

# **ANDHRA PRADESH PUBLIC SERVICE COMMISSION: HYDERABAD**

**NOTIFICATION NO.06/2016, Dt.17/08/2016**

## **ASSISTANT EXECUTIVE ENGINEERS IN VARIOUS ENGINEERING SERVICES (GENERAL RECRUITMENT)**

### **PARA – 1:**

Applications are invited On-line for recruitment to the post of **Assistant Executive Engineers in various Engineering Services**.

The profoma Application will be available on Commission's Website ([www.psc.ap.gov.in](http://www.psc.ap.gov.in)) from **18/08/2016 to 21/09/2016**. (Note:21/09/2016 is the last date for payment of fee up- to 11:59 mid night).

Before applying for the post, applicant primarily shall register their bio-data particulars through One Time Profile Registration (OTPR) on the Commission Website viz., [www.psc.ap.gov.in](http://www.psc.ap.gov.in). Once applicant registers his/her particulars, a User ID is generated and sent to his/her registered mobile number and email ID. Applicants need to apply for the post using the OTPR User ID through Commission's website.

*The Examination is likely to be held between 3rd November,2016 and 5<sup>th</sup> November,2016.*

*HALL TICKETS can be downloaded 7 days before commencement of Examination.*

*The recruitment test will be in Computer Based Recruitment Method. The objective type question papers are to be answered on computer system. Instructions regarding this computer based recruitment test are detailed in the Annexure - III.*

The applicant is facilitated with MOCK TEST to acquaint with the computer base recruitment test. Applicant shall visit the website and practice the answering pattern under MOCK TEST option available on main page of website [www.psc.ap.gov.in](http://www.psc.ap.gov.in)

The desirous and eligible applicant may apply ON-LINE by satisfying themselves with the terms and conditions of this recruitment. The details are as follows:-

<b>Post Code</b>	<b>Name of the post and Department</b>	<b>Number of posts</b>	<b>Age as on 01/7/2016 Min. Max.</b>	<b>Scale of pay Rs.</b>
01	AEE (Civil) in A.P. PH & ME Department	56	18-40*	Rs.37,100-91,450
02	AEE (Civil / Mech) in A.P. Tribal Welfare Engineering Department.	41		
03	AEE (Civil) in A.P. Water Resources Department.	473		
04	AEE (Mech) in A.P. Water Resources Department.	63		
05	AEE (Civil / Mech) in A.P Panchayat Raj Engineering Service.	113		
06	AEE (Mech / Agrl..) in A.P Ground Water Department	02		
<b>Grand Total</b>		<b>748</b>		

**IMPORTANT NOTE:** Distribution of vacancies among roster points is subject to variation and confirmation from the Unit Officer/ Appointing authority.

**(The details of vacancies viz., Community, Zone, State-Wide and Gender wise (General / Women) may be seen at Annexure-I)**

### **PARA-2: EDUCATIONAL QUALIFICATIONS:**

Applicant must possess the qualifications as detailed below or equivalent thereto, subject to various specifications in the relevant service rules and as indented by the department as on the date of notification, i.e., **17/08/2016**.

<b>Post Code</b>	<b>Name of the Post</b>	<b>Educational Qualifications</b>
01	AEE (Civil) in A.P PH & ME Department.	Must possess a Bachelor's Degree in Civil Engineering of a University in India established or incorporated by or under a Central Act, State Act or an Institution Recognized by the University Grants Commission / AICTE or a Pass in Sections 'A' and 'B' of AMIE (India) Examination in Civil Engineering

02	AEE (Civil / Mech) in A.P Tribal Welfare Engineering Department.	Must be a Graduate in Engineering (Civil / Mechanical) from any University in India established or incorporated by or under a Central Act, or a State Act or an Institution Recognized by the University Grants Commission or an Equivalent qualification.
03	AEE (Civil) in A.P. Water Resources Department.	Must possess a Bachelor's Degree in Civil Engineering of a University in India established or incorporated by or under a Central Act, Provincial Act or a State Act or an Institution Recognized by the University Grants Commission / All India Council for Technical Education or an Equivalent qualification.
04	AEE (Mech) in A.P. Water Resources Department.	Must possess a Bachelor's Degree in Mechanical Engineering of a University in India established or incorporated by or under a Central Act, Provincial Act or a State Act or an Institution Recognized by the University Grants Commission / All India Council for Technical Education or an Equivalent qualification.
05	AEE (Civil / Mech) in A.P Panchayat Raj Engineering Service.	Must possess a Bachelor's Degree in Civil or Mechanical Engineering of a University in India established or incorporated by or under Central Act, or a Provincial Act or a State Act or an Institution Recognized by the University Grants Commission or a Pass in Sections 'A' and 'B' of AMIE Examination conducted by Institute of Engineers in Civil or Mechanical or AMIE and B.Sc. (Engg.) of Ranchi University or an equivalent qualification.
06	AEE (Mech / Agrl.) in A.P Ground Water Department	Must possess a B.E. Degree (Mechanical) or B.Tech. (Agricultural Engineering) of a University or an Institution recognized by the University Grants Commission or an equivalent qualification.

**PARA-3 AGE:** No person shall be eligible for direct recruitment if he/she is less than 18 years of age and if he/she is more than 40 years of age as on 01/07/2016.

*\*As per G.O.Ms.No 295 General Administration (Ser. A) Dept., Dt.23/03.2014 the upper age limit raised up to 6 years i.e from 34 to 40 years*

**Age Relaxations:** The upper age limit prescribed above is relaxable in the following cases:

Sl. No.	Category of candidates	Relaxation of age permissible
1.	Retrenched temporary employees in the State Census Department with a minimum service of 6 months.	3 Years
2.	A.P. State Government Employees (Employees of APSEB, APSRTC, Corporations, Municipalities etc. are not eligible).	5 Years based on the length of regular service.
3.	Ex-Service men	3 years & length of service rendered in the armed forces.
4.	N.C.C.(who have worked as Instructor in N.C.C.)	3 Years & length of service rendered in the N.C.C.
5.	SC/ST and BCs	5 Years
6.	Physically Handicapped persons	10 Years

**EXPLANATION:**

After provision of the relaxation of Age in Col. No. 3 of table above; the age shall not exceed the maximum age prescribed for the post for the candidates at Sl. No. 3 & 4.

The age relaxations for Ex-Servicemen is applicable for those who have been released from Armed Forces otherwise than by way of dismissal or discharge on account of misconduct or inefficiency.

**PARA - 4: RESERVATION TO LOCAL CANDIDATES:**

Reservation to the Local candidates is applicable as provided in the Rules and as amended from time to time as in force on the date of notification. The candidates claiming reservation as Local candidates should obtain the required Study certificates (from IV Class to X Class or SSC) OR Residence Certificate in the Proforma only for those candidates who have not studied in any Educational Institutions as the case may be. The relevant certificates with authorized signature shall be produced as and when required.

**DEFINITION OF LOCAL CANDIDATE:**

- i) "LOCAL CANDIDATE" means a candidate for direct recruitment to any post in relation to that Local areas where he/she has studied in Educational Institution(s) for not less than four consecutive academic years prior to and including the year in which he/she appeared for S.S.C or its equivalent examination. If however, he/she has not studied in any educational institution during the above four years period, it is enough if he/she has resided in that area which is claimed as his/her local area during the above said period.
- ii) In case Candidate does not fall within the scope of above then, if he/she has studied for a period of not less than seven years prior to and inclusive of the year in which he/she has studied SSC or its equivalent, he/she will be regarded as local candidate on the basis of the maximum period out of the said period of seven years AND where the period of his/her study in two or more local areas or equal such local area where he/she has studied last in such equal periods will be taken for determining the local candidature. Similarly, if he/she has not studied during the above said period in any Educational Institution(s) the place of residence during the above period will be taken into consideration and local candidature determined with reference to the maximum period of residence or in the case of equal period where he/she has resided last in such equal periods.
- iii) If the claim for local candidature is based on study, the candidate is required to produce a certificate from the Educational Institution(s) where he/she has studied during the said 4/7-year period. If, however, it is based on residence, a certificate should be obtained from an officer of the Revenue Department not below the rank of a Mandal Revenue Officer in independent charge of a Mandal.
- iv) If, however, a candidate has resided in more than one Mandal during the relevant four/seven years period but within the same District or Zone as the case may be separate certificates from the Mandal Revenue Officers exercising jurisdiction have to be obtained in respect of different areas.

**NOTE:**

- (A) Single certificate, whether of study or residence would suffice for enabling the candidate to apply as a "**LOCAL CANDIDATE**".
- (B) RESIDENCE CERTIFICATE WILL NOT BE ACCEPTED, IF A CANDIDATE HAS STUDIED IN ANY EDUCATIONAL INSTITUTION UPTO S.S.C. OR EQUIVALENT EXAMINATION, SUCH CANDIDATES HAVE TO PRODUCE STUDY CERTIFICATES INVARIABLY. THE CANDIDATES, WHO ACQUIRED DEGREE FROM OPEN UNIVERSITIES WITHOUT STUDYING SSC/ MATRICULATION OR EQUIVALENT IN EDUCATIONAL INSTITUTIONS, HAVE TO SUBMIT RESIDENCE CERTIFICATE ONLY. EDUCATIONAL INSTITUTIONS MEANS A RECOGNIZED INSTITUTION BY THE GOVERNMENT / UNIVERSITY/COMPETENT AUTHORITY.
- (C) Candidates are advised to refer provisions of the PRESIDENTIAL ORDER 1975 in this regard
- (D) *G.S.R. 591(E).—In exercise of the powers conferred by clauses (1) and (2) of article 371D of the Constitution, the President hereby makes the following Order further to amend the Andhra Pradesh Public Employment (Organisation of Local Cadres and Regulation of Direct Recruitment) Order, 1975, namely:-*
  1. (1) this order may be called the Andhra Pradesh Public Employment (Organisation of Local Cadres and Regulation of Direct Recruitment) Amendment Order, 2016. (2) It shall come into force at once.
  2. In the Andhra Pradesh Public Employment (Organisation of Local Cadres and Regulation of Direct Recruitment) Order, 1975, in paragraph 7, after sub – paragraph (2) and before the Explanation, the following subparagraph shall be inserted, namely:-  
“(3) Notwithstanding anything contained in sub-paragraph (1) or (2), candidates who migrate to any part of the State of Andhra Pradesh from the State of Telangana within a period of three years from the 2<sup>nd</sup> day of June, 2014 shall be regarded as the local candidate in the State of Andhra Pradesh at the place of his residence and be treated at par with the local candidates residing in that area, in accordance with such guidelines as may be issued by the Government of Andhra Pradesh for the purpose of employment.

Note: At the time of verification, candidates who have migrated from Telangana to Andhra Pradesh in between 2<sup>nd</sup> June,2014 and 1<sup>st</sup> June, 2017 shall produce local Status certificate as laid out in circular memo No.4136/SPF & MC/2015-5, Dated.08/08/2016.

(E) The composition of Districts in each zone is as hereunder:

**Zones:**

1. Srikakulam, Vizianagaram and Visakhapatnam. (SKM, VZM,VSP,)
2. East Godavari, West Godavari and Krishna. (EG, WG, KST)
3. Guntur, Prakasam and Nellore. (GNT, PKM, NLR)
4. Chittoor, kadapa, Anantapur and Kurnool. (CTR, CDP, ATP, KNL)

**PARA - 5 HOW TO APPLY:****A) HOW TO UPLOAD THE APPLICATION FORM:**

(i) The Applicants have to read the User manual for On-Line submission of application and then proceed further. User manual is available at [www.psc.ap.gov.in](http://www.psc.ap.gov.in)

**I STEP:** The applicant has to fill the OTPR application to obtain ID Number. While filling the same, the candidates have to ensure that there are no mistakes in it. The Commission bears no responsibility for the mistakes, if any, made by the candidates.

**II STEP:** The applicant has to fill and submit Application and Click on the Link with Notification Number and Name, OTPR ID Number and Date of Birth to proceed further.

Applicant has to verify the details as obtained from OTPR database displayed on the screen. If any details are to be changed, applicant should go back to the website and use the Modify OTPR link. In addition to the details obtained from OTPR database, Notification specific details such as Examination City opted, eligibility and accepting declarations etc. are to be filled by the applicant. (Preview and Edit facility is available to make changes) and SUBMIT the application form. An Application Fee ID is generated and sent through the SMS/email after successful submission of application form, which is to be used for payment of Fee.

**III STEP:-** Once the Application Fee ID is generated, select the payment of Fee option for paying through either Net banking / Credit Card / Debit Card OR APOnline Centre.

**IV STEP:-** After payment of fee, the PDF Application will be generated which contains the particulars furnished by the applicant. The Application Fee ID No in the PDF Application form has to be quoted for future reference/correspondence.

- i) Applicant shall note that, the details available with OTPR database at the time of submitting the application will be considered for the purpose of this notification. If, any changes are made by the applicant to OTPR database at a later date will not be considered for the purpose of this Notification.
- ii) Hand written/ Typed/ Photostat copies/ outside printed Application Form will not be accepted and liable for rejection.
- iii) For any Technical problems related to Online submission and downloading of Hall Tickets please contact 040- 29802633 (Call Time: 10.30 A.M to 1.00 P.M & 1.30 P.M to 5.00 P.M) or mail to [appschelpdesk@gmail.com](mailto:appschelpdesk@gmail.com)

**NOTE:**

1. The Commission is not responsible, for any omissions by the applicant in bio-data particulars while submitting the application form On-Line. The applicants are therefore, advised to strictly follow the instructions given in the User guide before submitting the application.
2. The particulars furnished by the applicant in the Application Form will be taken as final, and data entry processed, based on these particulars only by Computer. Candidates should, therefore, be very careful in Uploading / Submitting the Application Form Online.
3. INCOMPLETE/INCORRECT APPLICATION FORM WILL BE SUMMARILY REJECTED. THE INFORMATION IF ANY FURNISHED BY THE CANDIDATE SUBSEQUENTLY WILL NOT BE ENTERTAINED BY THE COMMISSION UNDER ANY CIRCUMSTANCES. APPLICANTS SHOULD BE CAREFUL IN FILLING-UP THE APPLICATION FORM AND SUBMISSION. IF ANY LAPSE IS DETECTED DURING THE SCRUTINY, THE CANDIDATURE WILL BE REJECTED EVEN THOUGH HE/SHE COMES TO THE FINAL STAGE OF RECRUITMENT PROCESS OR EVEN AT A LATER STAGE.
4. Before Uploading/Submission Application Form, the Candidates should carefully ensure his/her eligibility for this examination. NO RELEVANT COLUMN OF THE APPLICATION FORM SHOULD BE LEFT BLANK; OTHERWISE APPLICATION FORM WILL NOT BE ACCEPTED.

**PARA - 6: (a) FEE:**

**Applicant must pay Rs. 250/- (Rupees Two Hundred and Fifty Only) towards application processing fee and Rs 120/- (Rupees One Hundred and Twenty Only) towards Examination Fee.**

**However,** the following categories of candidates are exempted from payment of examination fee (Rs.120/-).

- a) SC, ST, BC, PH & Ex-Service Men.
- b) Families having Household Supply White Card issued by Civil Supplies Department, A.P. Government. (Residents of Andhra Pradesh)
- c) Un-employed youth in the age group of 18 to 40\* years as per G.O.Ms.No. 439, G.A.(Ser.A) Dept., dated: 18/10/1996 should submit declaration at an appropriate time to the Commission.

- d) Applicants belonging to the categories mentioned above (except Physically Handicapped Persons & Ex-Service Men) hailing from other States are not entitled for exemption from payment of fee and not entitled for claiming any kind of reservation.

**b) Mode of Payment of Fee:**

- i) The Fee mentioned in the above paragraph is to be paid online through two different channels viz., (i) Online using Payment Gateway using Net Banking/ Credit card / Debit Card and (ii) AP Online Centers.. The list of Banks providing service for the purpose of online remittance of Fee will be appended separately.
- ii) The fee once remitted shall not be refunded or adjusted under any circumstances. Failure to pay the examination fee, application fee will entail total rejection of application.
- iii) IPO's / Demand Draft are not accepted

**PARA-7: SCHEME OF EXAMINATION:-** The Scheme & Syllabus for the examination has been shown in Annexure-II. For the purpose of writing paper-III the candidate has to choose the branch of Engineering related to the subject of study in the Degree.

**PARA - 8: CENTRES FOR THE WRITTEN EXAMINATION:**

The CBR TEST WILL BE HELD AT ALL THE DISTRICTS in Andhra Pradesh AND HYDERABAD. The applicant may choose the Test City with three preferences. However the Commission reserves the right to allot the applicant to any centre of examination depending on the availability of computer systems.

**PARA - 9 PUBLICATION OF ANSWER KEYS:**

On completion of CBRT, the answer keys will be hosted on the Commission's website and candidates are allowed to file the objections, if any, within the specified period, with supportive documents towards his/her claim.

The answer keys shall be finalized by the experts group duly considering all the objections and selections shall be processed. No objections will be entertained after due date.

**PARA -10 NOTE ON IMPORTANT LEGAL PROVISIONS GOVERNING THE RECRUITMENT PROCESS:**

1. Vacancies: The recruitment will be made to the vacancies notified only. There shall be no waiting list as per G.O. Ms. No. 81 General Administration (Ser. A) Department, Dated 22/02/1997 and Rule 6 of APPSC Rules of procedure. In any case, no cognisance will be taken by Commission of any vacancies arising or reported after the completion of the selection and recruitment process or the last date as decided by the Commission as far as this Notification is concerned, and these will be further dealt with as per G.O. & Rule cited above.
2. The Recruitment will be processed as per this Notification and also as per the Rules and Instructions issued by the Government and also as decided by the Commission from time to time in terms of respective Special Rules/ Adhoc Rules governing the Recruitment applicable in this regard.
3. Rules: The various conditions and criterion prescribed herein are governed by the General Rules of A.P. State and Subordinate Service Rules, 1996 read with the relevant Special Rules applicable to any particular service in the departments. Any guidelines or clarification is based on the said Rules, and, in case of any necessity, any matter will be processed as per the relevant General and Special Rules cited as in force.
4. The Commission is empowered under the provisions of Article 315 and 320 of the Constitution of India read with relevant laws, rules, regulations and executive instructions and all other enabling legal provisions in this regard to conduct examination for appointment to the posts notified herein, duly following the principle of order of merit as per Rule 3(vi) of the APPSC Rules of Procedure read with relevant statutory provisions and ensuring that the whole recruitment and selection process is carried out with utmost regard to maintain secrecy and confidentiality so as to ensure that the principle of merit is scrupulously followed. A candidate shall be disqualified for appointment, if he himself or through relations or friends or any others has canvassed or endeavored to enlist for his candidature, extraneous support, whether from official or non-official sources for appointment to this service.
5. Zonal/Local: In terms of Para 4 of the G.O., A.P. Public Employment (Organization of Local Cadres and Regulation of Direct Recruitment) Order, 1975 (G.O.Ms.No. 674, G.A. (SPF-A) Dept., dated: 20/10/1975) read with G.O.Ms.No.124, General Administration (SPF-A) Department, dated: 07/03/2002, and other orders/instructions issued by the Government in this regard 60% of posts are to be filled by local cadre candidates and remaining 40% of

posts are open for which local and non-local are to be considered on the basis of combined merit list. *This clause is applicable for all post codes except Pc. No. 06 which is State level post covered under GSR 526-E of G.O. Ms. No. 675, Dated: 20/10/1975.*

6. The persons already in Government Service/ Autonomous bodies/ Government aided institutions etc., whether in permanent or temporary capacity or as work charged employees are however required to inform in writing, their Head of Office/ Department that they have applied for this recruitment.
7. The Commission is also empowered to invoke the penal provisions of the other Public Examinations (Prevention of Malpractices and Unfair means) Act 25/97 for matters connected therewith or incidental thereto in respect of this Notification. Any regulations with reference to malpractices in force at the time of examination also will be applicable.
8. **Caste & Community:** Community Certificate issued by the competent authority in terms of G.O. Ms No. 58, SW (J) Dept., dt: 12/5/97 should be submitted at appropriate time. As per General Rules for State and Subordinate Service Rules, Rule -2(28) Explanation: No person who professes a religion different from Hinduism shall be deemed a member of Schedule Caste. **BCs, SCs & STs belonging to other States are not entitled for reservation, Candidates belonging to other States shall pay the prescribed fee of Rs. 120/- (One hundred and Twenty only) through to different channels as indicated at Para-4. Otherwise such applications will not be considered and no correspondence on this will be entertained.**
9. Reservation and eligibility in terms of General Rule 22 of A.P. State and Subordinate Service Rules are applicable.
10. Reservation to Disabled persons is subject to their eligibility to any of the above category of posts and shall be subject to Special Rules/Adhoc Rules governing the posts. The required extent of deformity and the genuineness of the Medical Certificate and in the case of ambiguity or doubt, the same shall be referred to the Appellate Medical Boards as per the instructions of the Government orders of Hon'ble Supreme Court with reference to reservations for PH will be applied.
11. The Reservation to Women will apply as per G.O. Ms. No. 40, DWCD & SC (Prog. II) Dt. 25/07/2016..
12. Reservation to BC-E group will be subject to the adjudication of the litigation before the Honorable Courts including final orders in Civil Appeal No: (a) 2628-2637 of 2010 in SLP. No. 7388-97 of 2010, dated. 25/03/2010 and orders from the Government.
13. Government have issued orders in G.O. Ms. No. 3, Backward Classes Welfare(C-2) Department, Dated 04.04.2006 read with G.O. Ms. No. 26 Backward Classes Welfare(C) Department, Dated 09.12.2013 laying down the criteria to determine Creamy Layer among Backward Classes in order to exclude from the provisions of reservations. Government of Andhra Pradesh have adopted all the criteria to determine the Creamy Layer among Backward Classes as fixed by the Government of India. In view of the Government orders, in G.O. Ms. No. 3, Backward Classes Welfare(C-2) Department, dated 4/4/2006 read with G.O. Ms. No. 26 Backward Classes Welfare(C) Department, Dated 09.12.2013, **the candidates claiming to be belonging to Backward Classes have to produce a Certificate regarding their exclusion from the Creamy Layer from the competent authority (Tahasildar). The Certificate excluding from Creamy Layer has to be produced at an appropriate time. B.C. Candidates whose Parent's income is less than 6.00 Lakhs per annum come under Non-Creamy Layer. In case of failure to produce the same on the day of verification, the Candidature will be rejected without further correspondence.**

**PARA- 11 Please read the following Annexures appended to the notification before filling the application form**

- Annexure- I- Break up of vacancies
- Annexure- II- Scheme & Syllabus
- Annexure- III- Instructions to candidates
- Annexure- IV- LIST OF SC / ST /BC's

**PARA-12: PROCEDURE OF SELECTION:**

THE SELECTION OF CANDIDATES FOR APPOINTMENT TO THE POSTS SHALL BE DONE BASED ON THE MERIT IN THE COMPUTER BASED RECRUITMENT TEST, TO BE HELD AS PER THE SCHEME OF EXAMINATION ENUNCIATED AT PARA 7 ABOVE.

1. The minimum qualifying marks for consideration of candidate to the selection process of OCs 40%, BCs 35% SCs, STs and PHs 30% or as per rules. The minimum qualifying marks is relaxable in the case of SC/ST/BC/PH at the discretion of the Commission.
2. The candidates will be selected and allotted to Service/ Department as per their rank in the merit list and as per zonal preference opted by the applicant at the time of making application to the post online.

N.B.: Mere securing minimum qualifying marks does not confer any right to the candidate for being considered to the selection.

3. The appearance in all the papers is compulsory. Absence in any of the papers will automatically render his candidature as disqualified.

4. Candidate as and when called for by the Commission to certificate verification, shall produce Original documents. If **candidate fails to produce the certificates if any and/or** the particulars furnished in the Application do not tally with the Original documents produced by the candidate, the candidature will be rejected/**disqualified without any further correspondence**. As candidature for the recruitment is processed through Computer/Electronic devices based on the particulars furnished in the Application Form, the candidate is advised to fill in all the relevant particulars carefully.

5. While the Commission calls for preference of candidates in respect of posts, zones etc., in the application form, it is hereby clarified that the said preferences are only indicative for being considered to the extent possible but not binding or limiting the Commission's powers under Article 315 and 320 of the Constitution of India. Therefore, the Commission has the power to assign a candidate to any of the notified posts for which he is considered to be qualified and eligible, subject to fulfilling the selection criterion. Mere claim of preference for any Zone for allotment against vacancy does not confer a right to selection for that Zone in particular or any Zone in general.

6. The appointment of selected candidates will be subject to their being found medically fit in the appropriate medical classification, and if he/she is of sound health, active habits free from any bodily defect or infirmity.

**PARA-13:DEBARMENT:**

- a) Candidates should make sure of their eligibility to the post applied for and that the declaration made by them in the format of application regarding their eligibility is correct in all respects. Any candidate furnishing in-correct information or making false declaration regarding his/her eligibility at any stage or suppressing any information is liable TO BE DEBARRED FOR FIVE YEARS FROM APPEARING FOR ANY OF THE EXAMINATIONS CONDUCTED BY THE COMMISSION, and summarily rejection of their candidature for this recruitment.
- b) The Penal Provisions of Act 25/97 published in the A.P. Gazette No. 35, Part-IV.B Extraordinary dated: 21/08/1997 shall be invoked if malpractice and unfair means are noticed at any stage of the recruitment. Further candidates shall be liable for penalty under any relevant Rules/Regulations in force as on the date of examination.
- c) The Commission is vested with the constitutional duty of conducting recruitment and selection as per rules duly maintaining utmost secrecy and confidentiality in this process and any attempt by anyone causing or likely to cause breach of this constitutional duty in such manner or by such action as to violate or likely to violate the fair practices followed and ensured by the Commission will be sufficient cause for rendering such questionable means as ground for debarment and penal consequences as per law and rules as per decision of the Commission.
- d) Any candidate is or has been found impersonating or procuring impersonation by any person or resorting to any other irregular or improper means in connection with his / her candidature for selection or obtaining support of candidature by any means, such a candidate may in addition to rendering himself/ herself liable to criminal prosecution, will be liable to be debarred permanently from any exam or selection held by the Service Commission's in the country.
- e) **MEMORANDUM OF MARKS:** Memorandum of Marks is issued on payment of Rs.50/- (Rupees Fifty only) through Online payment facility available on psc.ap.gov.in. Request for Memorandum of Marks from candidates, will be entertained within two months from the date of publication of the selections. Such a request must necessarily be accompanied by a Xerox copy of the Hall-ticket. Request for revaluation or recounting will not be under taken under any circumstances. Invalid, disqualified, ineligible candidates will not be issued any Memorandum of Marks and fees paid by such candidates, if any, will be forfeited to Government account, without any correspondence in this regard.

**PARA-14: COMMISSION'S DECISION TO BE FINAL:**

The decision of the Commission in all aspects and all respects pertaining to the application and its acceptance or rejection as the case may be, conduct of examination and at all consequent stages culminating in the selection or otherwise of any candidate shall be final in all respects and binding on all concerned, under the powers vested with it under Article 315 and 320 of the Constitution of India. Commission also reserves its right to alter and modify regarding time and conditions laid down in the notification for conducting the various stages up to selection, duly intimating details thereof to all concerned, as warranted by any unforeseen circumstances arising during the course of this process, or as deemed necessary by the Commission at any stage.

HYDERABAD  
DATE:17/08/2016

Sd/-  
PRINCIPAL SECRETARY

**NOTIFICATOIN NO. 06/2016****BREAKUP OF PROVISIONAL VACANCIES FOR THE POST OF ASSISTANT EXECUTIVE ENGINEERS VARIOUS ENGINEERING SERVICES****PC. No. 01: Assistant Executive Engineers (Civil) in A.P. Public Health & Municipal Engineering Dept.,**

Zone	OC		BC-A		BC-B		BC-C		BC-D		BC-E		SC		ST		*PH		Total		Grand Total
	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W	
I	4	2	1	1	-	1	-	-	1	-	1	-	2	1	-	-	-	-	9	5	14
II	2	3	1	-	-	-	-	-	1	1	1	-	1	1	-	-	1(OH)	-	7	5	12
III	3	1	1	-	1	1	-	-	-	-	-	-	-	-	1	-	-	-	6	2	8
IV	6	3	1	-	2	-	-	-	1	1	1	-	3	1	1	1	1(OH)	-	16	6	22
<b>Total:</b>	15	9	4	1	3	2	-	-	3	2	3	-	6	3	2	1	2(OH)	-	38	18	56

**PC. No. 02: Assistant Executive Engineers (Civil / Mechanical) in A.P Tribal welfare Engineering Department.**

Zone	OC		BC-A		BC-B		BC-C		BC-D		BC-E		SC		ST		*PH		Total		Grand Total
	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W	
I	9	3	-	1	1	1	-	-	2	-	1	-	2	1	1	-	1(HH)	-	17	6	23
II	4	2	2	-	1	-	-	-	-	-	-	1	1	1	1	-	-	-	9	4	13
III	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	2	2
IV	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1(VH)	-	2	1	3
<b>Total:</b>	14	6	2	1	2	1	-	-	2	-	1	1	4	3	2	-	1	1	28	13	41

**PC. No. 03: Assistant Executive Engineers (Civil) in A.P Water Resources Dept.,**

Zone	OC		BC-A		BC-B		BC-C		BC-D		BC-E		SC		ST		*PH		Total		Grand Total
	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W	
I	31	13	2	1	4	6	1	1	4	1	3	3	5	4	2	5	1(VH) 1(HH)	1(OH) 1(HH) 1(VH)	54	37	91
II	23	12	4	2	4	4	1	1	3	1	4	2	9	4	4	7	2(VH) 1(OH)	1(HH) 1(VH)	55	35	90
III	35	18	4	2	6	4	1	-	5	1	4	2	8	5	5	7	2(HH) 1(VH)	1(OH) 1(HH) 1(VH)	71	42	113
IV	51	25	12	2	10	6	-	2	9	4	6	1	13	11	6	11	3(HH) 3(VH)	2(OH) 1(HH) 1(VH)	113	66	179
<b>Total:</b>	140	68	22	7	24	20	3	4	21	7	17	8	35	24	17	30	14	12	293	180	473

**PC. No. 04: Assistant Executive Engineers (Mechanical) in A.P Water Resources Dept.,**

Zone	OC		BC-A		BC-B		BC-C		BC-D		BC-E		SC		ST		*PH		Total		Grand Total
	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W	
I	4	4	1	1	-	-	-	-	-	-	-	1	1	-	1	1	-	-	07	07	14
II	3	1	1	-	-	-	1	-	-	1	-	2	1	-	-	-	-	-	06	04	10
III	5	2	1	-	1	-	-	-	-	-	-	1	-	1	1	-	1(HH)	-	09	04	13
IV	12	4	2	-	1	-	-	-	1	-	-	-	2	1	1	-	2(HH)	-	21	5	26
<b>Total:</b>	24	11	5	1	2	-	1	-	1	1	-	4	4	2	3	1	3	-	43	20	63



**ANNEXURE – II**  
**NOTIFICATION NO.06/2016**

**SCHEME AND SYLLABUS FOR RECRUITMENT TO THE POSTS OF ASSISTANT  
EXECUTIVE ENGINEERS VARIOUS ENGINEERING SERVICE  
GAZETTED SERVICES**

**SCHEME OF EXAMINATION**

**WRITTEN EXAMINATION (OBJECTIVE TYPE) BACHELOR'S DEGREE STANDARD**

<b><u>PAPER 1 :</u></b> i) General Studies	150 Marks	150 Questions	150 Minutes
<b><u>PAPER 2 :</u></b> Concerned Subject  Civil & Mechanical (Common) OR Agriculture	150 Marks	150 Questions	150 Minutes
<b><u>PAPER 3:</u></b>  Civil OR Mechanical OR Agriculture	150 Marks	150 Questions	150 Minutes
<b>Total:</b>	<b>450 Marks</b>		

NB: The candidate has to appear for Papers of his / her subject of study at Engg. Degree. i.e B.E / B. Tech (concerned Subject)

**PAPER -I**

**GENERAL STUDIES**

1. Events of national and international importance.
2. Current affairs- international, national and regional.
3. General Science and it applications to the day to day life Contemporary developments in Science & Technology and information Technology
4. Social- economic and political history of modern India with emphases on Indian national movement.
5. Indian polity and governance: constitutional issues, public policy, reforms and e-governance initiatives.
6. Economic development in India since independence.
7. Physical geography of India sub-continent.
8. Disaster management: vulnerability profile, prevention and mitigation strategies, Application of Remote Sensing and GIS in the assessment of Disaster
9. Sustainable Development and Environmental Protection
10. Logical reasoning, analytical ability and data interpretation.
11. Data Analysis:
  - a) Tabulation of data
  - b) Visual representation of data
  - c) Basic data analysis (Summary Statistics such as mean and variance coefficient of variation etc.) and Interpretation
12. Bifurcation of Andhra Pradesh and its Administrative, Economic, Social, Cultural, Political, and legal implications/problems, including
  - a). Loss of capital city, challenges in building new capital and it's financial implications.
  - b). Division and rebuilding of common Institutions.
  - c). Division of employees, their relocation and nativity issues.
  - d). Effect of bifurcation on commerce and entrepreneurs.
  - e). Implications to financial resources of state government.
  - f). Task of post-bifurcation infrastructure development and opportunities for investments.
  - g). Socioeconomic, cultural and demographic impact of bifurcation.

- h). Impact of bifurcation on river water sharing and consequential issues.  
 i). AP REORGANISATION ACT, 2014 on AP and the arbitrariness of certain provisions.

## **PAPER-2: COMMON FOR CIVIL AND MECHANICAL ENGINEERING**

### **Strength of Material:**

Forces, moments, Equilibrium; Applying the Equation of Equilibrium, Planar Trusses; Friction; Forces and Moments Transmitted by Slender members-shear Force and Bending Moment Diagrams; Mechanics of Deformable Bodies-Force –deformation –Relationships and Static Indeterminacy, Uniaxial Loading and Material Properties, Analysis of Statically Determinate and Indeterminate Trusses. Deflection of Statically Determinate Trusses.

Force –Stress- Equilibrium – Multi axial Stress and Strain and their relationship; Linear Elasticity – Material Behaviour – Stress-strain-temperature Relationships and Thin-walled Pressure Vessels. Thick Cylinders. Stress Transformations and Principal Stress, Stress and Strain Transformation, Theories of Failure.

Bending : Stress and Strains; Deflections – Pure Bending, Moment –curvature relationship. Deflection of statically determinate beams using Macaulay's method, Moment-Area Method and Conjugate Beam Method.

Torsion; Energy Methods –Torsion and Twisting, Energy Methods

### **Fluid Mechanic and Machinery**

Basic principles of fluid mechanics – pascal's law, transmission & multiplication of force, basic properties of hydraulic fluids , density , specific weight specific gravity , viscosity and bulk modulus, continuity equation, Bernoulli's eq., Torricelli's theorem laminar v/s turbulent flows ,static head pressure, pressure losses ,hydraulic system; Fluid Statics – Hydrostatics, Fluid forces on planes and curved surfaces, submerged and floating bodies, Buoyancy and stability. Control Volume analysis; Basic laws – Mass conservation law, thermodynamic laws, Newton's laws, Angular-Momentum principle; Flows in a pipes and channels – friction factor; Governing equations of fluid flows – continuity, Euler equations, Navier-stokes equations, internal flows; external flows, Flow separation;

Flow measurement devices – Gross measurement: Venturi meter, Orifice meter, notches and weirs, turbine flow meters, rotameters; Point measurement: pitot tubes, hot wire/film anemometer, their measurement principles and sources of errors; calibration, uncertainty estimation.

Hydraulic pumps-pumps flow and pressure, pump drive, torque and power, efficiency, types of pumps-gear, vane, piston; pressure compensated pumps, cavitation and aeration, velocity triangles, centerline thermodynamic analysis

Hydraulic Directional Control –Check Valves, Shuttle Valves, two-three- and four-Way Directional Control Valves, Directional Control Valve Actuation

Hydraulic Pressure Control – Pressure Relief Valves, Unloading Valves, Pressure Reducing Valves, Sequence Valves, Counterbalance Valves, Pressure Compensated Pumps

Turbines – performance characteristics for low and high speed machines, centerline thermodynamic analysis, velocity triangles, hydraulic turbines – pelton, Francis and Kaplan turbine

## **AGRICULTURAL ENGINEERING - PAPER-2**

**I. Surveying and Leveling and Theodolite:** Surveying – objectives, primary divisions, classification, principles of surveying units of measurement, difference between a plan and a map. Scales – representative fraction, types of measuring scales, degree of accuracy. Linear measurements – method of measurement of pacing, chains and their constructional details, chain types, folding and unfolding of chains, measuring tapes, instruments for chain survey. Ranging – chaining on flat and sloping grounds, chain and tape correction. Chain surveying –

definitions, method of booking field notes, offsets, layout of off-sets, cross staff survey, obstacles in chaining, problems on errors in chaining. Computation of areas by planimeter. Compass survey – types of traverse, meridians bearing – types, designation of bearings, fore and back bearings, calculation of included angles from bearings. Description of prismatic and surveyor compass – method of using prismatic compass, magnetic declination, determination of true bearings from magnetic bearings, running a compass traverse. Local attraction – problems on correction of local attraction. Plane table survey – accessories of plane table, basic definitions, setting of plane table, orientation, methods of plane tabling.

Leveling – basic definitions, methods of leveling, classification of direct leveling. Instruments used in leveling – dumpy level, leveling staff. Temporary adjustments of dumpy level. Bench marks. Booking the staff readings – methods of reducing levels. Leveling difficulties and errors in leveling.

Theodolite – components and temporary adjustments of a theodolite – measurement of horizontal angles by direct method, repetition and reiteration method – measurement of vertical and deflection angles. Measurement of deflection angles, magnetic bearings of line – traversing by included angles – traverse computations and volume computations.

**ii. Fluid mechanics and Open Channel Hydraulics:** Fluids – classification, properties and dimensions. Fluid pressure – measurement, manometry, classification of manometers. Fluid static force on submerged surfaces – total force on horizontal, vertical and inclined surfaces, center of pressure and practical applications – kinematics of fluid flow – lines of flow, general types of fluid flow, equation of continuity, flow net boundary layer theory. Dynamic of fluid flow – various forms of energy in fluid flow, frictional loss, general energy equation, Bernoulli's theorem, Euler's equation of motion. Practical applications of Bernoulli's theorem. Venturi meter, Pitot tube, orifice meter. Buoyancy Floatation – meta centric height. Flow through orifices and mouthpieces – vena contracta, hydraulic coefficient and their experimental determination. Flow over weirs and notches – classification, discharge measurement through rectangular, triangular, trapezoidal weirs, broad crested weirs, flow through pipes – laws of head in pipes, pipes in series and compound pipes, equivalent size. Open channel hydraulics, classification of open channels and definitions, most economical sections of regular cross sections, specific energy concepts – Critical depth, energy diagrams, velocity and pressure profiles in open channels, hydraulic jump – types.

**iii. Soil Mechanics:** Soil mechanics – definitions and relationships, Classification of soils – particle size distribution, sieve analysis, sedimentation analysis, Stokes law. Consistency of soils – determination of liquid, plastic and shrinkage limits. Permeability – Darcy's law, discharge velocity and seepage velocity, coefficient of permeability. Seepage of Soils – flownet properties and uses. Elasticity applied to soils – stress distribution, Bousinesq's stress distribution theory, Isobar and pressure bulb, Vertical Pressure under uniformly loaded rectangular area, Comparison of Bousinesq's theory with linear theory, Westergard's theory. Newmark's influence chart, consolidation – process of consolidation relationship between void ratio and pressure, coefficient of volume change, time factor, settlement of soil. Compaction – introduction, factors. Shear strength – definition, Mohr's circle, Mohr Coulomb failure theory, measurement of shear strength. Earth pressure – active and passive earth pressure, Rankine's theory, slip circle method, Coulomb's wedge theory. Design requirements of retaining wall. Stability of slopes – types of failure and remedial measures. Bearing capacity – Rankine's analysis, Terzaghi's analysis, general and local shear failure, plate load test.

**iv. Electronics:** Photoelectricity – photoelectric emission, laws of photoelectric emission, phototube and photo multiplier tube. Thermo electricity – Seebeck effect, Peltier effect, variation of e.m.f. with temperature, laws of thermo electricity, thermo couple, thermometer. Alternating currents – average value, r.m.s. value of A.C. circuits with resistance, inductance and capacitance, L.C.R. circuits resonance circuits, watt meter, A.C. frequency measurement, transformers. Electronics – types of emission, methods of heating, vacuum tubes, diode, space charge, diode characteristics, Child's law of diode, rectifiers, half wave and full wave rectifiers, filter circuit types. Triode – action of grid, triode characteristics, tube constants, inter electrode capacitance, multi-electrode tubes, triode as an amplifier, classification of amplifiers. Metals semi conductors and insulators – N type, P type, germanium, P N junction diodes, junction triode transistors NPN and PNP.

**v. Fundamentals of soil science:** Nature and properties of soil – soil genesis and classification. Soil clay and organic matter. Physical and chemical properties of soils. Soil fertility and its evaluation. Soil water relations. Acidic, saline and alkali soils and their management.

Determinations of the followings: Total soluble salts by EL method, available nitrozens, available P.K. chlorides by mohars method, sulphates, calcium, (ca + mg), sodium, potassium, computation of SAR, RSC.

**vi. Strength of materials:** Introduction – units and dimensions – simple stresses and strains, elastic limit, compressive stress, tensile stress, principle of super position, stresses in bars of uniform tapering circular section, stresses in composite bars, elastic constants, primary secondary strains, poissions's ratio, volumetric strain, bulk modulus, shear modulus, and their relationships. Principal stresses and strains – analytical and graphical methods. Strain energy and impact loading – strain energy stored in a body gradually applied, suddenly impact, shock load, proof resilience. Shear force and bending moment of beams – cantilever, over handing, simply supported, application of point load, uniformly distributed load. Bending stresses in beams – theory of simple bending, neutral axis, moment of resistance, section modulus, bending stress in unsymmetrical sections. Shearing stresses in beams – loaded beam, distribution of shear stresses, different sections. Deflection of simple beams – relation between slope, deflection and radium of curvature. Methods of determination of slope and deflection and radius of curvature. Methods for determination of slope and deflection – double integration. Macaulay's method.

**vii. Soil Physics:** Dynamic properties of soils – bulk density, particle density, porosity, void ratio, volume expansion, soil consistency, soil compaction, soil strength. Soil texture, soil separates, particle size analysis, stoke's law, derivation, it's applicability and limits of validity. Classification of soil types, significance of soil texture, soil structure – definition, genesis, classification, evaluation of soil structure, indices of soil structure – methods of improving soil structure. Soil water, structure of water, properties of water, potential terminology, soil moisture potentials, soil moisture tensions, pF values, soil moisture constants, loss of soil water movement in saturated and unsaturated conditions, general flow equations, water infiltration into soil profile and its redistribution, infiltration equations, seepage and deep percolation losses. Soil temperature – thermal properties of soils, heat transfer in the soils, modifying the thermal regime of soils. Soil air-composition of soil air, movement of gases through soils, influence of aeration on plant growth, measurement of soil aeration. Soil air management. Physically problematic soils and their management.

**viii. Fundamentals of Agronomy:** Agriculture in India – definition of agriculture and agronomy, development of scientific agriculture, important events in Indian agriculture, important national and international institutes.

Agricultural meteorology – introduction, definition of meteorology, weather and climate and their importance in agriculture. Weather aberrations – inadequate and excess rainfall, unseasonal rains, cyclones, depressions, cold and heat waves, frost, hailstorms, hurricanes. Tornado. Drought and their effect on crop production. Weather forecasting – importance, types of forecasting, synoptic charts, weather forecasting organisations. Agroclimatic zones of Andhra Pradesh. Agricultural seasons in the state.

Tillage and tilth – objectives, characteristics of good tilth, types of tillage, preparatory cultivation, intercultivation, aftercultivation and preparatory cultivation for low land rice. Sowing – Methods of sowing – Time and depth or sowing.

Crops and their classification. Manures and fertilizers – method and time of application, relationship between soil moisture and fertilizer application. Weeds – definitions, their influence on crop production, principles of crop weed competition, critical periods of weed competition in different crops, principles of weed management and methods of weed control. Crop water requirements – critical stages of irrigation in important crops, scheduling of irrigation, methods of irrigation and water use efficiency. Cropping systems – definition. Principles of crop rotation and mixed cropping. Problems of dry land agriculture and water shed management.

**ix. Hydrology:** Hydrology – definition, hydrologic cycle and its components. Forms of precipitation – rainfall, measurement and analysis, point rainfall analysis, probability analysis, determination of net effective rainfall, phi index. Runoff – components, factors affecting runoff, estimation of design peak runoff rates, rational method, curve number method, rainfall runoff relations. Hydrographs – components, factors affecting hydrographs, separation of hydrographs for simple and complex storms. Unit hydrographs – concept and derivation, conversion of unit hydrographs, superposition method, S curve method. Synthetic units hydrographs – Necessary and derivation, Snyder's method and applications, instantaneous unit hydrograph. Flood routing – introduction, basic equations, hydrologic storage routing, modified Puls's method.

**x. Thermodynamics and Heat Engines:** Basic concepts of thermodynamics – thermodynamic equilibrium, energy and forms of energy, heat and work, thermal capacity and specific heat. Ideal gases – introduction, laws of perfect gases. Specific heats of gases. Laws of thermodynamics – zeroth law, first law, thermodynamic processes based on first law, entropy, second law of thermodynamics, refrigerator & heat pump, reversibility and irreversibility, Carnot's theorem. Gas cycles – efficiencies. Air standard cycles – efficiencies. Fuels types, calorific values of fuels, Bomb calorimeter, Boy's gas calorimeter, properties of fuels, apparatus for determination of fuel properties. Combustion of fuels– combustion equations, carbon analysis, flue gas analysis, Orsat apparatus. Heat engines – E.C. and I.C. engines, classification of I.C. engines, principles of operation, S.I. and C.I. engines, two stroke and four stroke engines, valve timing diagrams. Testing of I.C. engines – IHP, BHP, air consumption, fuel consumption, air-fuel ratio, efficiencies, heat balance sheet. Reciprocating air compressors – working, workdone. Horse power, volumetric efficiency, isothermal efficiency, multistage air compressors, inter cooling, condition for maximum power, P V diagrams. Formation and properties of steam, entropy of steam.

**xi. Electrical Engineering and Farm Electrification:** Basic electrical quantities – specific resistance temperature coefficient. Network theorems – Kirchoff's laws, Maxwell's loop method. Nodal analysis – superposition theorem, Thevenin's theorem. Star delta transformation. D.C. generators – classification, lap and wave wound generators, E.M.F. equation of a generator, losses, condition for maximum efficiency, armature reaction, commutation. D.C. motors – maximum power, armature torque, shaft torque, speed regulation. Motor characteristics – series motors, shunt motors, compound motors. Motors starters. Farm electrification and load estimation. Transformers – introduction, working principles. A.C. motors – types of motors, starting torque, running torque, starting of induction motors. Types of single-phase motors.

**xii. Computer Programming in 'C':** Computers – introduction, types, generation of computers, input output devices, central processing unit, memory devices, processors, key board, printers, 'C' Language – introduction, importance of 'C' basic structure of 'C' programme, algorithms, flow charts, programming translation. Programming preliminaries and fundamentals – constants, variables, data types, operators and expressions, input and output in 'C' decision making and branching, decision making and looping, arrays, functions, common programming errors. Writing of complete programmes - programme on mean, standard deviation and coefficient of variation, summation of series, quadratic equations, matrices addition, subtraction and multiplication, correlation and linear regression. Application of 'C' language for solving the problems related to agricultural engineering.

**xiii. Engineering Mechanics:** Introduction – units and dimensions. Classification of force system – coplanar, colinear, concurrent, coplanar parallel forces, resolution of forces. Condition of equilibrium - action and reaction, free body diagram. Support reactions – types of supports, types of loading, finding reactions of simply supported, overhanging, roller and hinged beams, analytical and graphical methods. Analysis of perfect frames – types, reaction of supports of a frames – types, reaction of supports of a frame by method of joints, method of sections and graphical method. Center of gravity and moment of inertia – determination by method of moments, theorems of parallel and perpendicular axes, product of inertia. Friction – definitions, types, laws of friction, angle of repose, equilibrium of a body, analysis of ladder and wedge friction. Lifting machines – definitions, law of machine, study of important lifting machines. Virtual work – principle, units and applications.

**xiv. Refrigeration and Air Conditioning:** Principles of refrigeration – units, terminology, production of low temperatures, air refrigerators working on reversed Carnot cycle and bell

Coleman cycle. Vapour compression refrigeration – mechanism, PV, PS, PH diagrams, vapour compression cycles, dry and wet compression, superheating and sub cooling, Vapour absorption refrigeration system. Common refrigerants and their properties. Design calculations for refrigeration systems. Cold storage plants.

Air conditioning – factors of human comfort, equipment used in A/C cycle, classification of A/C system, winter, summer and central A/C system, design calculations for air conditioning systems.

**xv. Mechanical Measurements and Instrumentation:** Measurement and its significance – methods of measurement, instruments, classification of instruments, elements of a generalised measurement system, errors in measurement and their uncertainty. Detector transducer elements – introduction, primary and secondary transducers, classification, signal conditioning and data presentation elements, static performance characteristics of instruments. Measurement of pressure – introduction, types of pressure measuring devices, ranges and their application. Measurement of strain – introduction, strain gauge, resistance strain gauge theory, strain gauge circuits, strain gages arrangement for the measurement of axial force, bending force, torque and pressure. Measurement of temperature – introduction, classification of temperature measuring devices, methods of measuring temperature, Measurement of sound – introduction, measurement of sound using microphones. Measurement of vibration – introduction, seismic transducers, types of accelerometers. Study of miscellaneous instruments – tachometers, stroboscope, proving ring, LVDT.

**xvi. Theory of structures:** Theory of structures – introduction, moment, slope, deflection equations and applications of propped, fixed and continuous beams, theorem of three moments. Stresses in thin walled vessels – cylindrical and spherical. Combined bending and axial thrust of columns – Euler's formulae for long struts, practical applications, empirical column formula.

**xvii. Heat and Mass Transfer:** Heat transfer – modes of heat transfer. Heat transfer by conduction – through tubes, composite tube section, plain and composite walls, overall heat transfer coefficient, critical insulation thickness, unsteady state heat conduction with known temperature distribution, with negligible internal thermal resistance, application of Heisler chart heat transfer by convection free and forced convection, determination of Nusselt's number with dimensional analysis. Heat transfer by radiation – black body concept, Planck's law, Stefan Boltzmann's law, gray body, emissive power of gray body, emissivity, Kirchoff's law, combined heat transfer coefficient, fouling factor, LMTD and NTU method of heat exchanger analysis.

Mass Transfer – molecular diffusion in gases, liquids and solids, unsteady state diffusion, convective mass transfer coefficients.

### **PAPER – 3 : OPTIONAL FOR CIVIL ENGINEERING**

1. BUILDING MATERIALS: Timber: Different types and species of structural timber, density – moisture relationship, strength in different directions, defects, preservations, plywood.

Bricks: Types, Indian standard classification, absorption, saturation factor, strength in masonry, influence of mortar strength on masonry strength.

Cement: Compounds of different types, setting times, strength.

Cement mortar: Ingredients, proportions, water demand, mortars for plastering and masonry.

Concrete: Importance of w/c ratio, strength, ingredients including admixtures, workability, testing for strength, mix design methods, non-destructive testing.

2. STRUCTURAL ANALYSIS: General theorems : theorems relating to elastic structures, principles of virtual work, strain energy in elastic structures, complementary energy, Castigliano's theorem, Betti's and Maxwell's reciprocal theorems.

Analysis of determinate structures – Deflection of determinate beams by double integration Macaulay's movement area and conjugate beam methods, Analysis of indeterminate skeletal frames-Moment distribution, Slope deflection, Kani's, Stiffness and force methods, Energy methods, Plastic analysis of indeterminate beams and simple portal frames..

3. DESIGN OF STEEL STRUCTURES: Principles of working stress method. Design of bolted and welded connections, axially and eccentrically loaded joints, Simple connection of bracket plates to columns, beam to beam and beam to column connections, design of framed, unstiffened and stiffened seat connections Design of industrial roofs. Principles of ultimate load design. Design of simple members.

4. DESIGN OF CONCRETE AND MASONRY STRUCTURES: Limit state design for bending, Shear, Axial compression and combined forces. Codal provision for slabs, Beams, Columns and footings. Working stress method of design of R.C. members. Principles of pre-stressed concrete design, Materials, Methods of pre-stressing, losses. Design of simple members and determinate structures. Design of brick masonry as per IS codes.

5. CONSTRUCTION PLANNING AND MANAGEMENT: Bar chart, Linked bar chart, Work break down structures, Activity – on – arrow diagrams. Critical path, Probabilistic activity durations, Event based networks. PERT network: Time-cost study, Crashing, Resource allocation.

6. HYDROLOGY AND WATER RESOURCE ENGINEERING: Hydrological cycle, Precipitation and related data analysis, Unit hydrographs, Evaporation and transpiration. Floods and their management, Stream gauging, Routing of floods, Capacity of reservoirs. Multi purpose uses of water: Soil-plant – Water relationships, Irrigation systems. Water demand assessment: Storages and their yields. Ground water yield and well Hydraulics. Water logging and drainage design. Design of rigid boundary canals, Lacey's and tractive force concepts in canal design, Lining of Canals, Sediment transport in canals, Non-overflow and overflow dams and their design, Energy dissipaters, Design of head works, Distribution works, Falls, Cross-drainage works, Outlets, River training.

7. ENVIRONMENTAL ENGINEERING:

- Water Supplying Engineering: Sources of supply, Yields, Design of intakes and conductors, Estimation of demand. Water quality standards, Control of water borne diseases. Primary and secondary treatment. Conveyance and distribution systems of treated water, Leakages and control. Rural water supply. Institutional and industrial water supply.
- Waste Water engineering: Urban rain water disposal, Systems of sewage collection and disposal. Design of sewers and sewerage systems, Pumping. Characteristics of sewage and its treatment. Disposal of products of sewage treatment. Plumbing systems. Rural and semi-urban sanitation.
- Solid Waste Management: Sources and effects of air pollution, Monitoring of air pollution, Noise pollution, Standards, Ecological chain and balance. Environmental assessment.

8. SOIL MECHANICS AND FOUNDATION ENGINEERING: Properties and classification of soil, Compaction, Permeability and Seepage, Flow nets, Compressibility and consolidation. Stress distribution in soils, Shearing resistance, Stresses and failure. Soil testing in laboratories and in-situ, Earth pressure theories, Soil exploration. Types of foundations, Selection criteria, Bearing capacity, Settlement, Laboratory and field tests, Design of shallow foundations. Types of piles and their design and layout. Foundations on expansive soils.

9. SURVEYING AND TRANSPORT ENGINEERING: Classification of surveys, Scales, Accuracy, Measurement of distances, Direct and indirect methods, Optical and electronic devices, Measurement of directions, Prismatic compass, Local attraction, Theodolites, Types, Measurement of elevations, Spirit and trigonometric leveling, Contours, Digital elevation modeling concept, Establishment of control by triangulations and traversing, Measurement and adjustment of observations, Computation of coordinates, Field astronomy, Concept of global positioning system, Map preparation by plane tabling and by photogrammetry, Remote sensing concepts, Map substitutes. Planning of Highway systems, Alignment and geometric design, Horizontal and vertical curves, Grade separation, Highway Materials and construction methods for different surfaces and maintenance. Principles of pavement design, Drainage. Traffic surveys, Intersections, Signaling, Mass transit systems, Accessibility, Networking.

### **Paper-3 OPTIONAL FOR MECHANICAL ENGINEERING**

#### ***Thermodynamics***

Definition of system & control volume, properties and state of a substance, units of mass, length, time, force, energy and work; Equality of temperature, Zeroth Law; Properties of Pure Substances – Pure substance; phase change and phase equilibrium; properties tables and diagrams; Ideal gas law, deviation from ideal law and compressibility factor; Work & Energy – Definition of work and energy; First Law of Thermodynamics; internal energy, enthalpy and

specific heat of gases, liquids and solids; energy analysis of closed system; mass and energy analysis of control volumes; Second of Thermodynamics – Thermal efficiency and coefficient of performance; Kelvin-Planck and Clausius statements and their equivalence; reversibility and its departure; Carnot cycle; thermodynamic temperature scale; Entropy – Clausius inequality; entropy change for pure substance; entropy generation and principle of entropy increase; entropy change for reversible process; entropy change for ideal gases; Exergy – Work potential of energy; reversible work and irreversibility; Second Law efficiency; Exergy change of a system; Exergy transfer by heat, work and mass; Exergy balance for closed system and control volumes; Power & Refrigeration Cycles – Air standard power cycles: Otto Cycle, Diesel Cycle, Stirling & Ericsson Cycle; Brayton Cycle and its variants; Second law analysis of gas power cycles; Rankine Cycle and its variants; Vapour Compression Cycle; Second law analysis of vapour power cycles

### **Heat Transfer**

Steady state conduction in one and two-dimensional systems – one dimensional unsteady state conduction; analytical and numerical methods. Extended surface heat transfer (Fins). Convection: Basic equations, Dimensional analysis, Boundary layers; Forced convections: External and internal flows, correlations, Natural convection and Mixed convection. Design of heat exchangers: LMTD and NTU methods. Radiation heat transfer: Basic laws, properties of surfaces, view factors, network method and enclosure analysis for gray – diffuse enclosures containing transparent media, engineering treatment of gas radiation; boiling and condensation

### **Refrigeration and Air Conditioning**

Refrigerating machines, heat pump, vapour compression system, second law efficiency of vapour compression cycle, refrigerants – section of a refrigerant; thermodynamic, chemical and physical requirements, substitutes of CFC refrigerants; Multi-stage systems, components of a refrigerator – Compressor, condensers, expansion devices, evaporators; Gas cycle refrigeration; Vapour absorption

system; Properties of moist air and psychometric chart; psychrometry of air-conditioning processes; solar radiation, heat transfer through buildings and load calculations; Component design of airconditioning units.

### **Turbomachines**

Dimensional analysis – incompressible and compressible fluid analysis, performance characteristics for low and high speed machines, cavitation; 2D Cascades – cascade geometry, flow characteristics, forces, performance, turbine cascades; Axial flow turbines – mean line analysis, velocity vector diagram, thermodynamic analysis, multistaging and losses per stage of axial turbines, effect of reaction on efficiency, turbine blade cooling; axial compressor – mean line analysis, velocity diagram, thermodynamic analysis, multistage analysis, high Mach number compressors, stall and surge phenomenon; Centrifugal Pumps, fans and compressors – their definitions and differences, Thermodynamic analysis, diffuser performance, slip factor, Performance analysis, choking in a compressor; Hydraulic Turbines – Pelton, Francis and Kaplan turbines, cavitation

### **Theory of Machines**

Basic Kinematic concepts: Introduction to mechanisms, Links, Kinematic pairs, Kinematic chains, Mechanism and Inversions, Kennedy's theorem, Velocity and acceleration in mechanism, Relative velocity methods, Instantaneous center of rotation, Acceleration diagram, Acceleration center. Cams: Synthesis of translating flat-face, translating roller and oscillating roller follower cams. Gears: terminology, fundamental law of gearing, involute profile, Interference and undercutting, minimum number of teeth, contact ratio, bevel helical, spiral and worm gears, Gear Trains – simple, compound and epicyclic gear trains; sliding gear boxes and synchronous gear boxes.

Dynamics of machines: Dynamics of Rigid Bodies in Plane Motion; Dynamic Force Analysis of Machines. Balancing of inertia forces: Balancing of rotors, balancing of inline internal combustion engines. Friction Devices: Introduction to friction, Belt, chain and rope drive, Transmission of Power through friction clutch

## **Machine Design**

Design consideration – limits, fits, tolerances, and standardization, a brief introduction to strength of materials, modes of failure, failure theories, design of shafts under static and fatigue loadings, design of springs – helical, compression, tension, torsional and leaf springs, design of joints – threaded fasteners, preloaded bolt joints, welded and glued joints, design and analysis of sliding and rolling contact bearings, analysis and applications of power screws and couplings, analysis of clutches and brakes, design of belt and chain drives, design of spur and helical gears

## **Machine Drawing and Solid Modelling**

Principle of drawing. Introduction to machine drawing, production drawing, assembly drawing. Different sectional views. Fits, limits, tolerances and surface finish. Introduction to computer aided design, fundamentals of computer graphics; geometric modelling of synthetic curves: Hermite, Bezier, B-spline, NURBS. Parametric representation of surfaces: plane, ruled, revolution; Part modelling techniques: wireframe, surface and solid modelling, data representation and exchange formats, geometry and topology. Three-dimensional transformations and projections. Solid modelling of different machine elements. Example, threads, bolts, and nuts, welded and riveted joints, shafts, keys, cotter, and pin joints; couplings and clutches, springs, belts, and pulleys; bearings, gears. Assembly of different components of IC engine

## **Engineering Materials**

Concepts of metallurgy and materials science, types of materials (metals, ceramics, polymers, hybrids), material properties (structural and functional), application orientated material design, some case studies: biomaterials, automotive, aerospace, etc. Structure of metals, Determination of structure and chemical composition, concepts of alloys, phase and phase diagrams. Imperfections in

crystals-point defects, dislocations and voids, theory of dislocations, strengthening mechanisms, diffusion in solids, heat treatments and phase transformations, mechanical response and microstructure-property relationship.

## **Manufacturing Science**

Introduction to Manufacturing and its evolution, Net and near-net shape manufacturing; Metal Casting: Solidification of Alloys and its mechanism, Gating System Design and Estimation of Solidification time, Riser Design and Riser Placement, Process Variations, Defects and Product Design; Metal Forming: Mechanism of plastic deformation, fundamentals of plasticity, Introduction to Force equilibrium method, State of Stress and boundary conditions in Upsetting/forging, Rolling, Wire and tube drawing, Extrusion and Deep Drawing, Defects, Load estimation for one plane strain and one axisymmetric bulk deformation processes, Analysis of Deep Drawing and Bending, Introduction to High velocity forming processes; Powder Processing (Metals and Ceramics), Polymer Part Manufacturing, Introduction and properties of polymer melts and Visco-elasticity, Processing of Thermoplastics (Extrusion, Injection Molding, Blow Molding, Rotational Molding) and Thermosets (compression and transfer molding), Tool and product design principles; Rapid Manufacturing: Need for RP/RT/RM, Introduction to Processes for Prototyping, Tooling and Manufacturing; Joining and Welding: Introduction, Solid State and Fusion Joining, Brazing and Soldering, Mechanical and Adhesive Joining, Metal and nonmetal joining; Metrology: Tolerancing (Dimensional and Geometric) principles and their measurements (Geometrical tolerances using point data), Interferometry – principles, flatness testing using optical flat, optical interferometers, Moire fringe system measurements.

Conventional Removal and Finishing Processes: Importance of Material Removal and allied processes, classification; Chip Formation; Types of Chips; Tool Specification: Coordinate and Orthogonal Systems; Mechanics of Metal Cutting: Merchant's Circle Diagram, Stress, Strain and Strain Rate, determination of Shear Plane Angle; Tool Wear and Tool Life; Variables affecting Tool Life; Practical Machining Operations: Turning, drilling, milling; Finishing Operations: Grinding (MRR estimation, Wheel Specifications, Wheel Wear) and other processes; Economics of machining: Minimum Production Cost Criterion, Maximum Production Rate and Maximum

Profit Rate Criteria; Unconventional Removal and Finishing Processes: Abrasive Jet Machining, Ultrasonic Machining; Electro Discharge Machining; Abrasive Jet Machining; Electron Beam Machining; Laser Beam Machining, Finishing processes (AFM and other variants); MicroManufacturing and Scaling Laws: Miniaturization and its importance, MicroManufacturing Processes (Additive, formative and Removal), Scaling laws with emphasis on microManufacturing.

### **Computer Integrated Manufacturing**

Current developments in CAD- feature based modeling, design by feature, function, feature linkages, application of feature based models, parametric modeling; Computer Aided Manufacturing: fundamentals of part programming, path generation, post processing and verification; Group Technology, Computer aided process planning (CAPP), computer aided inspection and reverse engineering, manufacturing process simulation, virtual and distributed manufacturing, computer integrated manufacturing.

### **Industrial Engineering**

Basics of probability and statistics, Linear Programming and applications, Queuing theory and its applications, forecasting approaches, Monte Carlo simulation procedure (OR). Inventory models discussion (deterministic and probabilistic Models), Newsvendor model, Inventory Planning and Control, Decision support system tools, Economic Order Quantity (EOQ). Product Design: Design for Manufacture and Assembly (DFM), Concurrent engineering Work systems design: Work study and classifications, Method study – work measurement, work sampling, Cost Estimation, Calculation of Machining Times, Cost Depreciation, Productivity, Productivity Measurement, Time study, Recording Techniques for Work Study, Information Collection Techniques, Job Evaluation, Ranking system,

Incentive Schemes, Individual/Group-Company-wide Bonus Schemes, Behavioural aspects of Incentives Plant layout, Ergonomics, CRAFT, Cellular Manufacturing, Scheduling, Assembly Line Balancing, Future directions in Production. Quality management and control: Quality Improvement, Cost of Quality, Statistical Process Control, Central Tendency and Dispersion, Control Charts, Acceptance Sampling, New Quality Concepts, Taguchi Methods, Design of Experiments (DoE), Robust Design, Ishikawa Diagram, ISO certification, Kaizen, Zero Defects Program, Total Quality Management (TQM), Six Sigma; Maintenance Management: Preventive and breakdown maintenance approaches, reliability, Work study for Maintenance, Total Productive Maintenance (TPM), Spare Parts Management, Characteristics and classification of Spare parts; Supply Chain design, scheduling, layout design: Materials Requirement Planning (MRP), MRP-II, Enterprise Resource Planning (ERP), Logistic, Distribution and Supply chain Management, Applications of Newsvendor model in supply chain

### **Modelling and Simulation**

Introduction to modelling and simulation, introduction to symbolic and numerical computations, degrees of freedom, modelling in dependent and independent coordinates, Lagrange equations, state space formulation, Newton-Raphson method, explicit integrator, implicit integrator, dynamics of constrained mechanical systems as differential algebraic equations, Baumgaurte stabilization, Gauss principle, and inverse problems

### **PAPER-3: OPTIONAL ONLY FOR AGRICULTURAL ENGINEERING**

**I. Agricultural process Engineering (Unit Operations):** Introduction to unit operations – classification, conservation of mass and energy SI system of units, consistency of units. Size reduction – principles of comminution, characteristics, particle size distribution, energy and power requirements, crushing efficiency, Rittinger's, Kick's and Bond's laws of crushing. Size reduction equipments – crushers, hammer mills, attrition mills and ball mills. Mixing – mixing of solids, pastes and liquids, characteristics of mixtures, blending, emulsification, mixing index, mixing and blending equipments. Evaporation – single and multiple effect evaporators steam economy, vacuum evaporation, vapour compression, boiling point elevation. Evaporation equipments – open pan, short and long tube evaporators, forced circulation evaporators. Mechanical separations – filtration filter cake resistance, filtration equipment, sedimentation, gravitational sedimentation of particles in fluid and gas, setting under combined forces, cyclone

separator, centrifugal separator. Moisture content – determination methods, equilibrium moisture content. Psychrometry – terms, chart and application. Drying process – theories in drying, methods of drying, classification of dryers. Contact equilibrium separation process – concentrations, extraction, rate of extraction, stage equilibrium extraction. McCabe and Theile plot. Distillation – stage distillation, steam, vacuum and batch distillation, distillation equipment.

**II. Process Engineering for agricultural produce:** Engineering properties of agricultural produce – physical, thermal and aerodynamic properties, force deformation curve of food grains. Principles of threshing – threshing equipment, types, care and maintenance. Principles of winnowing – winnower types. Cleaning and separation – principles, equipment, effectiveness of separation, selection of separating machines. Grading – principles equipment. Rice processing – parboiling of paddy, traditional and modern methods of parboiling, drying equipment, methods of rice milling, rice husk and bran utilisation, layout of modern rice mill, manufacturing process for puffed, flaked and extruded products. Cereal processing – wheat milling, maize shelling, Milling, Degerming. Milling of pulses, Red gram, black gram and green gram. Oil seed processing. Sugarcane crushers. Seed technology – terminology, storage of seeds and treatment. Principles of grain storage – parameters affecting storage, changes occurring during storage, moisture migration, storage insects, pests and their control. Fumigation – principles, properties of fumigants and applications, rodent control. Grain storage structures – bag and bulk storage of grains. Grain handling equipment – bucket elevator, belt, screw and pneumatic conveyors. Quality control – Agmark and BI Standards.

**III. Process Engineering for Horticultural produce:** Engineering properties of horticultural crops – introduction, harvesting indices, methods and equipment. Handling and transportation. Cleaning and grading equipment, Preservation of fruits and vegetables – drying and dehydration, freeze drying, canning, concentration and reverse osmosis techniques, modified atmospheric and control atmospheric storage. Processing and processing machinery of important horticultural produce. Spices and condiments – oleoresins and essential oil extractions from aromatic plants, flowers and spices. Processing of important vegetables. Principles of packaging and packaging materials.

**IV. Vegetable oil technology:** Oils and fats – occurrence and distribution in nature, enzymatic and chemical spoilage, rancidification and its control, emulsions and emulsification. Processing of Oilseeds and other oil bearing materials – pretreatment and equipments, extraction methods, mechanical expression, solvent extraction, supercritical extraction, oil cake utilisation, refining of oils, hydrogenation, quality factors.

**V. Dairy and Food Engineering:** Milk – composition, characteristics, nutritive value, physico – chemical properties of milk, standardization, pasteurization, low temperature long time (LTLT), high temperature short time (HTST), ultra high temperature (UHT), plate heat exchanger, sterilization, homogenization, Manufacture of milk products – milk powder, cream, butter and ice cream. Milk and milk products packaging.

Material and energy balances in food engineering. Reaction kinetics – general principles, effect of time and temperature, Food preservation – principles and methods, causes of food spoilage, radiation preservation of food, properties of ionizing radiation, effects of irradiation on living organisms, technology aspects of irradiation preservation. Freezing of foods – freezing point of foods, freezing point depression, calculation of freezing time.

**VI. Agro Industries and by-product utilisation:** Agro industries – definition, classification, factors responsible for establishment.

Byproducts utilisation – rice husk, rice bran, coconut coir and shell utilisation, mango stone, cashewnut shell, banana pseudo stem, sugarcane bagasse, paper making from agricultural wastes, feed processing plants, layout of feed mills for commercial production. Planning waste management – properties of agricultural waste, waste collection, industrial waste treatment, storage and handling, waste for reuse, briquetting. Establishment of agroprocessing industries in rural areas. Cost benefit ratio for agroprocessing industries. Estimation of BOD, COD, Biological treatment of effluents, trickling filters.

**VII. Biomass energy conversion:** Energy sources – introduction, classification. Biomass – biomass characteristics, utilisation, biodegradation, microbial species, biogas production,

parameters affecting gas production, stirring and dilution, types of biogas plants, comparison, merits and demerits, community biogas plants, constructional details, operation and maintenance, safety measures, slurry utilisation, alternate feed stocks. Biogas appliances – biogas lights, biogas run engines. Agricultural wastes – characteristics, principles of combustion, pyrolysis, incineration, thermodynamic concepts, gasification. Gasifiers – principles, types, stability of operation, design. Charcoal making – principle, methods.

**VIII. Solar and Wind Energy:** Solar energy and its importance – heat transfer from solar energy by conduction, convection, radiation, reflectivity, transmissivity. Solar radiation analysis – solar constant, terminology connected with solar radiation, solar time, solar radiation measurement and estimation. Solar collectors – flat plate collectors, principle of conversion of solar radiation into heat, thermal losses, energy balance equation. Solar air heaters – performance and application. Focusing type solar collectors – thermal performance, optical losses. Solar energy storage – solar pond principles, types and applications of solar pond. Solar energy applications – solar furnace, distillation, cooking, grain drying. Photovoltaics – semi conductor principles, cell characteristics, application of photovoltaic systems in pumping.

Nature of wind power – seasonal influence, diurnal variation, characteristics of suitable sites, velocity and direction measuring instruments, anemometer, wind monitor, rotor classification, air foils, comparison of different types, lift and drag characteristics, wind mill components, power transmission, performance of wind mill, application of wind mills.

**IX. Greenhouse Technology:** Greenhouse technology – introduction, importance of greenhouse, greenhouse effect. Factors responsible for plant growth – heat, light, moisture, carbon dioxide, nutrients, plant response to greenhouse environment. Solar energy in greenhouse – importance, types of radiation, effect on greenhouse environment, parameters. Design criteria of greenhouse for cooling and heating purposes. Greenhouse equipments – materials of construction for traditional and low cost greenhouse, cost estimation and economic analysis. Typical applications – passive solar greenhouse, hot air greenhouse heating systems, greenhouse drying. Natural ventilation, summer and winter cooling – shadenets, polytunnels.

**X. Design and Costing of Farm Structures:** Farmstead – layout, design and costing of farm structures, farm, house, godowns, threshing and drying yards. Farm roads – types and construction. Farm fencing – types and cost estimation. Dairy barns – types, site selection, design and costing. Types, design and costing of poultry and hog housing. Storage structures – grain pressure theories, design and costing of traditional structures, bag storage structures, grain bins, silos for fodder storage. Design and costing of farm workshop and machinery storage structures.

**XI. Rural water supply, Sanitation and Environmental Engineering:** Rural water supply – water demands, sources of water supply. Collection and distribution of water – storage systems, distribution mains, pipes, joints and fittings, pumps and pumping stations. Quality and treatment of water – sedimentation, filtration, types of filters.

Sanitation – septic tanks, preparation of sanitary projects. Sewage disposal – methods, sewage treatment, sludge disposal and treatment methods. Air-pollution – sources and control measures.

**XII. Wells and Pumps with Special reference to Lift Irrigation:** Water resources – introduction, status of ground water development in India. Types of water bearing formations – ground water replenishment and recharge methods. Ground water investigation methods. Hydraulics of wells – aquifer characteristics influencing yield of wells both under steady state and unsteady state conditions, procedure involved in estimation of aquifer characteristics through pumping tests. Wells - classification of wells, design of open wells in unconsolidated formations, methods for increasing the yield in open wells. Types of tube wells – selection of type of tube well, analysis of particle size distribution of the aquifer, design of tube wells, tube well construction procedures and development and testing of tube wells.

Classification of water lifting devices – manual and animal powered devices. Pumps – reciprocating pumps (single and double acting). Centrifugal pumps – components, principle, characteristic curves, power requirements. Deep well pumps – turbine and submersible pumps, their components, working, principle installation and maintenance. Hydraulic ram – installation,

working principle. Jet pumps – components, working principle. Selection of pumps and economic evaluation of pumping.

**XIII. Irrigation Engineering:** Irrigation – necessity, benefits, sources, soil – water – plant relationships kinds of soil water. Types of Irrigation projects. Infiltration – characteristics, measurement and analysis. Evapotranspiration and its measurement. Water requirements of crops – duty and delta of water. Irrigation requirement – depth, interval, and period, irrigation efficiencies. Water application methods – borders, furrows and check basins and their designs. Measurement of irrigation water – different methods, volumetric, area velocity, measuring devices, weirs, flumes, watermeter. Design of open channels and canals – Lacey's and Kennedy's theories. Design of underground pipeline systems.

**XIV. Soil and Water Engineering:** Importance and phases of soil and water conservation engineering. Soil conservation programmes in India. Erosion – main types of erosion, factors effecting erosion. Water erosion – types of water erosion, control measures. Wind erosion – phases, control measures. Land use capability classification. Measurement of soil loss – universal soil loss equation. Contour and graded bunds – design of bunds, spacing of bunds, determination of height of the contour bund, construction and alignment of bunds, surplus arrangements, contour ditching, area lost under contour bunding. Terracing – types of terraces, planning and design of a terrace system, constructional procedure, equipment needed. Bunch terracing – types, area lost under Bund terracing. Contour trenching – types, alignment and construction. Bed and furrow system. Vegetated waterways – functions, shape of water ways, design of vegetated waterways, maintenance. Gullies – planning for gully control, methods of gully control, temporary gully control structures, permanent gully control structures, phases.

**XV. Watershed Management:** Watershed management – concept and principles – watershed characteristics, watershed protection, analysis, and control measures. Effects of watershed management. Study of watershed management as a multi disciplinary approach – watershed identification, watershed delineation.

**XVI. Drainage Engineering:** Drainage – necessity, benefits, drainage requirements, drainage coefficient, hydraulic conductivity and its measurement, field and lab methods. Types of drainage – surface drainage systems for ponded, flat and slopy areas. Subsurface drainage methods, tile drainage, layout, depth and spacing of drains, steady and unsteady state condition, Hooghoudt's analysis, equivalent depth concept, size, grade and materials for tile drains, envelope materials and types of outlets. Drainage for salinity control – leaching requirements. Loads on conduits – ditch type and projecting type conditions, strength requirements of tile drains.

**XVII. Sprinkler and Drip Irrigation:** Sprinkler irrigation – adaptability, limitations, types, components of the sprinkler system including fertilizer applicator, precipitation profiles and recommended spacings, effect of wind speed on working of the system, design of sprinkler system, lay out, laterals and mains, selection of pump, operation and maintenance of system. Field evaluation of the system – distribution pattern and uniformity coefficient, cost analysis.

Drip irrigation – advantages and limitations, types, components of the system including fertilizer applicator and pressure regulators, distribution network, main lines, laterals, drippers. Planning and design of the drip system – collection of preliminary data, layout, crop water requirements, hydraulic design, selection of components, installation, operation and maintenance, testing and field evaluation of the system.

**XVIII. Land Development Machinery:** Land Clearing – rock blasting, stump pulling. Land development – terminology, methods, cost of material movement. Land development machinery – types, crawler tractors, track versus rubber tyres. Excavators – shovel, hoe, dragline, clamshell, proclaines, rippers. Combined excavation and hauling units – wagons, trucks and front end dumpers, hydraulic trippers. Compaction rollers. Scrapers – types, bulldozers, levelling blades.

**XIX. Farm power and Tractor Systems:** I.C. engines – introduction, principles of operation of I.C. engines, performance characteristics of diesel engine, different components of I.C. engines. Tractor systems – fuel, lubrication, cooling, electrical, transmission, governing, brakes, steering, hydraulic systems, principle and maintenance of storage battery. Chasis mechanism –

determination of center of gravity, maximum drawbar pull. Tractor and power tillers – classification, selection, operation, adjustments, common troubles and remedies, maintenance, comfort, safety, power and its measurement, traction theory, tyres.

**XX. Farm machinery and agricultural machine design:** Tillage – introduction, objectives, primary and secondary tillage, animal and tractor drawn implements. Mould board plough – constructional details, terminology, materials of construction, types of plough bottoms, shares, plough accessories, force analysis and design considerations, problems on M.B. Plough operations, victory plough, turn wrest plough. Disc ploughs – advantages, disadvantages, constructional details of various components, accessories, plough adjustments, disc angle and tilt angle, differences between M.B. plough and disc plough, Ploughing methods. Chisel and subsoiler. Secondary tillage implements – harrows, types, constructional details of single action, double action, tandem and offset disc harrows, spike tooth, spring tooth harrows, differences between vertical disc plough and standard disc plough. Cultivators – rigid, spring type cultivator, types of sweeps and shovels. Weeding, manual and power operated equipments. Other implements – bund former, ridger, APAU puddler, clod breaker, rototiller, green manure trampler. Cost of operation of farm implements. Sowing – methods, seed drill functions, calibration procedure, numerical problems, types of metering mechanisms, types of furrow opener, types of planter, construction and working principles of dibbler. Planting equipments – paddy transplanter, potato planter, sugarcane planter. Manure and fertilizer application – manure applicators spreaders, broadcasters, fertidrill.

Plant protection equipments – importance, types, Sprayers – classification, bucket, knapsack, boom sprayers, parts and accessories, atomizers, agitators, determination of particle size distribution, MMD and SMD/VMD, ultra low volume, low volume, high volume spraying, aerial spraying, orchard sprayers, factors affecting drift. Distlers – types, hand, rotary and power operated sprayers cum dusters. Care and maintenance of plant protection equipment. Crop harvesting machinery – mower, reaper, cutting and driving mechanism, adjustments of mower. Combines – working of combines. Harvesting equipment for cotton, maize, potato, groundnut, fruits and vegetables.

Design process – classification of design work. Working stresses – stress concentration, notch sensitivity. Theories of failure – maximum shear stress theory, maximum strain theory, maximum distortion theory. Limits, fits and tolerances. Design of knuckle joints, cotter joints. Design of hand lever, foot lever, crank lever. Design of springs – flat and leaf springs. Design of shafts – design of belts pullys – keys and key ways. Design of flywheels. Design of couplings – muff, flange couplings. Design of bearings – ball, roller bearing. Design of I.C. engine parts – cylinder, cylinder head, connecting rod.

**XXI. Design and Costing of Soil Conservation and Irrigation Structures:** Introduction to soil and water conservation structures. Design and costing of mechanical structures – contour bund, graded bund, broad based terraces, bench terraces, contour trenches and conservation ditches. Design and costing of gully control structures – drop spillways, drop inlet spillways, chute spillways, check dams. Design and costing of water harvesting structures – farm ponds, percolation tanks. Design and costing of energy dissipaters – stilling basins.

Irrigation engineering structures – design and costing of canal falls, cross drainage works, aqueducts, super passage, inverted syphon aqueduct. Irrigation outlets – non-modular, semi modular, rigid modular outlets, baffle sluice irrigation modules. Regulators – head regulator, cross regulator.

## Annexure-III

### INSTRUCTIONS TO CANDIDATES:

#### A) GENERAL INSTRUCTIONS TO CANDIDATES:

- 1) *The candidates must note that his/her admission to the examination is strictly provisional. The mere fact that an Admission to the examination does not imply that his/her candidature has been finally cleared by the Commission or that the entries made by the candidate in his/her application have been accepted by the Commission as true and correct. The candidates have to be found suitable after verification of original certificates; and other eligibility criteria. The Applicants have to upload his/her scanned recent colour passport photo and signature to the Application Form. Failure to produce the same photograph, if required, at the time of interview/ verification, may lead to disqualification. Hence the candidates are advised not to change their appearance till the recruitment process is complete.*
- 2) *The candidates are not allowed to bring any Electronic devices such as mobile / cellphones, Calculators, tablets, iPad, Bluetooth, pagers, watches to examination centre. Loaning and interchanging of articles among the candidates is not permitted in the examination hall and any form of malpractice will not be permitted in the exam hall.*
- 3) *The candidates are expected to behave in orderly and disciplined manner while writing the examination. The candidature will be rejected and in case of impersonation/ disorder/ rowdy behaviour during Examination, necessary F.I.R. for this incident will be lodged with concerned Police Station, apart from disqualifying his / her candidature.*
- 4) *Candidates trying to use unfair means shall be disqualified from the selection. No correspondence whatsoever will be entertained from the candidates.*
- 5) *The Penal Provisions of Act 25/97 published in the A.P. Gazette No. 35, Part-IV.B Extraordinary dated: 21/08/1997 shall be invoked if malpractice and unfair means are noticed at any stage of the Examination. Action will be taken to penalize as per any other Regulations/Rules in force as on date of examination.*
6. (a) **Wherever the candidates who are totally blind will be provided a scribe to write the examination and 20 minutes extra time is permitted to them per hour.**
- (b) *The applicants shall upload the certificate relating to percentage of disability for considering the appointment of scribe in the examination.*
- (c) *An extra time of 20 minutes per hour is also permitted for the candidates with locomotor disability and CEREBRAL PALSY where dominant (writing) extremity is affected for the extent slowing the performance of function (Minimum of 40% impairment). No scribe is allowed to such candidates.*
- (d) *Scribe will be provided to those candidates who do not have both the upper limbs for Orthopedically Handicapped. However, no extra time will be granted to them.*
- (e) *The scribe should be from an academic discipline other than that of the candidate and the academic qualification of the scribe should be one grade lower than the stipulated eligibility criteria.*
- (f) *The candidate as well as the scribe will have to give a suitable undertaking confirming the rules applicable*
- 7) *In case the Hall-Ticket is without photo or too small, he/she should affix a passport size photo on Hall-ticket and appear by duly getting attested by Gazetted Officer. He/she shall handover similar photo for each paper to Chief Superintendent for affixing the same on the Nominal Rolls.*
- 8) *The candidate will not be admitted to the examination Hall without procedural formatives.*
- 9) *The candidate's admission to the Examination is provisional, subject to the eligibility, confirmation/satisfaction of conditions laid down in the Notification No.06/2016.*
- 10) *The candidates should put his/ her signature and get the signature of the invigilator at the appropriate places in the Nominal Roll.*
- 11) *Instructions to be followed scrupulously in the Examination Hall*

#### B) INSTRUCTIONS TO CANDIDATES:

1. THE APPLICANTS ARE REQUIRED TO GO THROUGH THE USER GUIDE AND DECIDE THEMSELVES AS TO THEIR ELIGIBILITY FOR THIS RECRUITMENT CAREFULLY BEFORE APPLYING AND ENTER THE PARTICULARS COMPLETELY ONLINE.
2. APPLICANT MUST COMPULSORILY FILL-UP ALL RELEVANT COLUMNS OF APPLICATION AND SUBMIT APPLICATION THROUGH WEBSITE ONLY. THE PARTICULARS MADE AVAILABLE IN THE WEBSITE SHALL BE PROCESSED THROUGH COMPUTER AND THE ELIGIBILITY DECIDED IN TERMS OF NOTIFICATION AND CONFIRMED ACCORDINGLY.
3. THE APPLICATIONS RECEIVED ONLINE IN THE PRESCRIBED PROFORMA AVAILABLE IN THE WEBSITE AND WITHIN THE TIME SHALL ONLY BE CONSIDERED AND THE COMMISSION WILL NOT BE HELD RESPONSIBLE FOR ANY KIND OF DISCREPANCY.

4. APPLICANTS MUST COMPULSORILY UPLOAD HIS/ HER OWN SCANNED PHOTO AND SIGNATURE THROUGH J.P.G FORMAT.
5. THE APPLICANTS SHOULD NOT FURNISH ANY PARTICULARS THAT ARE FALSE, TAMPERED, FABRICATED OR SUPPRESS ANY MATERIAL INFORMATION WHILE MAKING AN APPLICATION THROUGH WEBSITE.
6. **IMPORTANT:-** HAND WRITTEN/TYPED/PHOTOSTAT COPIES/PRINTED APPLICATION FORM WILL NOT BE ENTERTAINED.

THE APPLICANT SHALL PRODUCE ALL THE ESSENTIAL CERTIFICATES ISSUED BY THE COMPETENT AUTHORITY, FOR VERIFICATION BY THE COMMISSION, AS AND WHEN CALLED FOR. IF CANDIDATES FAIL TO PRODUCE THE SAME, HIS/HER CANDIDATURE SHALL BE REJECTED / DISQUALIFIED WITHOUT ANY FURTHER CORRESPONDENCE.

**The following certificate formats are available on the Commission's Website ([www.psc.ap.gov.in](http://www.psc.ap.gov.in)) for reference.**

- i). **Community, Nativity and Date of Birth Certificate**
- ii). **Declaration by the Un-Employed**
- iii). **School Study Certificate**
- iv). **Certificate of Residence**
- v). **a) Medical Certificate for the Blind**  
**b) Certificate of Hearing Disability and Hearing Assessment**  
**c) Medical Certificate in respect of Orthopedically Handicapped Candidates**
- vi). **Creamy Layer Certificate**
- vii). **Local status certificate (if applicable)**

### **C) INSTRUCTIONS REGARDING ONLINE EXAMINATION FOR CANDIDATES:**

- 1) Candidates shall report at the venue one and half hour (90 minutes) before the Commencement of Examination as the candidates have to undergo certain procedural formalities required for online examination.
- 2) Paper – I Examination will be from 10.00 AM to 12.30 PM (150 minutes).
- 3) Paper – II Examination will be from 2.30 PM to 5.00 PM (150 minutes).
- 4) Paper - III Examination will be from 10.00 AM to 12.30 PM (150 minutes)
- 5) The examination link with the login screen will already be available on your system. Please inform the invigilator if this is not the case.
- 6) 10 minutes prior to the exam, you'll be prompted to login. Please type the Login ID (Roll No) and the Password (Password for Candidate will be given on exam day) to proceed further.
- 7) Invigilator will announce the password at 09.50 AM and 02.20 PM.
- 8) Copying or noting down questions and/or options is not allowed. Severe action will be taken if any candidate is found noting down the questions and/or options.
- 9) After logging in, your screen will display:  
\*Profile Information - Check the details & click on "I Confirm" or "I Deny".  
\*Detailed exam instructions - Please read and understand thoroughly.  
\*Please click on the "I am ready to Begin" button, after reading the instructions.
- 10) You have to use the mouse to answer the multiple choice type questions with FOUR alternative answers.
- 11) To answer any numerical answer type question, you need to use the virtual numeric key pad and the mouse.
- 12) On the online exam question screen, the timer will display the balance time remaining for the completion of exam.
- 13) The question numbers are color coordinated and of different shapes based on the process of recording your response: White (Square) - For un-attempted questions. Red (Inverted Pentagon) - For unanswered questions. Green (Pentagon) - For attempted questions. Violet (Circle) - Question marked by candidate for review, to be answered later. Violet (Circle with a Tick mark) - Question answered and marked by candidate for review.
- 14) After answering a question, click the SAVE & NEXT button to save your response and move onto the next question.
- 15) Click on Mark for Review & NEXT to mark your question for review, and then go to the next question.
- 16) To clear any answer chosen for a particular question, please click on the CLEAR RESPONSE button.
- 17) A summary of each section, (i.e. questions answered, not answered, marked for review) is available for each section. You have to place the cursor over the section name for this summary.
- 18) In case you wish to view a larger font size, please inform the Invigilator. On the Invigilator's confirmation, click on the font size you wish to select. The font size will be visible on the top.

- 19) You may view INSTRUCTIONS at any point of time during exam, by clicking on the INSTRUCTIONS button on your screen.
- 20) The SUBMIT button will be activated after 150 Minutes. Please keep checking the timer on your screen.
- 21) In case of automatic or manual log out, all your attempted responses will be saved. Also, the exam will start from the time where it had stopped.
- 22) You will be provided a blank sheet for rough work. Do write your Login ID and Password on it. Please ensure that you return it to the invigilator at the end of the exam after tearing ONLY the password from it.
- 23) Please don't touch the key board as your exam ID will get locked. If your ID gets locked, please inform a nearby invigilator who will help in unlocking your ID and then you can continue with the exam.
- 24) Please inform the invigilator in case of any technical issues.
- 25) Please do not talk to or disturb other candidates.
- 26) In case you are carrying articles other than the admit card, photo identity proof and pen, please leave them outside the exam room.
- 27) You cannot leave exam room before submitting the paper. Please inform the invigilator if you want to use the wash room.

#### **ANNEXURE-IV**

#### **LIST OF SCHEDULED CASTES**

#### **(Definition 28 of General Rule - 2) SCHEDULE - I**

(Substituted with effect from 27-07-1977 through G.O.Ms.No. 838, G.A.(Services-D) Department, dated 15/12/1977)

- 1 Adi Andhra
- 2 Adi Dravida
- 3 Anamuk
- 4 Aray Mala
- 5 Arundhatiya
- 6 Arwa Mala
- 7 Bariki
- 8 Bavuri
- 9 Beda Jangam, Budga Jangam (In Districts of Hyderabad, Rangareddy, Mahaboobnagar, Adilabad, Nizamabad, Medak, Karimnagar, Warangal, Khammam and Nalgonda)\*
- 10 Bindla
- 11 Byagara, Byagari\*
- 12 Chachati
- 13 Chalavadi
- 14 Chamar, Mochi, Muchi, Chamar-Ravidas, Chamar-Rohidas\*
- 15 Chambhar
- 16 Chandala
- 17 Dakkal, Dokkalwar
- 18 Dandasi
- 19 Dhor
- 20 Dom, Dombara, Paidi, Pano
- 21 Ellamalwar, Yellammalawandlu
- 22 Ghasi, Haddi, Relli, Chachandi
- 23 Godagali, Godagula(in the Districts of Srikakulam, Vizianagaram & Vishakapatnam) \*
- 24 Godari
- 25 Gosangi
- 26 Holey a
- 27 Holey a Dasari

- 28 Jaggali
- 29 Jambuwulu
- 30 Kolupulvandu, Pambada, Pambanda, Pambala \*
- 31 Madasi Kuruva, Madari Kuruva
- 32 Madiga
- 33 Madiga Dasu, Mashteen
- 34 Mahar
- 35 Mala, Mala Ayawaru \*
- 36 Mala Dasari
- 37 Mala Dasu
- 38 Mala Hannai
- 39 Mala Jangam
- 40 Mala Masti
- 41 Mala Sale, Netkani
- 42 Mala Sanyasi
- 43 Mang
- 44 Mang Garodi
- 45 Manne
- 46 Mashti
- 47 Matangi
- 48 Mahter
- 49 Mitha Ayyalvar
- 50 Mundala
- 51 Paky, Moti, Thoti
- 52 (Omitted)\*
- 53 Pamidi
- 54 Panchama, Pariah
- 55 Relli
- 56 Samagara
- 57 Samban
- 58 Sapru
- 59 Sindhollu, Chindollu
- 60 Yatala (Srikakulam Dist. Only) Memo No. 8183/CV-1/2006-10 SW (CV-I) Dept., Dt. 31/03/2008
- 61 Valluvan \* (Chittoor and Nellore Dist. Only) Memo No. 8183/CV-1/2006-10 SW (CV-I) Dept., Dt. 31/03/2008

\* As for the Constitution (Scheduled Caste) orders (Second Amendment) Act 2002, Act No. 61 of 2002

### LIST OF SCHEDULED TRIBES

1. Andh, Sadhu Andh \*
2. Bagata
3. Bhil
4. Chanchu (Chenchwar omitted) \*
5. Gadabas, Boda Gadaba, Gutob Gadaba, Kallayi Gadaba, Parangi Gadaba, Kathera Gadaba, Kapu Gadaba \*
6. Gond, Naikpod, Rajgond, Koitur \*
7. Goudu (in the Agency tracts)
8. Hill Reddis
9. Jatapus
10. Kammara
11. Kattunayakan
12. Kolam, Kolawar \*
13. Konda Dhoras, Kubi \*
14. Konda Kapus
15. Konda Reddis
16. Kondhs, Kodi, Kodhu, Desaya Kondhs, Dongria Kondhs, Kuttiya Konds, Tikiria Khondhs, Yenity Khondhs, Kuinga \*
17. Kotia, Benth Oriya, Bartika, Dulia, Holva, Sanrona, Sidhopaiko (Dhulia, Paiko, Putiya-omitted \*)
18. Koya, Doli Koya, Gutta Koya, Kammara Koya, Musara Koya, Oddi Koya, Pattidi Koya, Rajah, Rasha Koya, Lingadhari Koya (Ordinary), Kottu Koya, Bhine Koya, Raj Koya (Goud-omitted \*)
19. Kulia
20. Malis (excluding Adilabad, Hyderabad, Karimnagar, Khammam, Mahabubnagar, Medak, Nalgonda, Nizamabad and Warangal District)

21. Manna Dhora
22. Nayaks (in the Agency tracts)
23. Mukha Dhora, Nooka Dhora
24. Pardhan
25. Porja, Parangi Perja
26. Reddi Dhoras
27. Rona, Rena
28. Savaras, Kapu Savaras, Maliya Savaras, Khutto Savaras
29. Sugalis, Lambadis, Banjara \*
30. Thoti (in Adilabad, Hyderabad, Karimnagar, Khammam, Mahabubnagar, Medak, Nalgonda, Nizamabad and Warangal Districts)
31. Valmiki (in the Scheduled Areas of Vishakapatnam, Srikakulam, Vizianagaram, East Godavari and West Godavari Districts \*)
32. Yenadis, Chella Yenadi, Kappala Yenadi, Manchi Yenadi, Reddi Yenadi \*
33. Yerukulas, Koracha, Dabba Yerukula, Kunchapuri Yerukula, Uppu Yerukula \*
34. Nakkala Kurivikaran (Nakkala – A.P. Gazette, Part – III (B) Central Acts ordinance and Regulations Issue No. 05 Dt. 02/10/2003 )
35. Dhulia, Paiko, Putiya (in the districts of Vishakapatnam, Vizianagaram \*)

\* As for the Scheduled Castes and Scheduled Tribes Orders (Amendment) Act 2002, Act No. 10 of 2003

**LIST OF SOCIALLY AND EDUCATIONALLY BACKWARD CLASSES**

(Amended from time to time as on 31/08/2007)

**GROUP- A**

Aboriginal Tribes, Vimuktha Jathis, Nomadic and Semi Nomadic Tribes etc.,

1. Agnikulakshatriya, Palli, Vadabalija, Besta, jalari, Gangavar, Gangaputra, Goondla, Vanyakulakshatriya (Vannekapu, Vannereddi, Pallikapu, Pallireddy Neyyala and Pattapu) \*Mudiraj / Mutrasi / Tenugollu, The G.O. Ms.No. 15 BCW(C2) Dept., dt. 19/02/2009 is suspended. Hence the inclusion of Mudiraj / Mutrasi / Tenugollu is suspended) vide Hon'ble A.P. High Court orders in WP No. 2122/2009 dated: 29-04-2009.
2. Balasanthu, Bahurupi
3. Bandara
4. Budabukkala
5. Rajaka (Chakali Vannar)
6. Dasari (formerly engaged in bikshatana)  
(amended vide G.O.Rt.No. 32, BCW(M1) Department, dated 23/02/1995)
7. Dommara
8. Gangiredlavaru
9. Jangam (whose traditional occupation is begging)
10. Jogi
11. Katipapala
12. Korcha
13. Lambada or Banjara in Telangana Area  
(deleted and included in S.T. list vide G.O.Ms.No. 149, SW, dated 3/5/1978)
14. Medari or Mahendra
15. Mondivaru, Mondibanda, Banda
16. Nayee Brahmin (Mangali), Mangala and Bajantri  
(amended vide G.O.Ms.No. 1, BCW(M1) Department, dated 6/1/1996)
17. Nakkala (Deleted vide G.O. Ms. No. 21, BCW(C2) Dept., Dt. 20/06/2011)
18. Vamsha Raj (amended vide G.O.Ms.No. 27, BCW(M1) Department, dated 23/06/1995 deleting the Original name Pitchiguntla)
19. Pamula
20. Pardhi (Mirshikari)
21. Pambala
22. Peddammavandlu, Devaravandlu, Yellammavandlu, Mutyalammavandlu (Dammali, Dammala, Dammula, Damala Castes confined to Srikakulam dist. Vide G.O.Ms. No.: 9 BCW(C2) Dept., Dt. 9/04/2008)
23. Veeramushti (Nettikotala), Veera bhadreeya (Amended vide G.O. Ms. No. 62, BCW (M1) Dept., Dt. 10/12/1996)
24. Valmiki boya (Boya, Bedar, Kirataka, Nishadi, Yellapi, Pedda Boya) Talayari and Chunduvallu  
(G.O.Ms. No. 124, SW, Dt. 24.06.85) Yellapi and Yellapu are one and the same amended vide G.O. Ms. No. 61, BCW(M1) Dept., Dt. 05.12.1996)
25. Yerukalas in Telangana area (deleted and included in the list of S.Ts)
26. Gudala
27. Kanjara - Bhatta
28. Kalinga (Kinthala deleted vide G.O.Ms. No. 53, SW, Dt. 07.03.1980)
29. Kepmare or Reddika
30. Mondipatta
31. Nokkar
32. Pariki Muggula
33. Yata
34. Chopemari
35. Kaikadi
36. Joshinandiwalas
37. Odde (Oddilu, Vaddi, Vaddelu)
38. Mandula (Govt. Memo No. 40-VI/70-1, Edn., Dt. 10.02.1972)
39. Mehator (Muslim) (Govt. Memo No. 234-VI/72-2, Edn., Dt. 05.07.1972).
40. Kunapuli (Govt. Memo No. 1279/P1/74-10, E&SW, Dt. 03.08.1975)
41. Patra (included in G.O. Ms. No. 8, BCW(C2) Dept., Dt. 28.08.2006)
42. kurakula of Srikakulam, Vizianagaram and Visakhapatnam Districts only. Included vide in G.O.MS.No. 26 BC W (C2) Dept., Dt. 4/07/08
43. Pondara of Srikakulam, Vizianagaram, and Visakhapatnam Districts only. Included vide G.O.MS.No. 28 BC W (C2) Dept., Dt. 4/07/08
44. Samanthula, Samantha, sountia, Sauntia of Srikakulam District only. Included vide G.O.MS.No. 29 BC W (C2) Dept., Dt. 4/07/08

45. pala-Ekari, Ekila, Vyakula, Ekiri, Nayanivaru, Palegaru, Tolagari, Kavali of Chittoor, Cuddapah, Kurnool, Anantapur, Nellore, Hyderabad and Rangareddy Districts only. Included Vide G.O. MS. No. 23 B.C. W (C2) Dept., Dt. 4/07/08
46. Rajannala, Rajannalu of Karimnagar, Warangal, Nizamabad and Adilabad Districts only. (included in vide G.O.Ms. No. 44 B.C.W(C2) Dept., Dt.07/08/2008).
47. Bukka Ayyavars, Included vide G.O.Ms.No. 6 Backward Classes Welfare (C2) Dept., dt. 19/02/2009.
48. Gotrala, Included vide G.O.Ms.No. 7 Backward Classes Welfare (C2) Dept., dt. 19/02/2009. The area of operation shall be confined to Telangana Region only.
49. Kasikapadi / Kasikapudi, Included vide G.O.Ms.No. 8 Backward Classes Welfare (C2) Dept., dt. 19/02/2009. The area of operation shall be confined to Hyderabad, Rangareddy, Nizamabad, Mahaboobnagar and Adilabad Districts of Telangana Region only.
50. Siddula, Included vide G.O.Ms.No. 9 Backward Classes Welfare (C2) Dept., dt. 19/02/2009. The area of operation shall be confined to Telangana Region only.
51. Sikligar / Saikalgar, Included vide G.O.Ms.No. 10 Backward Classes Welfare (C2) Dept., dt. 19/02/2009.
52. Poosala included vide G.O. Ms.No. 16 Backward Classes Welfare (C2) Dept., dt. 19/02/2009.
53. Aasadula / Asadula, included vide G.O. Ms. No. 13, Backward Classes Welfare (C2) Dept., Dt. 27/05/2011. The area of operation shall be confined to East Godavari and West Godavari Districts only.
54. Keuta/Kevuto/Keviti, included vide G.O. Ms. No. 15, Backward Classes Welfare (C2) Dept., Dt. 27/05/2011. The area of operation shall be confined to Srikakulam District only.

**GROUP – B (Vocational)**

1. Achukatlavandlu in the Districts of Visakhapatnam and Guntur confined to Hindus only as amended vide G.O. Ms. No. 8, BCW(C2) Dept., Dt. 29.03.2000
2. Aryakshatriya, Chittari , Giniyar, Chitrakara, Nakshas (Muchi Telugu Speaking deleted vide G.O. Ms. No. 31, BCW (M1) Dept., 11.06.1996)
3. Devanga
4. Goud (Ediga) Gouda (Gamella) Kalalee, Goundla, Settibalija of Vishaphapatnam, East Godavari, West Godavari and Krishna Districts and Srisayana (Segidi) – (amended vide G.O. Ms. No. 16, BCW (A1) Dept., dt. 19.06.1997
5. Dudekula, Laddaf, Pinjari or Noorbash
6. Gandla, Telikula, Devatilakula (Amended vide G.O. Ms. No. 13, BCW(A1) Dept., dt. 20.05.1997)
7. Jandra
8. Kummara or Kulala, Salivahana (Salivahana added vide G.O. Ms. No. 28, BCW(M1) Dept., 24.06.1995)
9. Karikalabhakthulu, Kaikolan or Kaikala (Sengundam or Sengunther)
10. Karnabhakthulu
11. Kuruba or Kuruma
12. Nagavaddilu
13. Neelakanthi
14. Patkar (Khatri)
15. Perika (Perikabaliya, Puragirikshatriya)
16. Nessi or Kurni
17. Padmasali (Sali, Salivan, Pattusali, Senapathulu, Thogata Sali)
18. Srisayana ((**sagidi**)- deleted and added to Sl.No. 4 of Group-B)
19. Swakulasali
20. Thogata, Thogati or Thogataveerakshtriya
21. Viswabrahmin, Viswakarma (Ausula or Kamsali, Kammari, Kanchari Vadla or Vadra or Vadrangi and Silpis)  
(Viswakarma added vide G.O. Ms. No. 59 BCW(M1) Dept., Dt. 06.12.1995)
22. Kunchiti, Vakkaliga, Vakkaligara, Kunchitiga of Anantapur Dist. Only vide G.O. Ms.No. 10 BCW(C-2) Dept., Dt. 9-04-2008
23. Lodh, Lodhi, Lodha of Hyderabad, Rangareddy, Khammam and Adilabad Districts only. Included in Vide G.O.MS.No. 22 BC W (C2) Dept., Dt. 4/07/08
24. Bondili (included in vide G.O.Ms. No. 42, B.C.W(C2) Dept., Dt.07/08/2008)
25. Are Marathi, Maratha(Non-Brahmins), Arakalies and Surabhi Natakavallu. (included in vide G.O.Ms. No. 40, B.C.W(C2) Dept., Dt.07/08/2008)
26. Neeli (included in vide G.O.Ms. No. 43, B.C.W(C2) Dept., Dt.07/08/2008).
27. Budubunjala/Bhunjwa/Bhadbhunja, included vide G.O.Ms. No. 11, Backward Classes Welfare (C2) Dept., Dt. 27/05/2011. The area of operation shall be confined to Hyderabad and Ranga Reddy District only.

28. Gudia/Gudiya, included vide G.O.Ms. No. 14, Backward Classes Welfare (C2) Dept., Dt. 27/05/2011. The area of operation shall be confined to Srikakulam, Vizianagaram and Vishakhapatnam, district only.

**GROUP – C**

**Scheduled Castes converts to Christianity and their progeny**  
(Substituted in G.O.Ms.No.159, G.A.(Ser.D) Dept., dt. 02/04/1981)

**GROUP – D (Other Classes)**

1. Agar
2. Are-Katika, Katika, Are-Suryavamsi(Are-Suryavamsi added vide G.O. Ms. No. 39, B.C. W(C2) Dept., Dt. 7/08/08)
3. Atagara
4. Bhatraju
5. Chippolu (Mera)
6. Gavara
7. Godaba
8. Hatkar
9. Jakkala
10. Jingar
11. Kandra
12. Kosthi
13. Kachi
14. Surya Baliya, (Kalavanthulu) Ganika (amended vide G.O.Ms. No. 20, BCW(P2) Dept., Dt. 19.07.1994)
15. Krishanabaliya (Dasari, Bukka)
16. Koppulavelama
17. Mathura
18. Mali (Bare, Barai, Marar and Tamboli of all Districts of Telangana Region added as synonyms vide G.O. Ms. No. 3, BCW(C2) Dept., Dt. 09.01.2004 and G.O. Ms. No. 45, B.C.W(C2) Dept., Dt.07/08/2008)
19. Mudiraj / Mutrasi / Tenugollu.
20. Munnurukapu (Telangana)
21. Nagavamsam (Nagavamsa) vide G.O.Ms.No. 53, BC Welfare Dept., dated:19/09/1996
22. Nelli(deleted vide G.O.Ms. No. 43, B.C.W(C2) Dept., Dt.07/08/2008)
23. Polinativelmas of Srikakulam and Visakhapatnam districts
24. . . . deleted vide G.O. Ms.No. 16 Backward Classes Welfare (C2) Dept., dt. 19/02/2009
25. Passi
26. Rangrez or Bhavasarakshtriya
27. Sadhuchetty
28. Satani (Chattadasrivaishnava)
29. Tammali (Non-Brahmins) (Shudra Caste) whose traditional occupation is playing musical instruments, vending of flowers and giving assistance in temple service but not Shivarchakars. Included vide G.O. Ms. No. 7, Backward Classes Welfare (C2) Dept., Dt. 19/02/2011).
30. Turupukapus or Gajula kapus {... the words "of Srikakulam, Vizianagaram and Vishakhapatnam Districts" were deleted vide G.O.Ms.No. 62, Backward Classes Welfare (C2) Dept., dt. 20/12/2008 and G.O. Ms.No. 19 Backward Classes Welfare (C2) Dept., dt. 19/02/2009} who are subject to Social customs or divorce and remarriage among their women (G.O. Ms. No. 65, E&SW, dt. 18.02.1994)
31. Uppara or Sagara
32. Vanjara (Vanjari)
33. Yadava (Golla)
34. Are, Arevalli and Arollu of Telangana District (Included vide G.O.Ms.No. 11, Backward Classes Welfare (C-2) Department, dt. 13/5/2003 and G.O.Ms. No. 41, B.C.W(C2) Dept., Dt.07/08/2008)
35. Sadara, Sadaru of Anantapur Dist. Only vide G.O.Ms.No. 11 BCW (C-2) Dept., Dt. 9-04-2008
36. Arava of Srikakulam District only. Included in vide G.O. MS. No. 24 BC W (C2) Dept., Dt. 4/07/08
37. Ayyaraka, of Srikakulam, Vizianagaram, Visakhapatnam, East Godavari, West Godavari, Krishna, Guntur, Khammam and Warangal Districts only. Included in vide G.O. MS. No. 25 BC W (C2) Dept., Dt. 4/07/08
38. Nagaralu of Srikakulam, Vizianagaram, Visakhapatnam, Krishna, Hyderabad and Rangareddy Districts only. Included in vide G.O. MS. No. 27 BC W (C2) Dept., Dt. 4/07/08

39. Aghamudian, Aghamudiar, Agamudivellalar and Agamudimudaliar including Thuluva Vellalas of Chittoor, Nellore, Kurnool, Anantapur, Hyderabad and Rangareddy Districts only. Included in vide G.O. MS. No. 20 BC W (C2) Dept., Dt. 4/07/08
40. Beri Vysya, Beri Chetty of Chittoor, Nellore and Krishna Districts only. Included in vide G.O. MS. No. 21 BC W (C2) Dept., Dt. 4/07/08
41. Atirasa included vide G.O. Ms.No. 5 Backward Classes Welfare (C2) Dept., dt. 19/02/2009. The area of operation shall be confined to East Godavari and West Godavari Districts only.
42. Sondi / Sundi included vide G.O. Ms.No. 11 Backward Classes Welfare (C2) Dept., dt. 19/02/2009.
43. Varala included vide G.O. Ms.No. 12 Backward Classes Welfare (C2) Dept., dt. 19/02/2009. The area of operation shall be confined to Telangana region only.
44. Sistakaranam included vide G.O. Ms.No. 13 Backward Classes Welfare (C2) Dept., dt. 19/02/2009.
45. Lakkamari Kapu included vide G.O. Ms.No. 14 Backward Classes Welfare (C2) Dept., dt. 19/02/2009. The area of operation shall be confined to Telangana region only.
46. Veerashaiva Lingayat/Lingabaliya, included vide G.O. Ms.No. 22 Backward Classes Welfare (C2) Dept., dt. 28/02/2009.
47. Kurmi, included vide G.O.Ms. No. 12, Backward Classes Welfare (C2) Dept., Dt. 27/05/2011. The area of operation shall be confined to Telangana Region and also Krishna District only.

### **GROUP – E**

#### **(Socially and Educationally Backward Classes of Muslims)**

1. Achchukattalavandlu, Singali, Singamvallu, Achchupanivallu, Achchukattuvaru, Achukatlavandlu.
2. Attar Saibuli, Attarollu
3. Dhobi Muslim/ Muslim Dhobi/ Dhobi Musalman, Turka Chakla or Turka Sakala, Turaka Chakali, Tulukka Vannan, Tskalas or Chakalas, Muslim Rajakas.
4. Faqir, Fhaker Budbudki, Ghanti, Fhaker, Ghanta Fhakerlu, Turaka Budbudki, Derves, Fakeer
5. Garadi Muslim, Garadi Saibulu, Pamulavallu, Kani-Kattuvallu, Garadollu, Garadiga.
6. Gosangi Muslim, Phakeer Sayebulu
7. Guddi Eluguvallu, Elugu Bantuvallu, Musalman Keelu Gurravallu
8. Hajam, Nai, Nai Muslim, Navid
9. Labbi, Labbai, Labbon, Labba
10. Pakeerla, Borewale, Deraphakerlu, Bonthala
11. Kureshi/ Khureshi, Khasab, Marati Khasab, Muslim Katika, Khatik Muslim
12. Shaik/ Sheikh
13. Siddi, Yaba, Habshi, Jasi
14. Turaka Kasha, Kakkukotte Zinka Saibulu, chakkitananevale, Terugadu Gontalavaru, Thirugatiganta, Rollaku Kakku Kottevaru, Pattar Phodulu, Chakketakare, Thuraka Kasha
15. Other Muslim groups excluding  
Syed, Saiyed, Sayyad, Mushaik;  
Mughal, Moghal;  
Pathans;  
Irani;  
Arab;  
Bohara, Bohra;  
Shia Imami Ismaili, Khoja;  
Cutchi-Memon;  
Jamayat;  
Navayat;  
and all the synonyms and sub-groups of the excluded groups; and except those who have been already included in the State List of Backward Classes.

N.B.:1. The above list is for information and subject to confirmation with reference to G.O. Ms. No. 58, SW(J) Department, dated 12/05/1997 and time to time orders.

2. On account of any reason whatsoever in case of any doubt/ dispute arising in the matter of community status (SC/ST/BC/OC) of any candidate, subject to satisfaction with regard to relevant rules and regulations in force the decision of the Commission shall be final in all such cases.