



TAMIL NADU PUBLIC SERVICE COMMISSION

NOTIFICATION NO. 16 /2017

DATED:05.07.2017

Applications are invited only through online mode upto 02.08.2017 only from Applicants belonging to Scheduled Castes/Scheduled Caste (Arunthathiar) and Scheduled Tribes for Direct Recruitment to the post of **Assistant Engineer (Agricultural Engineering)** included in Tamil Nadu Agricultural Engineering Service **for SC/SC(A) and ST backlog vacancies.**

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

Name of the Post	Name of the Service	No. of Vacancies	Scale of Pay
Assistant Engineer (Agricultural Engineering) (Post Code No. 1667)	Tamil Nadu Agricultural Engineering Service (Service Code No.011)	21	Rs.9300 - 34800 + Grade Pay Rs. 5100/- p.m.

2. DISTRIBUTION OF VACANCIES

Name of the post	SC(G)	SC(A)	ST	Total
Assistant Engineer (Agricultural Engineering)	17	3	1	21

Abbreviation:-

SC-Scheduled Caste, ST-Scheduled Tribes, A - Arunthathiar, G – General.

3. IMPORTANT DATES AND TIME

Date of Notification	05.07. 2017		
Last date for submission of application	02.08. 2017		
Date of Written Examination			
Paper – I (Subject Paper)	07. 10 .2017 FN	10.00 A.M. to 01.00 P.M	
Paper – II (General Studies)	07. 10 .2017 AN	02.30 P.M. to 04.30 P.M	

4. FEES

a)	<p><u>Registration Fee</u> For One Time Registration (Revised with effect from 01.03.2017 vide G.O.(Ms).No.32, Personnel and Administrative Reforms (M) Department, dated 01.03.2017). <u>Note</u> Applicants who have already registered in One Time Registration system paying Rs.50/- before 01.03.2017 and those who have registered for One-Time Registration on or after 01.03.2017 by paying Rs.150/- are exempted from paying the registration fee for this recruitment.</p>	Rs.150/-
b)	<p><u>Examination Fee</u></p>	Fully Exempted

5. MODE OF PAYMENT OF REGISTRATION FEE

- Applicants have to register their basic particulars through One -Time Registration which is mandatory on payment of Rs.150/- (Rupees One Hundred and Fifty only) towards registration fee and then should apply online for this recruitment. The One-Time Registration will be valid for 5 years from the date of registration. Thereafter, the registration should be renewed by paying the prescribed fee. Applicants who have already registered in one time Registration system by paying Rs.50/- before 01.03.2017 and having validity and those who have registered for One-Time Registration on or after 01.03.2017 by paying Rs.150/- towards One-Time Registration are exempted from paying the registration fee for this recruitment.

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

6 QUALIFICATIONS

(A) AGE LIMIT (as on 01.07.2017)

Category of Applicants	Minimum Age (should have completed)	Maximum Age (Should not have completed)
SCs, SC(A)s, STs.	18 Years	No Age Limit

(B) EDUCATIONAL QUALIFICATION (as on 05.07.2017)

Applicants should possess the following or its equivalent qualification awarded by any University or Institution recognized by the University Grants Commission or the State Board as the case may be.

Qualification	
i)	B.E. (Agriculture) or B. Tech (Agricultural Engineering) or B.Sc., (Agricultural Engineering) (or)
ii)	B.E. (Mechanical) (or) B.E. (Civil) (or) B.Tech (Automobile Engineering) or B.E. (Production Engineering) or B.E.(Industrial Engineering)
<u>Provided that only if sufficient applicants with qualification on item (i) is not available, the applicants in item (ii) will be considered.</u>	

Note

- The qualification prescribed for these posts should have been obtained by passing the required qualification in the order of studies, viz., 10th + HSC or its equivalent + Bachelor's Degree + PG Degree as required under Section 25 of Tamil Nadu Government Servants (Conditions of Service) Act, 2016.
(Results of the examination should have been declared on or before the date of notification)
- The qualifications considered equivalent are indicated in **Annexure-I** to this notification.
(Refer also to the disclaimer annexed to the notification)
- Applicants claiming equivalence of qualification should upload and submit evidence for equivalence of qualification in the form of G.O. issued prior to the date of this notification when called for, failing which, their application will be summarily rejected. The G.Os issued regarding equivalence of prescribed qualification after the date of this notification will not be accepted.
(For further details refer [para10 of "Instructions to Applicants"](#)).

(C) CERTIFICATE OF PHYSICAL FITNESS

Applicants selected for appointment to the posts will be required to produce a certificate of physical fitness in the form prescribed below:

Name of the Post	Standard of Vision	Form of Certificate of Physical Fitness
Assistant Engineer (Agricultural Engineering)	Standard-II	Form prescribed for Executive post.

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

(D) KNOWLEDGE IN TAMIL

Applicants should possess adequate knowledge in Tamil.

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

7. SCHEME OF EXAMINATION (OBJECTIVE TYPE) AND ORAL TEST

Subject	Duration	Maximum Marks	SCs, SC(A)s, STs
(i) Paper-I Subject Paper (Degree Standard - 200 questions each) One of the subjects as follows: (a) Agricultural Engineering (code No. 280) (For those who studied Agricultural Engineering) or (b) Basics of Engineering (code No. 230) (For those who studied Mechanical, Civil, Automobile, Production and Industrial Engineering)	3 Hours	300	171
(ii) Paper -II General Studies (Code No-003)(100 Questions) General Studies (Degree Standard) – 75 Questions and Aptitude and Mental Ability (SSLC Standard) – 25 Questions.	2 Hours	200	
(iii) Interview and Records	--	70	
Total		570	

Note

- (i) The Questions in Paper-I will be set in English only and Paper-II "General Studies" will be set both in English and in Tamil.
- (ii) The applicants who have not appeared for any of the paper in the written examination will not be considered for selection even if they secure the minimum qualifying marks for selection.
- (iii) The syllabus for the subjects Paper-I (Subject Paper) and Paper-II (General Studies) are available in **Annexure-II** to this Notification.
- (iv) Refer [para 22 of "Instructions to Applicants"](#) in regard to Instructions to be followed while appearing for competitive Examinations conducted by the Commission.

8. CENTRE FOR EXAMINATION

Examinations will be held at the following centre:-

Sl.No.	Name of the Centre	Centre Code
1	Chennai	0100
2	Coimbatore	0200
3	Madurai	1000

Note.

- (i) Request for change of venue will not be complied with (For further details refer "[Instructions to Applicants](#)").
- (ii) The Commission reserves the right to increase the number of examination centres and to re-allot the applicants.
- (iii) Applicants should appear for the Written Examination / Certificate Verification/ Oral Test at their own expenses.

9. SELECTION PROCEDURE

Selection will be made in two successive stages i.e., (i) Written Examination and (ii) Oral Test in the shape of an interview. 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. Applicant's appearance in the Written Examination and Oral Test is compulsory. An Applicant who has not appeared for the Written Examination or the Oral Test will not be considered for selection, even if he/she secures qualifying marks for selection.

(For further details refer **paragraph 23 (b)** of "[Instructions to Applicants](#)")

10. NO OBJECTION CERTIFICATE / INFORMATION TO THE EMPLOYER

No Objection Certificate obtained from appropriate authority shall be produced at the time of Certificate Verification. Failure to produce at that time will lead to rejection of application.

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

11. GENERAL INFORMATIONS

- A. The rule of reservation of appointments will not apply to this recruitment.
- B. The selection for appointment to the above said posts are purely provisional subject to final orders on pending Writ Petitions, if any, filed at Madras High Court and Madurai Bench of Madras High Court.
- C. As per Section 27(h) of Tamil Nadu Government Servants (Conditions of Service) Act, 2016, reservation of appointment to "Women" and "Ex-servicemen" **will not apply** to this recruitment.
- D. As per Section 27(h) of Tamil Nadu Government Servants (Conditions of Service) Act, 2016, reservation of appointment to "Differently Abled persons" **will not apply** to this recruitment. Hence, reservation to Differently Abled persons is not applicable to this recruitment. However, they can apply and should upload the documents referred in para 14 (b) of the Commission's 'Instructions to Applicants' when called for, if they are otherwise eligible.
- E. The Differently Abled persons should upload a copy of certificate of physical fitness specifying the nature of physical handicap and the degree of disability based on the norms laid down,

from the Medical Board to the effect that his/her handicap will not render him/her incapable of efficiently discharging the duties attached to the post to which he / she has been selected when called for by the Tamil Nadu Public Service Commission

- F. Wherever vacancies are reserved for Arunthathiyars on preferential basis, even after filling up of the vacancies reserved for SC (Arunthathiyars) on preferential basis, if more number of qualified Arunthathiyars are available, they shall be entitled to compete with the Scheduled Castes other than Arunthathiyars in the inter-se-merit among them and if any posts reserved for Arunthathiyars remain unfilled for want of adequate number of qualified applicants, it shall be filled up by Scheduled Castes other than Arunthathiyars.
- G. Evidence for claims made in the online application should be uploaded / submitted in time when documents are called for. Any subsequent claim made thereafter on submission of online application will not be entertained. Failure to submit the documents within the stipulated time limit **will entail rejection of application.**
- H. **Correct and True information regarding arrest, convictions / debarment / disqualification by any recruiting agency, criminal or any disciplinary proceedings initiated / pending or finalised, participation in agitation or any Political Organisation, candidature in election for Parliament / State Legislature / Local Bodies etc, if any, should also be furnished to the Commission at the time of application i.e. the details thereof, originals of the judgement, order/ or G.O. dropping further action in Departmental proceedings or any document that may prove the suitability of such applicants for a Government appointment in such cases must be produced at the stage / time of certificate verification without fail.**
- I. Incomplete applications and applications containing wrong / incomplete claims or incorrect particulars relating to category of reservation / other basic qualification / eligibility wise / age / communal categories / educational qualification / PSTM / physical qualification and other basic eligibility criteria **will be liable for rejection.**
- J. One Time Registration is not an application for any Post / Recruitment. Though the details / particulars were furnished in the one Time Registration by the applicants, the details / particulars furnished in the online application for this recruitment alone will be taken into consideration. Tamil Nadu Public Service Commission will not be responsible for any consequences arising out of furnishing of incorrect and incomplete details in the application or omission to provide the required details in the application for this recruitment.

12. OTHER IMPORTANT INSTRUCTIONS

- a) Applicants **should ensure their eligibility for examination.** The Applicants applying for the examination should go through all instructions carefully and ensure that they fulfil all eligibility conditions for admission to examination. Their admission to all stages of the examination will be purely provisional subject to satisfaction of the eligibility conditions. Mere issue of memo of admission to the applicants will not imply that his/her candidature has been fully cleared by the Commission.
- b) The **Hall Tickets** for eligible applicants will be made available in the Commission's Website www.tnpsc.gov.in or www.tnpscexams.net or www.tnpscexams.in for downloading by applicants. No Hall Tickets will be sent by post. So the applicants should watch TNPSC website before the scheduled date of examination.
- c) **Communication to Applicants**
Individual communication regarding the date and time of certificate verification, oral test and counselling will not be sent to the applicants by post. The details will be made available on

the Commission's website. Applicants will be informed of the above fact only through SMS and e-mail.

- d) **Grievance Redressal Cell for guidance of applicants:** In case of any guidance /information / clarification regarding applications, candidature, etc., applicants can contact Tamil Nadu Public Service Commission's Office in person or over Telephone No. 044-25332833 / 25332855 or the Commission's Office Toll-Free No. 1800 425 1002 on all working days between 10.00 a.m. and 05.45 p.m.
- e) **Mobile Phones and other Articles Banned**
- i. Applicants are not allowed to bring Pager, Cellular Phone, Calculator, Watches and Ring with Inbuilt Memory Notes etc., or any other Electronic device and Non Electronic devices such as P&G Design Data Book, Books, Notes, Hand Bags and Recording Device either as separate piece or part of something used by the applicant such as Watch or Ring etc., to the examination hall / room on the date of examination.
 - ii. Do not bring into the Examination Hall any article such as books, notes, loose sheets, electronic or any other type of calculators, mathematical and drawing instruments, Log Tables, stencils of maps, slide rules, Text Books, rough sheets etc., except the permitted writing material (i.e. pen).
 - iii. If they are found to be in possession of any such thing or instrument they will not be allowed to write the examination further, besides invalidation of answer paper and / or debarment. If it is considered necessary they will be subjected to thorough physical search including frisking on the spot ([For further details refer "Instructions to Applicants"](#)).
 - iv. **Applicants are advised in their own interest not to bring any of the banned items including Mobile Phones / Pager to the venue of the examination, as arrangements for safekeeping cannot be assured.**
- f) Unless specific instruction is given, applicants are not required to submit along with their application any certificates (in support of their claims regarding age, educational qualifications, physical qualification, community certificates and certificates regarding their physical disability etc.,) which should be submitted when called for by the Tamil Nadu Public Service Commission. The applicants applying for the examination should ensure that they fulfil all the eligibility conditions for admission to the Examination. Their admission at all the stages of examination for which they are admitted by the Commission viz. Written Examination and Oral Test will be purely provisional, subject to their satisfying the prescribed eligibility conditions. **If, on verification at any time before or after Written Examination, Certificate Verification and Oral Test, it is found that they do not fulfil any of the eligibility conditions, their candidature for the examination will be liable for rejection / cancellation by the Commission.** ([For further details refer "Instructions to Applicants"](#))
- g) If any of their claims is found to be incorrect, it will lead to rejection of their candidature and suitable penal action.
- h) **Unfair means strictly prohibited:** No applicant shall copy from the papers of any other applicant or permit his papers to be copied or give or attempt to give or obtain or attempt to obtain irregular assistance of any description. ([For further details refer "Instructions to Applicants"](#))
- i) **Conduct in Examination Hall:** No applicant should misbehave in any manner or create a disorderly scene in the Examination Hall or harass the staff employed by the Commission for

the conduct of the examination. Any such misconduct will be severely viewed and penalised. (For further details refer [“Instructions to Applicants”](#))

- j) For violation of “Instructions to Applicants” in any manner, suitable penalty will be imposed as per the “Instructions to Applicants” or as deemed fit by the Commission.

13 HOW TO APPLY

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

14 UPLOAD OF DOCUMENTS

The candidates must upload / submit the documents whenever called for specifically.

15. LAST DATE FOR SUBMITTING APPLICATION

The Online Application can be submitted upto 02.08.2017 till 11.59 p.m., after which the link will be disabled.

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

Secretary

DISCLAIMER

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

Secretary

ANNEXURE-I

Sl. No.	Degree considered as Equivalent to the Qualification prescribed in the Rule	G.O.
1	B.E. (Production Engineering) and B.E. (Industrial Engineering) awarded by the Universities in Tamil Nadu be treated as an equivalent qualification to the B.E. Degree in Mechanical Engineering.	G.O.No.183, Personnel and Administrative Reforms (R) Department, dated 06.06.1995.
2	B.E. (Civil and Transportation Engineering) awarded by Bharathiyar University be equivalent to B.E. (Civil Engineering).	G.O.(Ms).No.110, Public Works (B2) Department, dated 30.04.2008.
3	B.E. (Civil Engineering with Diversification in Construction Engineering and Management) awarded by Anna University, B.E. (Civil Engineering and Computer based construction) awarded by Anna University and Madurai Kamaraj University and B.E. (Civil Engineering with Diversification in Environmental Engineering) awarded by the Anna University be equivalent to B.E. (Civil Engineering).	G.O.(Ms).No.232, Public Works (B2) Department, dated 23.07.2008.
4	B.Sc., (Civil Engineering) awarded by Kurukshetra University as equivalent to B.E. (Civil Engineering).	G.O.Ms.No.260, Public Works (B2) Department, dated 16.11.09.
5	B.E Manufacturing Engineering (Part-time) awarded by Anna University as equivalent to that of B.E Mechanical Engineering of the Anna University.	G.O.Ms.No.9 Energy (B2) Department, dated 28.01.2010.
6	B.E. (Civil and Structural Engineering) is equivalent to B.E. (Civil Engineering) and B.E. (Mechanical and Production Engineering) is equivalent to B.E. (Mechanical Engineering).	G.O.(Ms) No.102, Agriculture (AA3) Department, dated 11.05.2010.
7	6 years integrated U.G. Level Engineering B.Tech. degree programme in Civil Engineering / Mechanical Engineering (for Speech and Hearing Impaired Students) awarded by Kalasalingam University is equivalent to B.Tech. in similar programmes offered by Anna University.	G.O.(Ms) No.41, Higher Education (J2) Department, dated 03.03.2014.

8	<ol style="list-style-type: none"> 1. B.E. (Environmental Engineering) Avinashilingam Institute for Home Science and Higher Education for Women Deemed University is equivalent to B.E. (Civil Engineering) 2. B.E. (Civil Engineering with Diversification in Building Technology) Anna University is equivalent to B.E. (Civil Engineering). 	G.O.(Ms)No.178, Higher Education (J1) Department, dated 17.07.2015.
9	B.Tech (Mechanical / B.Tech (Civil) (Part-Time) obtained from Vellore Institute of Technology, Vellore is equivalent to B.E. (Mechanical) / B.E. (Civil) (Regular)	G.O.(Ms) No.77, Higher Education (J2) Department, dated 03.03.2016.

ANNEXURE-II
PAPER-I (DEGREE STANDARD)

(a) AGRICULTURAL ENGINEERING

CODE NO: 280

UNIT-I: SURVEYING AND HYDROLOGY

Surveying – Instruments - Methods of surveying – Computation of area – Triangulation, intersection, traversing, cross staff survey – Plane table survey – Earth work computation - Simpson's trapezoidal rule - Levelling - Definition - Types of benchmarks - Different types of levels – Reduction of leveling data by rise and fall method and height of collimation method -Contouring – Profile surveying - Cross section survey - Use of Minor instruments - Hydrology – Measurement of rainfall, evaporation and infiltration – Estimation of runoff – Factors affecting runoff – Computation of volume of runoff and peak flow – Unit hydrograph - Occurrence of ground water, hydraulics of wells, types of wells and their construction - Well drilling – Techniques for different formations - Well logging - Types of well screen - Design of well screens - Well development - Yield testing.

UNIT-II: SOIL EROSION AND CONSERVATION

Soil erosion – Types – Factors affecting erosion by water and wind - Stages of water erosion -Biological control measures - Biological control measures and their suitability - Contour farming, strip cropping, mixed cropping, intercropping and mulching - Mechanical control measures and their suitability – Design and construction of contour bunds, graded bunds, terraces, contour stone walls, contour trenches, staggered trenches and diversion drain - Gully control structures and check dams - Wind erosion – Types and control - Dry farming techniques for improving crop production - Estimation of soil erosion - Universal Soil Loss Equation.

UNIT-III: WATERSHED DEVELOPMENT AND MANAGEMENT

Watershed – Concept, types and delineation - Land capability classification - Participatory rural appraisal technique – Watershed development plan – Estimation of cost and benefits -Gully and ravine reclamation – In-situ & Ex-situ water harvesting, micro catchments – Ground water recharge - Farm pond and percolation pond – Selection of suitable soil and water conservation practices – Afforestation – Holistic planning - Watershed based rural development – Use of aerial photography and remote sensing in watershed management - Applications of GIS in planning and development of watersheds including forest cover and water resources.

UNIT-IV: IRRIGATION AND DRAINAGE

Irrigation - Sources – Soil- water- Plant relationship - Water requirement of crops – Measurement of irrigation water - Weirs and flumes - Methods of irrigation - Surface, sprinkler and drip irrigation - Drip irrigation – Components - Wetting pattern - Filters and Fertigation tanks - Design of laterals - Submain - Main lines - Pump capacity - Operation and maintenance - Sprinkler irrigation - Components - Sprinkler performance - Hydraulic design of sprinkler systems - Duty and delta relationship – Irrigation scheduling - Irrigation efficiencies and their estimation - Pumps - Types, selection and installation - Drainage - Causes of water logging and salt problem - Methods of drainage - Design of surface, sub-surface and vertical drainage systems - Improvement and utilization of poor quality water - Reclamation of saline and alkali soils.

UNIT-V: FARM AND IRRIGATION STRUCTURES

Design and construction of farm structures – Site selection - Materials of construction – Quality– types of masonry – Foundation, basement and superstructure – Types of roofs – building plan and estimation, requirements of farm house, threshing floor, drying floor, poultry house, dairy farm, rat proof godown and farm roads - Design features earthen dams and gravity dams - Water conveyance structures – Earthen channels and lined channels – Advantages of lining – materials of lining – Design of channel cross section – Crossing control structures – Drop spillway, chute spillway, pipe inlet spill way – Road crossing structures – Culvert, inverted siphon aqueduct – Their uses - Underground pipe line system – Components and their functions – Structures for plant environment – Green houses, polyhouses and shadenets – Construction and utilization - Soil less culture.

UNIT-VI: FARM POWER

Agricultural mechanization – Scope and sources of farm power - Animate and electromechanical - Thermodynamics - Construction and working of internal combustion engines - Fuel, ignition, lubrication, cooling, air intake, exhaust, governing and electrical systems of IC engines - Different types of tractors and power tillers - Power transmission, ground drive, power takeoff, steering, brake, implement control and hydraulic systems - Bulldozer – Features, traction, suspension, steering, operations using bulldozer – Weight transfer, theory of traction – Tractive efficiency – Mechanics and stability – Care and maintenance of tractors.

UNIT- VII: FARM MACHINERY

Farm machinery - Primary tillage implements – Mould board plough, disc plough and chisel plough - Secondary tillage implements – Cultivators, harrows and rotary tillers - Land shaping machinery – Leveller, ridger and bund former - Sowing and transplanting – Seed drills, planters and rice transplanters - Interculture implements - Plant protection equipment – Sprayers and dusters - Harvesting, threshing and combining equipment - Machinery for earth moving and land development - Machinery for horticulture, agro-forestry and forages – Haulage of agricultural and forest produces - Management of farm machinery - Cost estimation for farm operations.

UNIT-VIII: UNIT OPERATIONS IN FOOD AND AGRICULTURAL PROCESSING

Heat transfer principles – Conduction, convection and radiation - Types of heat exchangers - Unit operations – Evaporators - Types - Mechanical separation – Filtration – Sedimentation – Settling – Centrifugal separation – Cyclone separation - Size reduction – Mixing – Blending – emulsification - Food processing operations - Pasteurization – Sterilization – Canning - Retort processing - Extrusion processing of foods - Methods of drying of foods – Preservation of food by irradiation - Microwave and dielectric heating - Fats and oil processing – Extraction methods and equipments - Food packaging – Materials and characteristics – Suitability - Processing of milk and milk products, packaging of milk - Principles of refrigeration and applications in food industries – Cold storage of fruits and vegetables - Design aspects.

UNIT- IX: PROCESS ENGINEERING OF AGRICULTURAL AND HORTICULTURAL CROPS

Engineering properties of food materials – Moisture content – Methods of determination – Psychrometry - Drying – Thin layer and deep bed drying – Types of heat sources and types of dryers - Cleaning and grading – Principles – Separators – Efficiency – Performance index - Shelling and decortication – Seed processing and layout of seed processing units - Rice processing – Parboiling and dehusking of paddy – Machines used - Milling of wheat, corn and pulses - Material handling equipments - Conveyors and elevators - Storage – Conditions for safe storage – Bag and bulk storage – Silo storage - Design aspects - Modified atmosphere storage – Storage structures - Equipments used for processing of horticultural crops – Preservation of fresh fruits and vegetables – Drying and dehydration – Processing of coffee, tea, rubber, cashew nut, coconut, oil palm, aromatic plants, flowers and spices.

UNIT-X: RENEWABLE AND BIOENERGY

Solar energy – Solar collectors – Air heaters – Water heaters – Solar photovoltaic systems and applications - Wind energy - Suitable sites – Types of wind mills – Wind mill components – Applications – Performance of wind mills - Biomass resources – Agro residues – Characteristics - Conversion technologies – Biochemical conversion – Biogas plant – Types and selection, construction, operation and maintenance - Slurry handling - Thermochemical conversion – Stoves – Types - Improved stoves – Pyrolysis – Charcoal production – Gasification – Briquetting – Cogeneration - Energy plantation and environmental impact – Global warming – Clean development mechanism (CDM) and role of afforestation - Biofuels – Biodiesel feedstock, production and by-product utilization – Ethanol – Production and utilization – Emission - Standards and control.

PAPER-I (DEGREE STANDARD)

(b) BASICS OF ENGINEERING

Code No.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- Departmentation- 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, SO₂, CO, CO₂, 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.

PAPER-II**GENERAL STUDIES (DEGREE STANDARD/OBJECTIVE TYPE)****(Code No: 003)****UNIT-I: GENERAL SCIENCE**

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

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

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

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

UNIT- II: CURRENT EVENTS

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

Political Science 1. India's foreign policy 2. Latest court verdicts – public opinion 3. Problems in conduct of public elections 4. Political parties and political system in India 5. Public awareness & General administration 6. Role of Voluntary organizations & Govt., 7. Welfare oriented govt. schemes, their utility

Geography Geographical landmarks-Policy on environment and ecology.

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

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

UNIT-III : GEOGRAPHY

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

UNIT-IV: HISTORY AND CULTURE OF INDIA

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

UNIT-V: L INDIAN POLITY

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

public life- Anti-corruption measures – Central Vigilance Commission, lok-adalats, Ombudsman, - Comptroller and Auditor General of India- Right to information - Central and State Commission- Empowerment of women- Voluntary organizations and public grievances Redressal- Consumer protection forms

UNIT- VI: INDIAN ECONOMY

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

UNIT-VII: INDIAN NATIONAL MOVEMENT

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

UNIT-VIII: APTITUDE AND MENTAL ABILITY TESTS

Conversion of information to data-Collection, compilation and presentation of data - Tables, graphs, diagrams-Parametric representation of data-Analytical interpretation of data -Simplification-Percentage-Highest Common Factor (HCF)-Lowest Common Multiple (LCM)-Ratio and Proportion-Simple interest-Compound interest-Area-Volume-Time and Work-Behavioural ability -Basic terms, Communications in information technology- Application of Information and Communication Technology (ICT)- Decision making and problem solving-Logical Reasoning-Puzzles-Dice-Visual Reasoning-Alpha numeric Reasoning-Number Series-Logical Number/Alphabetical/Diagrammatic Sequences.
