in kg.
Cardio–Vascular System
Respiratory System
His / Her vision is normal
Hypermetropic/ Myopic/ Astigmatic/
[Here enter the degree of defect and the strength of correction glasses]
Hearing is normal / defective (much or slight)
Urine - Does chemical examination show
(i) Albumen (ii) Sugar State specific gravity:
Personal marks (at least two should be mentioned) For Identification
1.
2.

SIGNATURE:
RANK:
DESIGNATION: PRESIDENT:
Member (I)
(II)

STATION: STATION:
DATE: DATE:

The candidate must make the statement required below prior to his / her Medical Examination and must sign the declaration appended thereto. His attention is specially directed to the warning contained in the note below:-

1. State your name in full:

2. State your age and birth place:

3. (a) Have you ever had small pox, intermittent or any other fever, enlargement or suppuration of glands spitting of blood, asthma, inflammation of lungs, heart disease, fainting attacks, rheumatism, appendicitis?

OR

(b) any other disease or accident requiring confinement to bed and medical or surgical treatment?

4. When, where your last vaccinated

5. Have you or any of your near relations been afflicted with consumption, serefula gout, asthma, fits, epilepsy or insanity?

6. Have you suffered from any form of nervousness due to over work or any other cause?

7. Furnish the following particulars concerning your family:

Father's age, if living and state of health	Father's age at death and cause of death	No. of brothers living, their ages, state of health	No. of brothers dead, their ages at and cause of death
(1)	(2)	(3)	(4)

Mother's age, if living and state of health	Mother's age at death and cause of death	No. of Sisters living, their ages and state of health	No. of Sisters dead, their ages at and cause of death
(1)	(2)	(3)	(4)

I declare all the above answers to be to the best of my belief, true and correct.

CANDIDATE'S SIGNATURE

Note:- The candidate will be held responsible for the accuracy of the above statement by willfully suppressing any information he will incur the risk of losing the appointment and if appointed, of forfeiting all claim to superannuation allowance or gratuity.

MedI. I-68.

ANNEXURE- V

TENTATIVE TIMELINE FOR THE RECRUITMENT PROCESS

Sl. No.	Process	Timeline
1.	Last date upto which the application can be submitted/edited/ payment of fees can be made	06.09.2022
2.	Application Correction Window Period	From 11.09.2022 (12.01 A.M.) To 13.09.2022 (11.59 P.M.)
3.	Last date upto which the uploaded documents can be edited / uploaded / re-uploaded	20.11.2022
4.	Publication of Result for Written Examination	February 2023
5.	Certificate Verification / Oral Test	March 2023
6.	Counselling	

Secretary