TELANGANA STATE PUBLIC SERVICE COMMISSION: HYDERABAD

NOTIFICATION NO. 22/2017, Dt.02/06/2017

DEGREE COLLEGE LECTURERS IN RESIDENTIAL DEGREE COLLEGES(WOMEN)

(GENERAL RECRUITMENT)

PARA – I:

1) Applications are invited Online from qualified women candidates through the proforma Application to be made available on Commission's WEBSITE (www.tspsc.gov.in) to the post of **Degree College Lecturers in Residential Degree Colleges(women).**

i. **Submission of ONLINE applications from Dt. 06/06/2017**
ii. **Last date for submission of ONLINE applications Dt. 24/06/2017**
iii. **Hall Tickets can be downloaded 07 days before commencement of Examination.**
iv. **The question paper of Preliminary (Screening Test) will be supplied in English version only. The question paper of Main examination will be supplied in English version only except languages.**

2) The **Preliminary (Screening Test)** is of **Objective Type** and is likely to be held on **Dt.16/07/2017 and the Main Examination (Objective Type) is likely to be held on 12 OR 13 /08/2017. The Commission reserves the right to conduct the Examination either COMPUTER BASED RECRUITMENT TEST (CBRT) or OFFLINE OMR based Examination of objective type.**

Before applying for the posts, candidates shall register themselves as per the One Time Registration (OTR) through the Official Website of TSPSC. Those who have registered in OTR already, shall apply by login to their profile using their TSPSC ID and Date of Birth as provided in OTR.

IMPORTANT NOTE: Candidates are requested to keep the details of the following documents ready while uploading their OTR Applications.

i. Aadhar number
ii. Educational Qualification details i.e., SSC, INTERMEDIATE, DEGREE, POST GRADUATION etc. and their Roll numbers, Year of passing etc.
iii. Community/ Caste Certificate obtained from Mee Seva/ E Seva i.e., Enrollment number and date of issue for uploading in OTR.

3) The candidates who possess requisite qualification may apply online by satisfying themselves about the terms and conditions of this recruitment. The details of vacancies are given below:-

Sl. No.	Name of the Post	No. of Vacancies	Age as on 01/07/2017 Min. Max.	Scale of Pay Rs.
1	Degree College Lecturers in Mahatama Jothiba Phule Telangana Backward Classes Welfare Residential Degree Colleges(Women).	36	18-44*	40,270-93,780
2	Degree College Lecturers in Telangana Social Welfare Residential Degree Colleges(Women).	510		
TOTAL		**546**		

(The *Details of Vacancies* department wise i.e., Community and Gender wise (General / Women) may be seen at *Annexure-I*.)

IMPORTANT NOTE: The number of vacancies are subject to variation on intimation being received from the appointing authority

4) EDUCATIONAL QUALIFICATIONS:

Applicants must possess the qualifications from a recognized University/ Institution as detailed below or equivalent thereto as specified in the relevant Bye Laws/ Service Regulations, indented by the Residential Educational Institutions Societies as on the Date of Notification.

<table>
<tr><th>Sl. No.</th><th>Name of the Post</th><th>Educational Qualifications</th></tr>
<tr><td>1</td><td>Degree College Lecturers in Mahatama Jothiba Phule Telangana Backward Classes Welfare Residential Degree Colleges(Women).</td><td rowspan="2"><u>Academic Qualifications</u>

i) Good academic record in Post Graduation in the relevant subject (as shown in Annexure-A) with A minimum of 55% marks of an equivalent Grade of B in the 7 point scale with letter Grades O,A,B,C,D,E and F obtained from the Universities recognized in India.

ii) Should have passed National Eligibility Test (NET) for lecturers conducted by UGC/CSIR or similar Test accredited by the UGC or SLET conducted by PSC/ Universities of the State.

iii) If a candidate possesses Ph.D., or equivalent is exempted from passing National Eligibility Test (NET) for lecturers conducted by UGC/CSIR or similar Test accredited by the UGC or SLET conducted by the PSC/ Universities of the State.

Note:
1. In case of candidates belonging to SC/ST/Differently abled category, the Minimum % of marks shall be 50% (instead of 55%)
2. A relaxation of 5% marks may be provided (from 55% to 50%) to the Ph.D. Degree holder who passed Master Degree prior to 19-09-1991.</td></tr>
<tr><td>2</td><td>Degree College Lecturers in Telangana Social Welfare Residential Degree Colleges(Women).</td></tr>
</table>

ANNEXURE–A
SUBJECTS FOR THE POST OF DEGREE COLLEGE LECRURERS

Subjects in PG / Graduation

1. **English:** M.A. English or its equivalent Degree
2. **Telugu:** M.A. Telugu or its equivalent Degree
3. **Maths:** M.Sc., Mathematics or its equivalent Degree
4. **Physics:** M.Sc Physics or its equivalent Degree
5. **Chemistry:** M.Sc Chemistry or its equivalent Degree
6. **Statistics:** M.Sc Statistics or its equivalent Degree
7. **Computer Science:** Msc.Computer Science/ MCA or its equivalent Degree
8. **Botany:** M.Sc., Botany or its equivalent Degree
9. **Zoology:** M.Sc. Zoology or its equivalent Degree
10. **Micro-Biology:** M.Sc. Micro-Biology or its equivalent Degree
11. **Electronics:** M.Sc. Physics(with Electronics specialization) or its equivalent Degree
12. **Geology:** M.Sc. Geology or its equivalent Degree
13. **Genetics:** M.Sc. Genetics or its equivalent Degree
14. **Bio-Technology:** M.Sc. Bio-Technology or its equivalent Degree
15. **Food Science:** M.Sc. Food Science/Technology/Science and Technology or its equivalent Degree

16. **Bio-Chemistry:** M.Sc. Bio-Chemistry or its equivalent Degree
17. **Nutrition & Dietetics:** M.Sc. Applied Nutrition or its equivalent Degree
18. **History:** M.A. History or its equivalent Degree
19. **Economics:** M.A. Economics or its equivalent Degree
20. **Political Science:** M.A. Political Science or its equivalent Degree
21. **Public Administration:** M.A. Public Administration or its equivalent Degree
22. **Journalism:** M.A. Journalism or its equivalent Degree
23. **Psychology:** M.A. Psychology or its equivalent Degree
24. **Sociology:** M.A. Sociology or its equivalent Degree
25. **Commerce:** M.Com or its equivalent Degree
26. **Business Administration:** MBA or its equivalent Degree

5) AGE: Minimum 18 years & Maximum 44* years. The age is reckoned as on 01/07/2017 (Rule- 12(1)(a)(v) of State and Subordinate Service Rules).

Minimum Age (18 years): A Candidate should not be born after 01/07/1999.

Maximum Age (44 years): A candidate should not be born before 02/07/1973.

The Upper Age limit will be relaxed as per Rules and will be calculated on the above lines.

***As per G.O. Ms. No. 329 GA(Ser.A) Dept., Dt. 27/07/2015 read with G.O. Ms. No. 264 GA(Ser.A) Dept.,Dated: 26-07-2016, the upper age limit is raised up to 10 years.**

N.B.: 1) No person shall be eligible if he/she is less than 18 years of age.
2) No person shall be eligible if he/she crossed 58 years of age (Superannuation age).

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

Sl. No.	Category of candidates	Relaxation of age permissible
1	2	3
1.	Retrenched temporary employees in the State Census Department with a minimum service of 6 months.	3 Years
2.	Telangana State Government Employees (Employees of TSRTC, 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

6) (a) FEE: (Remittance of Fee) Each applicant must pay **Rs. 200/- (RUPEES TWO HUNDRED ONLY)** towards Online Application Processing Fee. This apart, the applicants have to pay **RS. 120/- (RUPEES ONE HUNDRED AND TWENTY ONLY)** towards Examination Fee. However, the following category of candidates belonging to Telangana State only are exempted from payment of Examination fee.

a) SC, ST, BC & PH.
b) Unemployed applicants in the age group of 18 to 44 years (They have to submit declaration at an appropriate time to the Commission that they are unemployed).

N.B.:- BC's, SC's and ST's belonging to other states are not exempted from payment of Application processing Fee and Examination Fee and they are not entitled for any kind of reservation.

b) Mode of Payment of Fee:

The Fee mentioned at Para-I(6)(a) is to be paid online through SBI ePay duly following online instructions once the application form details are submitted by filling TSPSC ID, date of birth and other particulars.

The fee once remitted, shall not be refunded or adjusted under any circumstances. Failure to pay the examination fee, application fee, wherever applicable will entail total rejection of application. The list of Banks providing service for the purpose of online remittance of fee is given in ***ANNEXURE – II.***

PARA-II: CENTRES FOR THE WRITTEN EXAMINATION:

1) The Screening Test will be held at **HYDERABAD (including HMDA Jurisdiction) only or all erstwhile District head quarters.** However, the Commission reserves the right either to increase or decrease the number of Centres.
2) The Main (Objective Type)Examination will be held at **HYDERABAD (including HMDA Jurisdiction) only**
3) However, the Commission reserves the right to abolish / create new centre or centres for administrative reasons. Request for change of the centre will not be entertained.

PARA-III: HOW TO APPLY:

A) HOW TO UPLOAD THE APPLICATION FORM:

(i) The Applicants have to read the ***User Guide*** for Online Submission of Applications and then proceed further.

I STEP: The Candidate has to visit the WEBSITE **http://www.tspsc.gov.in** and fill the OTR application if not registered earlier to obtain TSPSC ID. 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 candidates have to visit the website **http://www.tspsc.gov.in** to submit Application and Click on the Link with Notification Number and Name, provide TSPSC ID and Date of Birth to proceed further.

Candidate has to verify the details fetched from various databases pertaining to qualification, caste, Aadhar etc, and displayed on the screen. If the displayed details are correct he/she has to click **Yes** on confirm button. If any details are not displayed or need to be changed, he/she should click **No** on confirm button. If details are not displayed a text box will open and candidate has to feed the details manually. Required documents have to be uploaded by clicking the upload button. In addition to the details obtained from OTR database, Notification specific details such as Examination Centre opted, required qualification, university details, eligibility and accepting declarations etc. are to be filled by the candidate. Preview and Edit facility is available to make changes and submit for proceeding to Next step of making online payment of fee.

III STEP:-Immediately on entering the above details, the applicant will get payment gateway of SBI ePay.

IV STEP:-The applicant should pay the prescribed fee as specified through any of the four modes of payment online. Separate instructions have to be followed for each mode of payment.

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

i) Candidate shall note that, the details available with OTR database at the time of submitting the application will be considered for the purpose of this notification. If, any changes are made by the candidate to OTR 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) The applicants should be willing to serve anywhere in Telangana State.
iv) For any Technical problems related to Online submission and downloading of Hall-Tickets please contact 040-23120301 or 040-23120302(Call Time: 10.30 A.M to 1.00 P.M & 1.30 P.M to 5.30 P.M) or mail to helpdesk@tspsc.gov.in

NOTE:

1. The Commission is not responsible, for any discrepancy in Bio-data particulars while submitting the application form through Online. The applicants are therefore, advised to strictly follow the instructions and User guide in their own interest before submitting the application.
2. The particulars furnished by the applicant in the Application Form will be taken as final, and data entry is 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 in any form 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 through the final stage of recruitment process or even at a later stage.
4. Before Uploading/Submission of 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- IV GENERAL PROVISIONS

1. 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.
2. 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.
3. Applicants must upload his/her own scanned photo and signature through J.P.G format.
4. The applicants should not furnish any particulars that are false, tampered, fabricated or suppress any material information while making an application through website.
5. All the essential certificates issued by the competent authority of Telangana State shall compulsorily be kept with the applicants to produce as and when required to do so. Failure to produce the required certificates on the day of verification will lead to disqualification.
6. Important – The claim of the candidates with regard to the date of birth, educational / technical qualifications, experience and community are accepted only provisionally on the information furnished by them in their application form and is subject to verification and satisfaction of the Commission. Mere admission to any test or interview or inclusion of the name of a candidate in a Merit List will not confer on the candidate any right for appointment. The candidature is therefore, provisional at all stages and the Commission reserve the right to reject candidature at any stage of the selection even after the advice has been made.
7. This Recruitment is entrusted to TSPSC along with Finance Clearance vide G.O. Ms. No. 46 Finance (HRM-II) Department, Dt. 07/04/2016 and G.O. Ms. No. 94 Finance (HRM-VII) Department, Dt. 03/08/2016.

The following certificates must be kept ready by the candidates for the purpose of verification and also at the time of making Online application.

i. Aadhar Card.
ii. Proof of Educational Qualifications.
iii. Date of Birth Certificate / S.S.C
iv. School Study Certificate
v. Declaration by the Unemployed (For claiming exam fee exemption)
vi. No Objection Certificate from Employer (if anywhere employed)

The following Certificates should be obtained from Govt. of Telangana State in prescribed proforma for the purpose of verification.

i. Community Certificate.
ii. Non-Creamy Layer Certificate as per Form- VIIB **/** Creamy Layer Certificate as per Form- VIIC.
iii. Certificate of Residence / Nativity (where the Candidates not studied in School / Private Study)

The following Certificates (whichever is applicable) should be obtained from Competent Medical authority for the purpose of verification.

iv. a) Medical Certificate for the Blind
b) Certificate of Hearing Disability and Hearing Assessment
c) Medical Certificate in respect of Orthopedically Handicapped Candidates

PARA-V:- IMPORTANT LEGAL PROVISIONS GOVERNING THE RECRUITMENT PROCESS:

1. **Vacancies**: The recruitment will be made to the vacancies notified before the examination only. There shall be no waiting list as per G.O. Ms. No. 81 General Administration (Ser.A) Department, Dated 22/02/1997. If additional vacancies are reported by the Government an addendum to that effect will be issued.
   Note: The vacancies reported by the Residential Educational Institutions are in Degree Colleges (Women). As such all these vacancies are earmarked for women candidates only.
2. **Recruitment**:- The recruitment will be processed as per the Notification and also as per the Byelaws / Service Regulations, B.O.G recommendations of the Residential Educational Institution Societies and orders / Instructions issued by the Government and also as decided by the Commission from time to time.
3. **Constitutional Provisions:-** 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 3d(ix)(a) of the TSPSC Rules of procedure read with reference to 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 followed. A candidate shall be disqualified for appointment, if he himself / she herself 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.
4. **State Cadre Post:- The post is identified as State Cadre Post, hence reservation for Local Candidates is not applicable**
5. **Employed**:- The persons already in Government Service/ Autonomous bodies/ Government aided institutions etc., whether in permanent or temporary capacity or as work charged employees are required to inform in writing to the Head of Office / Department, as the case may be and required to submit the “No objection” from the concerned Head of Office / Department to the Commission as and when required to do so.
6. **Penal Action:-** The Commission is also empowered to invoke the penal provisions of the A.P. Public Examinations (Prevention of Malpractices and Unfair means) Act 25/97 for matters connected therewith or incidental thereto and as per the Rules of Procedure of TSPSC published in Telangana Gazette No: 60 dated 28/12/2015 in respect of this Notification.
7. **Caste & Community:** Community Certificate issued by the competent authority (obtained from Government of Telangana State) in terms of G.O.Ms No. 58, SW (J) Dept., dt: 12/5/97 read with G.O. Ms. No. 5 Scheduled Castes Development (POA.A2) Dept., Dt. 08/08/2014, G.O. Ms. No. 11 Scheduled Castes Development (POA.A2) Dept., Dt. 17/09/2014 and G.O. Ms. No. 2 Scheduled Castes Development (POA.A2) Dept., Dt. 22/01/2015 should be submitted at appropriate time in respect of SC & ST Candidates. In respect of candidates belonging to Backward Classes are required to produce Community Certificate (BC-A, BC-B, BC-C, BC-D& BC-E) from Competent Authority i.e., from Tahsildars in the State of Telangana not below the rank of Deputy Tahsildar through e-seva/ mee-seva(G.O. Ms. No. 16 BCW(OP) Dept., Dt. 11/03/2015) and orders and instructions issued by the Government from time to 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.
8. **Reservation**:- (i)The Reservation and eligibility in terms of General Rule 22 & 22 (A)(3) of State and Subordinate Service Rules are applicable.
   (ii) Reservation to Disabled persons is subject to their eligibility to any of the above category of posts and shall be subject to Telangana State and Subordinate

Service 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.

(iii) As per G.O.Rt.No.1274, G.A (Ser-B) Department, Dated 04-06-2016:
   (a) Women staff shall only be recruited in all cadres of posts in the Schools/ Institutions meant for Girls, in terms of Sub-Rule (3) of rule 22-A of Telangana State and Subordinate Service Rules.
   (b) Separate rosters in each cadre shall be maintained for Girls Schools / Institutions.

(iv) 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.

9. **Distance Education:-** The Candidates who have obtained Degrees through Open Universities / Distance Education mode are required to have recognition by the University Grants Commission / AICTE / Distance Education Council as the case may be. Unless such Degrees had been recognised by the relevant Statutory Authority, they will not be accepted for purpose of Educational Qualification. The onus of Proof of recognition by the relevant Statutory Authority that their Degrees / Universities have been recognised, rests with the Candidate.

PARA-VI: Reservation to the Local candidates is not applicable as the selection will be made on state-wide merit and allotment of zones will be made as per preference given by the candidates.

The following are the Present Zones in the Telangana State:

V Adilabad, Karimnagar, Warangal and Khammam. (ADB, KRMN, WGL, KMM)
VI Hyderabad, Ranga Reddy, Nizamabad, Mahaboobnagar, Medak and Nalgonda. (HYD, RRD, NZB, MBNR, MDK, NLG)

PARA-VII: SCHEME OF EXAMINATION:- The Scheme & Syllabus for the examination has been shown in ***ANNEXURE*-III**.

PARA-VIII: PROCEDURE OF SELECTION:

The selection to these posts will be based on the Scheme & Syllabus shown at **Annexure-III**

THE FINAL SELECTION OF THE POST WILL BE BASED ON MARKS SECURED IN THE MAIN EXAMINATION EITHER ONLINE OR OMR BASED AND INTERVIEW / DEMONSTRATION/VIVA-VOCE MARKS PUT TOGETHER.

1. The applicants will be subjected to a “Preliminary (Screening Test)” of Objective Type for the purpose of short listing the number of candidates to be admitted to the main examination (Objective Type) and the marks secured by the candidates in the preliminary (Screening Test) will not be counted for the purpose of final selection as preliminary examination is only a qualifying examination in terms of G.O.Ms.229, GA(Ser.A) Dept., dated 30-06-2016 read with G.O.Ms.No.316, GA(Ser.A) Dept., dated 17-08-2016.
2. The candidates will be picked up for the main examination based on their performance in preliminary examinations in the ratio of 1:15 in their respective categories duly following the Rule of reservation.
3. Those candidates who qualify in the Main Examination (Objective Type) in order of merit will be called for in 1:2 ratio for verification of Certificates and Interview/ Demonstration /viva-voce Community and Category wise for the vacancies available. The minimum qualifying marks for Selection are OCs 40%, BCs 35% SCs, STs and PHs 30%. The minimum qualifying marks are relaxable in the case of SC/ST/BC/PH at the discretion of the Commission.
4. The selection to the post will be based on marks secured in the main examination and Interview/ Demonstration /viva-voce marks put together.

5. The candidates will be selected and allotted to the Residential Educational Institutions Societies in Telangana State as per their rank in the merit list and as per zonal preference for allotment of candidates against vacancies and for the vacancies available. Selection will be made on State wide merit and allotment of zones will be made as per preference given by the candidates against the vacancies.

   N.B.: Mere securing minimum qualifying marks does not vest any right in a candidate for being considered for selection.

6. The appearance in all papers at the Written Examination as per rules is compulsory. Absence in any paper/papers will automatically render his candidature as disqualified.

7. Candidates have to produce Original documents and other particulars on the day of verification itself. If candidate fails to produce any of the required certificates and if the particulars furnished by him / her in the Application do not tally with the Original documents produced by him / her, then his / her 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.

8. While the Commission calls for preference of candidates in respect of posts/R.E.I. Societies 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 enjoyed under Article 315 and 320 of the Constitution of India. Therefore, the Commission has the power to assign a successful candidate to any of the notified posts for which he is considered by them to be qualified and eligible, subject to fulfilling the selection criterion.

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

PARA-IX: DEBARMENT:

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.

a) The Penal Provisions of Act 25/97 published in the State 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.

b) 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 and as may be decided by the Commission.

c) 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 debarred permanently from any exam or selection held by the Service Commission in the country.

d) **MEMORANDUM OF MARKS: -** Memorandum of Marks will be issued on payment of Rs.200/- (Rupees Two Hundred Only) through Online Payment in favour of the Secretary, T.S. Public Service Commission, Hyderabad. Request for Memorandum of Marks from candidates, will be entertained after one month from the date of publication of the final results in TSPSC Website. The Memorandum of Marks will be issued to the candidates for a period of 90 days only. Request for revaluation or recounting will not be undertaken 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.

In case of Off-line examination, if any candidate fails to mark the Booklet Series, Roll Number etc., in the OMR Answer Sheet, the Commission reserves the right to invalidate such Answer Sheets as Answer Sheets are valued by Optical Mark Scanner. No request for reconsideration of such rejected/invalidated cases will be entertained under any circumstances whatsoever.

PARA-X: - Please read the following Annexures appended to the Notification before filling the application form.

i) Breakup of Vacancies
ii) Payment gateway
iii) Scheme and Syllabus
iv) Instructions to the Candidates
v) List of Communities

PARA XI: SPECIAL INSTRUCTIONS TO CANDIDATES:

Candidates are directed to follow the Commission's Website (www.tspsc.gov.in) regularly to know the latest developments of this Recruitment and any changes/ Modifications/ Addendum/ Corrigendum, dates of Examination, calling of candidates for verification of Certificates/ Interviews/ Results etc. Candidates are advised to go through the Instructions to Candidates enclosed to this Notification at Annexure-IV.

PARA-XII: COMMISSION'S DECISION TO BE FINAL:

The decision of the Commission in all aspects and in 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 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 ***Sd/-***
DATE: 02 /06 /2017 ***SECRETARY***

ANNEXURE-I
(GENERAL RECRUITMENT)
DEGREE COLLEGE LECTURERS IN MJPTBC AND TELANGANA SOCIAL WELFARE RESIDENTIAL EDUCATIONAL INSTITUTIONS SOCIETY FOR WOMEN
Break-up of Vacancies

Society	Subject	State /Zone		OC	SC	ST	BC-A	BC-B	BC-C	BC-D	BC-E	VH	Grand Total
				W	W	W	W	W	W	W	W	W	
MJPTBCWREIS	Telugu	State	Zone V	-	-	-	-	-	-	-	-	-	-
			Zone VI	01	01	-	-	-	-	-	-	-	02
	English	State	Zone V	-	-	-	-	-	-	-	-	-	-
			Zone VI	02	01	-	01	-	-	-	-	-	04
	Economics	State	Zone V	-	-	-	-	-	-	-	-	-	-
			Zone VI	01	01	-	-	-	-	-	-	-	02
	History	State	Zone V	-	-	-	-	-	-	-	-	-	-
			Zone VI	01	01	-	-	-	-	-	-	-	02
	Pol.Science	State	Zone V	-	-	-	-	-	-	-	-	-	-
			Zone VI	01	01	-	-	-	-	-	-	-	02
	Commerce	State	Zone V	-	-	-	-	-	-	-	-	-	-
			Zone VI	02	01	-	01	-	-	-	-	-	04
	Maths	State	Zone V	-	-	-	-	-	-	-	-	-	-
			Zone VI	02	01	-	-	-	-	-	-	-	03
	Physics	State	Zone V	-	-	-	-	-	-	-	-	-	-
			Zone VI	01	01	-	-	-	-	-	-	-	02
	Chemistry	State	Zone V	-	-	-	-	-	-	-	-	-	-
			Zone VI	02	01	-	-	-	-	-	-	-	03
	Botany	State	Zone V	-	-	-	-	-	-	-	-	-	-
			Zone VI	01	01	-	-	-	-	-	-	-	02
	Zoology	State	Zone V	-	-	-	-	-	-	-	-	-	-
			Zone VI	01	01	-	-	-	-	-	-	-	02
	Mic.Biology	State	Zone V	-	-	-	-	-	-	-	-	-	-
			Zone VI	01	-	-	-	-	-	-	-	-	01
	Bio-Chemistry	State	Zone V	-	-	-	-	-	-	-	-	-	-
			Zone VI	01	-	-	-	-	-	-	-	-	01
	Bio.Technology	State	Zone V	-	-	-	-	-	-	-	-	-	-
			Zone VI	01	-	-	-	-	-	-	-	-	01
	Computer Science	State	Zone V	-	-	-	-	-	-	-	-	-	-
			Zone VI	02	01	-	-	-	-	-	-	-	03
	Statistics	State	Zone V	-	-	-	-	-	-	-	-	-	-
			Zone VI	01	01	-	-	-	-	-	-	-	02
	TOTAL			21	13	-	02	-	-	-	-	-	**36**

Society	Subject	State /Zone		OC	SC	ST	BC-A	BC-B	BC-C	BC-D	BC-E	VH	HH	Total	Grand Total
				W	W	W	W	W	W	W	W	W	W		
TSWREIS	Telugu	State	Zone V	11	04	01	02	02	01	01	01	01	-	24	60
			Zone VI	17	05	03	03	03	01	01	01	01	01	36	
	English	State	Zone V	11	04	01	02	02	01	01	01	01	-	24	60
			Zone VI	17	05	03	03	03	01	01	01	01	01	36	
	Economics	State	Zone V	03	01	-	01	-	-	-	0	01	-	6	15
			Zone VI	04	02	01	01	-	-	-	0	01	-	9	
	History	State	Zone V	03	01	-	01	-	-	-	0	01	-	6	15
			Zone VI	04	02	01	01	-	-	-	0	01	-	9	
	Pol.Science	State	Zone V	03	01	-	01	-	-	-	0	01	-	6	15
			Zone VI	04	02	01	01	-	-	-	0	01	-	9	
	Commerce	State	Zone V	17	05	03	03	03	01	01	01	01	01	36	89
			Zone VI	26	08	03	04	04	01	03	02	01	01	53	
	Maths	State	Zone V	06	02	01	01	01	-	-	0	01	-	12	30
			Zone VI	09	03	01	01	01	01	01	0	01	-	18	
	Physics	State	Zone V	06	02	01	01	01	-	-	0	01	-	12	28
			Zone VI	08	03	01	01	01	01	-	0	01	-	16	
	Chemistry	State	Zone V	09	03	01	01	01	01	01	0	01	-	18	35
			Zone VI	09	03	01	01	01	01	-	0	01	-	17	
	Botany	State	Zone V	06	02	01	01	01	-	-	0	01	-	12	30
			Zone VI	09	03	01	01	01	01	01	0	01	-	18	
	Zoology	State	Zone V	06	02	01	01	01	-	-	0	01	-	12	30
			Zone VI	09	03	01	01	01	01	01	0	01	-	18	
	Mic.Biology	State	Zone V	06	02	01	01	01	-	-	0	01	-	12	30
			Zone VI	09	03	01	01	01	01	01	0	01	-	18	
	Statistics	State	Zone V	06	02	01	01	01	-	-	0	01	-	12	30
			Zone VI	09	03	01	01	01	01	01	0	01	-	18	
	Computer Science	State	Zone V	06	02	01	01	01	-	-	0	01	-	12	31
			Zone VI	09	03	01	01	01	01	01	01	01	-	19	

Society	Subject	State /Zone		OC	SC	ST	BC-A	BC-B	BC-C	BC-D	BC-E	VH	HH	Total	Grand Total
				W	W	W	W	W	W	W	W	W	W		
TSWREIS	Electronics	State	Zone V	-	-	-	-	-	-	-	-	-	-	-	01
			Zone VI	01	-	-	-	-	-	-	-	-	-	01	
	Geology	State	Zone V	-	-	-	-	-	-	-	-	-	-	-	01
			Zone VI	01	-	-	-	-	-	-	-	-	-	01	
	Genetics	State	Zone V	-	-	-	-	-	-	-	-	-	-	-	01
			Zone VI	01	-	-	-	-	-	-	-	-	-	01	
	Bio-Technology	State	Zone V	-	-	-	-	-	-	-	-	-	-	-	01
			Zone VI	01	-	-	-	-	-	-	-	-	-	01	
	Food Science	State	Zone V	-	-	-	-	-	-	-	-	-	-	-	01
			Zone VI	01	-	-	-	-	-	-	-	-	-	01	
	Bio-Chemistry	State	Zone V	-	-	-	-	-	-	-	-	-	-	-	01
			Zone VI	01	-	-	-	-	-	-	-	-	-	01	
	Nutrition & Dietetics	State	Zone V	-	-	-	-	-	-	-	-	-	-	-	01
			Zone VI	01	-	-	-	-	-	-	-	-	-	01	
	Public Administration	State	Zone V	-	-	-	-	-	-	-	-	-	-	-	01
			Zone VI	01	-	-	-	-	-	-	-	-	-	01	
	Journalism	State	Zone V	-	-	-	-	-	-	-	-	-	-	-	01
			Zone VI	01	-	-	-	-	-	-	-	-	-	01	
	Psychology	State	Zone V	-	-	-	-	-	-	-	-	-	-	-	01
			Zone VI	01	-	-	-	-	-	-	-	-	-	01	
	Sociology	State	Zone V	-	-	-	-	-	-	-	-	-	-	-	01
			Zone VI	01	-	-	-	-	-	-	-	-	-	01	
	Business Administration	State	Zone V	-	-	-	-	-	-	-	-	-	-	-	01
			Zone VI	01	-	-	-	-	-	-	-	-	-	01	
	TOTAL			254	80	33	40	32	15	15	8	28	4	**510**	

IMPORTANT NOTE: The number of vacancies are subject to variation on intimation being received from the appointing authority.

ANNEXURE-II

List of Banks for making payment through SBI ePay.

STATE BANKGROUP	5.Oriental Bank of Commerce	17.Lakshmi Vilas Bank	6.Punjab National Bank
1.State Bank of India	6.United Bank of India	18.Punjab & Sind Bank	7.Union Bank of India
2.State Bank of Bikaner & Jaipur	7.Vijaya Bank	19.IDBI Bank	**LIST – C**
3.State Bank of Hyderabad	8.City Union Bank	20.Indusind Bank	1.HDFC Bank
4.State Bank of Mysore	9. Catholic Syrian Bank	21.Syndicate Bank	2.ICICI Bank
5.State Bank of Patiala	10.Federal Bank	**LIST – B**	3.Bank of Bahrain and Kuwait
6. State Bank of Travancore	11. ING Vysya Bank	1.Canara Bank	4.Citi Bank
LIST - A	12.Jammu & Kashmir Bank	2.Central Bank of India	5.Indian Overseas Bank
1.Bank of Maharashtra	13. KarurVysya Bank	3.Deutsche Bank	6.Karnataka Bank
2.Corporation Bank	14.South Indian Bank	4.Dhanalaxmi Bank	7.Ratnakar Bank
3.Dena Bank	15.Tamilnadu Mercantile Bank	5.Kotak Bank	
4.Indian Bank	16.DCB Bank		

CHANNEL		**AMOUNT RS.**	**PRICING IN RS.**
Internet Banking			
State Bank Group (6 Banks)		All amounts	Rs.3/-per transaction +Taxes
All other Banks	List-A (21 Banks)	All amounts	Rs.5/-per transaction +Taxes
	List-B (7 Banks)	All amounts	Rs.8/-per transaction +Taxes
	List-C (7 Banks)	All amounts	Rs.12/-per transaction +Taxes
Debit Card			
All Banks (Master/Mastreo/Visa/Rupay)		Up to 2000/-	0.75 % of the transaction amount + Taxes
		2001/- & above	1.00% of the transaction +Taxes
Credit card (Master/Visa/AMEX/Rupay)		All amounts	1.00% of transaction amount + Taxes
IMPS – Mobile payments		All Amounts	Rs. 7/- of the transaction Amount + Taxes

ANNEXURE-III

Scheme and Syllabus for the post of Degree Lecturers in Residential Educational Institution Societies

Preliminary (Screening Test)

Scheme of Examination

Written Examination (Objective Type)		No. of Questions	Duration (Minutes)	Marks
Paper	General Studies, General Abilities and Basic Proficiency in English	150	150	150

Syllabus
Paper: General Studies, General Abilities and Basic Profeiciency in English

Section-I: General Studies

1. Current Affairs – Regional, National & International.
2. Indian Constitution; Indian Political System; Governance and Public Policy.
3. Social Exclusion; Rights issues such as Gender, Caste, Tribe, Disability etc.and inclusive policies.
4. Society Culture, Civilization Heritage, Arts and Literature of India and Telangana
5. General Science; India's Achievements in Science and Technology
6. Environmental Issues; Disaster Management- Prevention and Mitigation Strategies and Sustainable Development.
7. Economic and Social Development of India and Telangana.
8. Socio-economic, Political and Cultural History of Telangana with special emphasis on Telangana Statehood Movement and formation of Telangana state.

Section-II: General Abilities

9. Analytical Abilities: Logical Reasoning and Data Interpretation.
10. Moral Values and Professional Ethics in Education.
11. Teaching Aptitude

Section – III: Basic Proficiency in English

i) School Level English Grammar:

Articles; Tense; Noun & Pronouns; Adjectives; Adverbs; Verbs; Modals; Subject-Verb Agreement; Non-Finites; Reported Speech; Degrees of Comparison; Active and Passive Voice; Prepositions; Conjunctions; Conditionals**.**

ii) Vocabulary:

Synonyms and Antonyms; Phrasal Verbs; Related Pair of Words; Idioms and Phrases; Proverbs.

iii) Words and Sentences :

Use of Words ; Choosing Appropriate words and Words often Confused; Sentence Arrangement, Completion, Fillers and Improvement; Transformation of Sentences ; Comprehension; Punctuation; Spelling Test; Spotting of Errors.

Main Examination Scheme for the post of Degree Lecturers in Residential Educational Institution Societies

Written Examination (Objective Type)		No. of Questions	Duration (Minutes)	Marks
Paper	Subject Discipline Knowledge/ Concerned Subject **(P.G. Level)**	150	150	300
Interview/ Demonstration /viva-voce				30
Total				330

Concerned Subjects are:

1. Telugu	2. English	3. Mathematics	4.Physics
5. Chemistry	6.Botany	7.Zoology	8.Micro biology
9. Bio-Chemistry	10. History	11. Economics	12.Political Science
13. Commerce	14. Computer Science	15. Statistics	16.Genetics
17.Geology	18. Nutrition & Dietetics	19. **PHYSICS (with Electronics Specialization)**	20. Psychology
21. Bio-Technology	22. Sociology	23. Communication and Journalism	24. Business Administration
25. Public Administration.		26. Food Science	

NOTE: 1. **PHYSICS (with Electronics Specialization)** syllabus for the post of **Electronics.**

2. **Communication and Journalism** syllabus for the Post of **Journalism.**

Main Examination Syllabus for the post of Degree Lecturers in Residential Educational Institution Societies

1. Paper-Telugu

Paper: తెలుగు

(ఎ) **సంప్రదాయ సాహిత్యకవుల అధ్యయనం – కాలం – రచనలు**

నన్నయ, తిక్కన, ఎర్రన, శివకవులు (నన్నెచోడుడు, మల్లికార్జున పండితారాధ్యుడు, పాల్కురికి సోమనాథుడు), నాచనసోమన – భాస్కర రామాయణ కావులు, రంగనాథ రామాయణ కవి – శ్రీనాథుడు – పోతన – పిల్లలమర్రి పినవీరభద్రుడు – గౌరన – అనంతామాత్యుడు – కొరవి గోపరాజు – నంది మల్లన, ఘంట సింగన – అష్టదిగ్గజ కవులు – తాళ్ళపాక కవులు – పొన్నగంటి తెలగన్న – చేమకూర వెంకటకవి – తంజావూరు రాజకవులు కవయిత్రులు – కందుకూరి రుద్రకవి, మడికి సింగన

(బి) **వేమన తాత్త్వికత – సమకాలిక పరిశీలన, దృక్పథం – సమాజంపై వేమన కవిత్వ ప్రభావం.**

సాహిత్య ధోరణుల అధ్యయనం – యుగప్రభావం – రూపాలు – మొదలైనవి. ఇతిహాసం – పురాణం ప్రబంధం – శతకం– సంకీర్తన సాహిత్యం – చారిత్రక కావ్యం – సంప్రదాయ, ఆధునిక గద్య రచనలు – నవల – కథానిక – వ్యాసం –ఏకాంకిక మొదలైనవి – వాదాలు (దళిత, హేతు, స్త్రీ, మైనారిటి , బి.సి. ప్రాంతీయ)

జానపద విజ్ఞానం – గేయాలు – కతాగేయాలు – గద్యాఖ్యానాలు – (పురాణగాథలు – ఐతిహ్యాలు – కథలు), సామెతలు – పొడుపుకథలు – జానపద కళలు – (వీధి నాటకాలు, యక్షగానాలు, బొమ్మలాటలు,, పగటి వేషాలు, చిందు, ఒగ్గు, జాతర కళారూపాలు.

ఆధునిక కవులు అధ్యయనం – ఆధునిక ధోరణులు వారి రచనలు – గురజాడ – రాయప్రోలు – విరేశలింగం – విశ్వనాథ – దేవులపల్లి – బసవరాజు – పింగళి – కాటూరి – దువ్వూరి – పుట్టపర్తి – శ్రీశ్రీ – కాళోజి, దాశరథి, సి. నారాయణ రెడ్డి , ఎన్. గోపి – ప్రసిద్ధ ఆధునిక కవులు – భావ, అభ్యుదయ, విప్లవ, – దిగంబర, చేతనావర్తన కవులు.

తెలుగు వ్యాకరణ, ఛందస్సు అధ్యయనం:

వ్యాకరణం – బాల వ్యాకరణం (సంజ్ఞ, సంధి, క్రియా, తత్సమ, ఆచ్చిక ప్రకరణాలు ఛందస్సు – వృత్తాలు, జాతులు, ఉపజాతులు (ఉత్పలమాల, చంపకమాల, శార్దూలం, మత్తేభం, ద్విపద, తరువోజ , సీసం, కందం, స్రగ్ధర , పంచచామరం) అలంకారాలు – అర్థాలంకారాలు, శబ్దాలంకారాలు తెలుగు భాషా చరిత్ర పరిణామం – (ప్రాఙ్నన్నయ యుగం నుండి నేటి వరకు) – ద్రావిడ భాషా కుటుంబాలలో తెలుగు స్థానం – భౌగోళిక విభజన – మాండలికాలు.

భాషా విజ్ఞాన అధ్యయనం – భాషా శాస్త్రం, అర్థ విపరిణామం – ఆధునిక కాలం,: శాసన భాష నుండి సాహిత్య భాష వరకు (వ్యావహారిక భాష ఉద్యమం వంటివి

తెలుగు సాహిత్య పరిణామం (ప్రాఙ్నన్నయ యుగం నుండి నేటి వరకు) సౌందర్య, సాహిత్య విమర్శ అధ్యయనం (ఫ్రాక్, పశ్చిమ) ఆధునిక తెలుగు సాహిత్య విమర్శ. సంస్కృత వ్యాకరణం – కావ్యాలు – సంస్కృత వ్యాకరణం ప్రాథమిక విజ్ఞానం, సామాన్య ప్రామాణిక గద్య, పద్య పాఠ్యాంశాలు – హితోపదేశం, కాళిదాసుని కృతులు, సంస్కృత పంచకావ్యాల పరిచయం.

Main Examination Syllabus for the post of Degree Lecturers in Residential Educational Institution Societies

2. Paper: English

I. Genres, Movements, Schools, Concepts.

- Renaissance-Reformation, Metaphysical poetry, Neo-classicism, Puritanism, Restoration, Romanticism,Victorian Age, Realism-Naturalism, Expressionism, Symbolism, Modernism, Postmodernism.
- Structuralism, Poststructuralism, Feminism, Postcolonialism, Diaspora, Race Gender and Caste.
- English Literary Criticism from Philip Sydney to Matthew Arnold
- New Criticism, Formalism, Archetypal criticism, New Historicism, Psychoanalytical criticism,Reader response criticism.
- Literary Genres: Poetry, Fiction, Prose, Drama (origins and development, elements, forms, types)

II. Writers and Texts

• Christopher Marlowe	Doctor Faustus
• William Shakespeare	Hamlet
• John Milton	Paradise Lost-Book 1
• William Wordsworth	“Immortality Ode”, Tintern Abbey
• Robert Browning	“My Last Duchess”, “Andrea del Sarto”
• Thomas Hardy	Tess of the d’ Urbervilles
• TS Eliot	The Waste Land
• G.B. Shaw	Saint Joan
• Virginia Woolf	“A Room of One’s Own”
• William Golding	Lord of the Flies
• Walt Whitman	“When Lilacs Last in the Dooryard Bloomd”,”Crossing Brooklyn Ferry”
• Arthur Miller	Death of a Salesman
• Toni Morrison	Beloved
• Mulk Raj Anand	Untouchable
• Kamala Das	“An Introduction”, “The Old Playhouse”
• Girish Karnad	Hayavadana
• Salman Rushdie	Midnight’s Children
• Chinua Achebe	Things Fall Apart
• Margaret Atwood	Edible Woman
• Derek Walcott	Dream on Monkey Mountain

III English Language Teaching

1. ELT in India : (History and status of English in India; English as Second Language, English asForeign Language, and English as Global Language).
2. Methods and Approaches: (Grammar Translation method, Direct method, Audio-Lingual method;Structural approach, Communicative language teaching)
3. Teaching of Language Skills : (Teaching of Listening, Speaking, Reading, and Writing Skills;Teaching of Grammar and Functional English; Teaching of Vocabulary; Classroom techniques; Useof authentic materials) Teaching literature.
4. Testing and Evaluation: (Principles, Types, Objectives of testing and evaluation)
5. Phonetics and Phonology; Syntax and Structure.

IV.Literary comprehension-(Excerpts from poetry and prose for comprehension)

Main Examination Syllabus for the post of Degree Lecturers in Residential Educational Institution Societies

3. Paper: Mathematics

I. Real Analysis

Finite, Countable and Uncountable sets – Real Number system R – Infimum and Supremum of asubset of R – Bolzano- Weierstrass Theorem- Sequences- Convergence- Limit Superior and LimitInferior of a Sequence- Sub sequences- Heine-Borel Theorem- Infinite Series – Tests of Convergence-Continuity and Uniform continuity of a real valued function of a real variable- Monotonic Functions- Functions of Bounded Variation- Differentiability and Mean Value Theorems- Riemann Integrability- Sequences and Series of Functions

II. Metric Spaces

Metric spaces – Completeness- Compactness- Connectedness – Continuity and Uniform continuity ofa function from one metric space into another-Topological Spaces – Bases and Subbases – Continuousfunctions

III. Elementary Number Theory

Primes and Composite numbers – Fundamental Theorem of Arithmetic – Divisibility – Congruences– Fermat's theorem – Wilson's Theorem – Euler's Phi - Function

IV. Group Theory

Groups- Subgroups- Normal Subgroups- Quotient groups- Homomorphisms- IsomorphismTheorems-Permutation groups- Cyclic groups- Cayley's theorem.Sylow's theorems - Their applications

V. Rings and Fields

Rings- Integral domain- Fields- Subrings - Ideals – Quotient rings – Homomorphisms – Prime ideals-Maximal ideals – Polynomial rings – Irreducibility of polynomials – Euclidean domains- Principalideal domains-Algebraic, Normal, Separable extensions of fields- Galois Theory

VI. Vector Spaces

Vector Spaces, Subspaces – Linear dependence and independence of vectors – basis and dimension –Quotient spaces – Inner product spaces – Orthonormal basis – Gram-Schmidt process.

VII. Functional Analysis

Normed Linear Spaces- Banach Spaces -Inner Product Spaces- Hilbert Spaces-Linear Operators- LinearFunctionals- Open Mapping Theorem- Closed Graph Theorem- Uniform Boundedness theorem- Hahn– Banach Theorem

VIII. Theory of Matrices

Linear Transformations – Rank and nullity – Change of bases- Matrix of a Linear Transformation –Singular and Non-singular matrices – Inverse of a matrix – Eigenvalues and Eigenvectors of a matrixand of a Linear Transformation – Cayley-Hamilton's theorem- Quadratic forms- Signature and Index

IX. Complex Analysis

Algebra of Complex Numbers – The Complex Plane – Complex Functions and Their Analyticity –Cauchy-Riemann equations – Mobius transformations- Power Series- Complex Integration – Cauchy'sTheorem – Morera's Theorem – Cauchy's Integral Formula – Liouville's Theorem – Maximum ModulesPrinciple – Schwarz's Lemma – Taylor's Series – Laurent's Series-Calculus of Residues – Evaluationof Integrals

X. Ordinary Differential Equations

Ordinary Differential Equations (ODE) of First order and First degree – Different methods of solvingthem – Exact Differential equations and Integrating factorsODE of First order and Higher degree – Equations solvable for p, x and y – Clairaut's equations

–Singular Solutions- Linear Differential Equations with Constant Coefficients and Variable Coefficients– Variation of Parameters

XI. Partial Differential Equations

Formation of Partial Differential Equations (PDE) – Lagrange and Charpit's methods for Solving firstorder PDEs – Cauchy problem for first order PDEs- Classification of Second Order PDE's – GeneralSolution of Higher Order PDEs with Constant Coefficients

XII. Solid Geometry

The Plane- Right line- Sphere- Cones and Cylinders

Main Examination Syllabus for the post of Degree Lecturers in Residential Educational Institution Societies

4. Paper: Physics

I. Mathematical Methods of Physics

Dimensional analysis, vector algebra and vector calculus. Linear algebra, matrices, cayley- HamiltonTheorem. Eigenvalues and eigenvectors. Linear ordinary differential equations of first & second order,special functions (Hermite, Bessel, Laguerre and Legendre functions). Fourier series, Fourier andLaplace transforms. Elements of complex analysis, analytic functions; Taylor & Laurent series: poles,residues and evaluation of integrals. Elementary probability theory, random variables, binomial, Poissonand normal distributions. Central limit theorem.

II. Classical Mechanics

Newton's laws. Dynamical systems, Phase space dynamics, stability analysis. Central force motions.Two body collisions-scattering in laboratory and centre of mass frames. Rigid body dynamics-momentof inertia tensor. Non-inertial frames and pseudo forces. Variational principle. Generalizedcoordinates.Lagrangian and Hamiltonian formalisms and equations of motion. Conservation laws andcyclic coordinates. Periodic motion: small oscillations, normal modes. Special theory of relativity-Lorentz transformations, relativistic kinematics and mass-energy equivalence.

III. Electromagnetic Theory

Electrostatics: Gauss's law and its applications, Laplace and Poisson equations, boundary valueproblems. Magneto statics: Biot-savart law, Ampere's theorem. Electromagnetic induction. Maxwell'sequations in free space and linear isotropic media; boundary conditions on the fields at interfaces.Scalar and vector potentials, gauge invariance. Electromagnetic waves in free space. Dielectrics andconductors. Reflection and refraction, polarization, Fresnel's law, interference, coherence anddiffraction. Dynamics of charged particles in static and uniform electromagnetic fields. Charges particlesin inhomogeneous fields.

IV. Quantum mechanics

Wave-particle duality. Schrodinger equation (time-dependent and time-independent). Eigenvalueproblems (particle in a box, harmonic oscillator,etc..).Tunnelling through a barrier. Wave function incoordinate and momentum representations. Commutators and Heisenberg uncertainty principle. Diracnotation for state vectors. Motion in a central potential: Orbital angular momentum, angular momentumalgebra, spin, addition of angular momenta; Hydrogen atom. Stem-Gerlach experiment. Timeindependent perturbation theory and applications. Variational method. Time dependent perturbationtheory and Fermi's golden rule.Selactin rules. Identical practices. Pauli exclusion principle.spin-statisticsconnection.

V. Themrdynamics and statistical Physics

Laws of thermodynamics and their significance. Thermodynamic potentials, Maxwell relations,chemical potential, Phase equilibria. Phase space. Micro and macro- states. Micro-canonical, canonicaland grand-canonical ensembles and partition functions. Free energy and it's connection withthermodynamic quantities. Classical and quantum statistics. Bose and Fermi gases. Principle of detailedbalance. Black body radiation and Planck's distribution law

VI. Electronics

Semiconductor devices (diods, junctions, transistors, field effect devices, homo- and hetero junctiondevices), device structure, device characteristics, frequency dependence and applications. Optoelectronicdevices (solar cells, photo detectors, LEDs). Rectifiers and power supplies. Feedbackamplifiers and their frequency response. Oscillators, Multivibrators. Operational amplifiers and theirapplications, Digital techniques and applications (Logic circuits, registers,

counters and Comparators).A/D and D/A converters. Microprocessors, micro controller basics. Fundamentals of AMcommunication, FM communication and Fibre optic communication and their techniques.

VII. Atomic & Molecular Physics

Quantum States of an electron in an atom. Electron spin. Spectrum of Helium and alkali atom.Relativistic corrections for energy levels of hydrogen atom, hyper fine structure and isotopic shift,width of spectrum lines, LS &JJ couplings. Zeeman, Paschen-Bach & Stark effects. Frank-Condonprinciple. Electronic rotational, vibrational and Raman spectra of diatomic molecules. Selection rules.Lasers: spontaneous and stimulated emission, Einstein A & B coefficients. Optical pumping, Populationinversion, rate equation. Modes of resonators and coherence length.

VIII. Condensed Matter Physics

Bravais lattice. Reciprocal lattice. Diffraction and the structure factor. Bonding of solids. Elasticproperties, Phonons, lattice specific heat. Free electron theory and electronic specific heat. Responseand Relaxation phenomena. Drude model of electrical and thermal conductivity. Hall Effect andthermoelectric power. Electron motion in a periodic potential, band theory of solids; metals, insulatorsand semiconductors. Super conductivity: Type-I and type-II super conductors. Josephson junctions.Superfluidity. Defects and dislocations. Ordered phases of matter: translational and orientation order,kinds of liquid crystalline order. Quasi crystals.

IX. Nuclear and Particle Physics

Basics of radio activity. Basic nuclear properties; size, shape and charge distribution, spin and parity.Binding energy, Semi-empirical mass formula, liquid drop model. Nature of the nuclear force, form ofnucleon-nucleon potential, charge –independence and charge symmetry of nuclear forces. Deuteronproblem. Evidence of shell structure, single-particle shell model, its validity and limitations. Elementaryideas of alpha, beta and gamma decays and their selection rules. Fission and fusion. Nuclear reactions.Reaction mechanism, compound nuclei and direct reactions.

X. Mathematical Methods of Physics

Green’s function. Partial differential equations (Laplace, wave and heat equations in two and threedimensions). Elements of computational techniques: root of functions, interpolation, and extrapolation,integration by trapezoid and Simpson’s rule, solution of first order differential equation using Rungekuttamethod. Finite difference methods. Tensors. Introductory group theory.

XI. Classical Mechanics

Basic concepts of Dynamical systems, Poisson brackets and canonical transformations. Symmetry,invariance and Noether’s theorem. Hamilton-Jacobi theory.

XII. Electromagnetic Theory

Dispersion relations in Plasma. Lorentz invariance of Maxwell’s equation. Transmission lines andwave guides. Radiation-from moving charges and dipoles and retarded potentials.

XIII. Quantum Mechanics

Spin-Orbit coupling, fine structure. WKB approximation. Elementary theory of scattering: Phase shifts,partial waves, Born approximation. Relativistic quantum mechanics: Klein- Gordon and Dirac equations.Semi- classical theory of radiation.

XIV. Thermodynamics and Statistical Physics

First- and second-order phase transitions. Diamagnetism, paramagnetism and ferromagnetism. Isingmodel. Bose-Einstein condensation. Diffusion equation. Random walk and Brownian motion.Introduction to non equilibrium processes.

XV. Condensed Matter Physics

Phase contrast microscopy, Thermo gravimetric analysis. Differential scanning calorimetry. Theoryand applications of Massbauer effect. Electron Spin Resonance (ESR), Nuclear Magnetic Resonance(NMR), Chemical shift and applications. X-ray diffraction technique, scanning electron microscopyand transmission electron microscopy and their applications.

XVI. Nuclear and Particle Physics

Classification of fundamental forces. Elementary particles and their quantum numbers (charge, spin,parity, isospin, strangeness, etc.). Quark model, baryons and mesons. C, P, and T invariance. Applicationsof symmetry arguments to particle reactions. Parity non-conservation in week interaction. Relativistickinematics.

Main Examination Syllabus for the post of Degree Lecturers in Residential Educational Institution Societies

5. Paper: Chemistry

Inorganic chemistry:

I. Atomic structure and chemical bonding – structure and bonding in homo and hetero nuclear molecules.Application of VSEPR, Valence Bond and Molecular orbital theories in explaining the structures ofsimple molecules.

II. Chemistry of main group (I to VII & Nobel gases) elements.

III. Chemistry of transition elements and inner transition elements.

IV. General principles of metallurgy: Occurrence of metals , Concentration of ores - levigation, magneticseparation, froth floatation, leaching , Extraction of crude metal from concentrated ore-conversion tooxide, reduction of oxide to the metal , Thermodynamic principles of metallurgy-Ellingham diagramlimitations,applications. Extraction of iron, copper and zinc from their oxides, Electrochemicalprinciples of metallurgy, Oxidation and reduction, Refining of crude metal-distillation, liquation poling,electrolysis, zone refining and vapour phase refining, Uses of aluminium, copper, zinc and iron.Alloys: Inter-metallic compounds

V. Concept of Symmetry in Molecules – Symmetry Operations – Symmetry Elements : Rotational Axisof Symmetry and Types of Rotational Axes, Plane of Symmetry and types of Planes, Improper RotationalAxis of Symmetry , Inversion Center and Identity Element. Molecular Point Groups: Definition andNotation of Point Groups, Classification Molecules in to C1, Cs, Ci, Cn, Cnv, Cnh , Dn , Dnh , Dnd,Sn. Td, Oh & Ih.

VI. Coordination Chemistry –IUPAC nomenclature, bonding theories – Werner's theory, EAN rule, VBT,Crystal Field Theory – Crystal Field splitting patterns in various geometries, Factors affecting onCFT. Calculation of CFSE – John Teller effect – Isomerism in complexes. Spectral and magneticproperties of Coordination complexes – Russell Sanders coupling – term symbols - charge transferspectra of complexes.

VII. Stability of metal complexes – Stepwise and overall stability constants – Factors affecting the stabilityof metal complexes - Chelate effect. Pearson's theory of hard and soft acids and bases (HSAB).

VIII. Reaction mechanism of metal complexes–Inert and labile complexes – Ligand substitution reaction ofoctahedral complexes – Acid hydrolysis, Base hydrolysis – Conjugate base mechanism – Anationreactions – Substitution reactions of square planar complexes – Trans effect – Electron transfer reactions– Inner and outer sphere mechanisms.

IX. Metal carbonyls, Nitrosyls and Metallocenes - Structure and bonding.

X. Bio-inorganic chemistry- Metal complexes as oxygen carriers-Hemoglobin and myoglobin-Oxygentransport – Non heme proteins – Hemerythrin and hemocyanin.

XI. Analytical chemistry- Chromatography – General principles involved in separations by Paper, Thinlayer, Column Chromatography, GC and HPLC.

Physical Chemistry:

I. Solutions and colligative properties: Types of solutions, Expressing concentration of solutions masspercentage, volume percentage, mass by volume percentage, parts per million, mole fraction, molarityand molality, Solubility: Solubility of a solid in a liquid, solubility of a gas in a liquid, Henry's law,Vapour pressure of liquid solutions: vapour pressure of liquid-liquid solutions. Raoult's law as aspecial case of Henry's law -vapour pressure of solutions of solids in liquids, Ideal and non-idealsolutions, Colligative properties and determination of molar mass - Relative lowering of vapour pressure,elevation of boiling point, Depression of freezing point, Osmosis and osmotic pressure-reverse osmosisand water purification. Abnormal molar masses - van't Hoff factor. Phase equilibria– Phase rule andits application to one component and two component systems

II. Acids and bases: Acids, bases and salts- Arrhenius, Bronsted-Lowry and Lewis concepts of acids andbases. Ionisation of Acids and Bases –

Ionisation constant of water and it's ionic product- pH scaleionisationconstant of weak acids and weak bases-relation between Ka and Kb. Di and poly basicacids and di and poly acidic Bases-Factors affecting acid strength-Common ion effect in the ionizationof acids and bases-Hydrolysis of salts and pH of their solutions. Buffer solutions.

III. Thermodynamics: Brief review of concepts of I and II laws of thermodynamics. Concept of entropy.Entropy as a state function. Calculation of entropy changes in various processes. Entropy changes inan ideal gas. Entropy changes on mixing of ideal gases. Entropy as a function of V and T. Entropy asa function of P and T. Entropy change in isolated systems- Clausius inequality. Entropy change ascriterion for spontaneity and equilibrium.Third law of thermodynamics.Evaluation of absolute entropiesfrom heat capacity data for solids, liquids and gases.Standard entropies and entropy changes of chemicalreactions.Helmholtz and Gibbs free energies (A and G). A and G as criteria for equilibrium andspontaneity. Physical significance of A and G. Driving force for chemical reactions- relative signs of?H and ?S. Thermodynamic relations. Gibbs equations. Maxwell relations. Temperature dependenceof G. Gibbs- Helmholtz equation. Pressure dependence of G. Chemical potential: Gibbs equations fornon-equilibrium systems. Material equilibrium. Phase equilibrium. Clapeyron equation and ClausiusClapeyron equation.Conditions for equilibrium in a closed system.Chemical potential of ideal gases.Ideal-gas reaction equlibrium-derivation of equilibrium constant. Temperature dependence ofequilibrium constant - The Van't hoff equation.

IV. Electrochemistry: Conductance and its applications, Derivation of Nernst equation. Chemical andconcentration cells (with and without transference).Liquid junction potential – derivation of theexpression for L J P – its determination and elimination. Applications of EMF measurements: Solubilityproduct, potentiometric titrations, determination of transport numbers, equilibrium constantmeasurements. Decomposition potential and its significance.Electrode polarization – its causes andelimination.Concentration over potential.Concept of activity and activity coefficients in electrolyticsolutions.The mean ionic activity coefficient.Debye-Huckel theory of electrolytic solutions.Debye-Huckel limiting law.Calculation of mean ionic activity coefficient.Limitations of Debye-Huckeltheory. Extended Debye-Huckel law. Theory of electrolytic conductance.Derivation of Debye-Huckel-Onsager equation – its validity and limitations. Concept of ion association – Bjerrum theory of ionassociation (elementary treatment) - ion association constant – Debye-Huckel-Bjerrum equation.

V. Quantum chemistry: Black body radiation-Planck's concept of quantization-Planck's equation, averageenergy of an oscillator. Wave particle duality and uncertainty principle - significance for microscopicentities.Emergence of quantum mechanics. Wave mechanics and Schrödinger wave equation.Operators - operator algebra: Commutation of operators, linear operators, Complex functions, Hermitianoperators. Operators and. Eigen functions and Eigen values. Degeneracy. Linear combination ofEigen functions of an operator.Well behaved functions. Normalized and orthogonal functions.Postulates of quantum mechanics.Physical interpretation of wave function.Observables and operators.Measurability of operators.Average values of observables.The time dependent Schrodinger equation.Separation of variables and the time-independent Schrodinger equation.Theorems of quantum mechanics: Real nature of the Eigen values of a Hermitian operator - significance.Orthogonal nature of the Eigen values of a Hermitian operator-significance of orthogonality.Expansionof a function in terms of Eigen values.Eigen functions of commuting operators - significance.Simultaneous measurement of properties and the uncertainty principle.Particle in a box- Particle in one and three dimensional box. Plots of ?and ?2 discussion, Degeneracyof energy levels. Comparison of

classical and quantum mechanical particles. Calculations using wavefunctions of the particle in a box-orthogonality, measurability of energy, position and momentum,average values and probabilities.

VI. Chemical kinetics: Theories of reaction rates - Collision theory, Transition state theory, Reactioncoordinate, activated complex and the transition state. Thermodynamic formulation of transition statetheory. Unimolecular reactions and Lindeman's theory.

VII. Complex reactions - Opposing reactions, parallel reactions and consecutive reactions. Chain reactions- general characteristics, steady state treatment - H2 - Br2 reaction. Derivation of rate law. Effect ofstructure on reactivity- Linear free energy relationships. Hammett and Taft equations – substituent (sand s*) and reaction constant (? and ?*) with examples.Michealis-Menten mechanism of enzyme catalyzed reactions - derivation of kinetic equation and itsapplications.

VIII. Photochemistry: Electronic transitions in molecules - The Franck Condon principle. Electronicallyexcited molecules- singlet and triplet states. Radiative life times of excited states-theoretical treatment.Measured lifetimes. Quantum yield and its determination. Actinometry - ferrioxalate and uranyl oxalateactinometers. Derivation of fluorescence and phosphorescence quantum yields. E-type delayedfluorescence- evaluation of triplet energy splitting (?EST). Laws of photo chemistry, Photo physicalprocesses, photo physical kinetics of unimolecular reactions. Calculation of rate constants of variousphoto physical processes, State diagrams, photochemical primary processes. Types of photochemicalreactions- electron transfer, photo dissociation, addition, abstraction, oxidation and isomerisationreactions with examples. Effect of light intensity on the rates of photochemical reactions.Photosensitization. Quenching-Stern Volmer equation. Experimental set up of a photochemical reaction.Introduction to fast reactions- Principles of flash photolysis.

IX. Solid state chemistry: General characteristics of solid state. Classification of crystalline solids basedon different binding forces, probing the structure of solids: X-ray crystallography, Crystal lattices andunit cells. Bravais lattices- primitive and centred unit cells, Number of atoms in a unit cell (primitive,body centred and face centred cubic unit cell), Close packed structures: Close packing in one dimension,in two dimensions and in three dimensions- tetrahedral and octahedral voids- formula of a compoundand number of voids filled- locating tetrahedral and octahedral voids, Packing efficiency in simplecubic, bcc and in hcp, ccp lattice. Calculations involving unit cell dimensions density of the unit cell.Imperfections in solids-types of point defects-stoichiometric and non-stoichiometric defects.Magneticproperties of solids- classification of magnetic materials, Magnetic susceptibility, Langevindiamagnetism, Weiss theory of para magnetism. Magnetic properties of solids - classification ofmagnetic materials, Magnetic susceptibility, Langevin diamagnetism, Weiss theory of para magnetism

X. Electronic properties of metals, insulators and semi conductors: Electronic structure of solids, Bandtheory, band structure of metals, insulators and semiconductors. Electrons holes and excitons. Thetemperature dependence of conductivity of extrinsic semi conductors. Photoconductivity andphotovoltaic effect.

XI. Superconductivity. Occurrence of superconductivity. Destruction of superconductivity by magneticfields-Meisner effect. Types of superconductors. Theories of super conductivity- BCS theory.

Organic Chemistry:

I. IUPAC nomenclature of organic molecules. Isomerism – classification of isomers.

II. Classification, preparations and properties of alkane, alkenes, alkynes, cyclo alkanes, aromatichydrocarbons, halogen compounds, hydroxy compounds, carbonyl compounds, carboxylic acids andits derivatives.

III. Stereo chemistry: Molecular representations (Wedge, Fisher, Newman and Saw-horse projectionformula) their description and interconversions. Stereoisomers – classification- configuration- R,SNomenclature,criteria for chirality, Axial chirality of allenes, spiranes, alkylidenes, Cycloalkanes,chiral biaryls - Atropisomerism. Planar chirality of ansa compounds and trans-cyclooctene.Helicalchiral compounds.Determination of absolute configuration by chemical correlation methods.Determination of configuration in E,Z-nomenclature. Spectral and chemical methods for determinationof E, Z-configuration, including aldoxime and ketoximes. Asymmetric synthesis: Topicity, pro-chirality,stereoslectivity, enatioselectivity and diastereoselectivity. Asymmetric aldol reaction and Diel's alderreaction.

IV. Introduction to conformational isomerism, Klyne - Prelog terminology for conformers and torsionangles, dihedral angle, Steric strain and the concept of dynamic stereoisomerism. Study of conformationsof acyclic compounds like ethane, butane, dihalobutanes, halohydrin, ethylene glycol, butane-2, 3-diol, amino alcohols and 1,1,2,2-tetrahalobutanes. Study of conformations of cyclic compounds -cyclo pentane, cylohexane, cyclohexanone, and its derivatives.

V. Nature of bonding in organic molecules and aromaticity, delocalized chemical bonding, conjugation,cross conjugation, resonance, hyperconjugation, tautomerism, Huckel's Rule and the concept ofaromaticity- Aromaticity, non-aromaticity and anti aromaticity. Aromaticity of benzenoid and nonbenzenoidcompounds, alternant and non-alternant hydrocarbons, Azulenes, Fulvenes and Annulenes.Metallocenes- Ferrocene.

VI. Reactive intermediate: Generation, detection, structure, stability and reactivity of carbocation, carbanion,free radical, carbene and nitrene. Molecular rearrangements: definition and classification, molecularrearrangements involving 1). Electron deficient carbon: Wagner - Meerwein, Pinacol-Pinacolone, allylicand Wolf rearrangement. 2). Electron deficient Nitrogen: Hofmann, Lossen, Curtius, Schmidt andBeckmann rearrangements. 3) Electron deficient Oxygen: Baeyer-Villiger oxidation. 4). Base catalysedrearrangements: Benzylic acid, Favourski, Tran annular, Sommlett-Hauser and Smile rearrangement.

VII. Organic reaction mechanism: Mechanism, stereochemistry and energy profile diagram of Additionreactions to polar and non polar double bonds. Substitution reactions: Mechanism, rate law,stereochemistry and factors affecting on aliphatic and aromatic reactions. Elimination reactions-mechanism,rate law, stereochemistry, orientation and factors affecting on E1, E2, E1CB, pyrolyticsyn elimination and a-elimination, elimination vs substitution. Detection of reaction mechanism byproduct isolation, isotopic labelling, chemical trapping and crossover experiments.

VIII. Oxidation- Swern, Cr (VI) oxidants, Oxidative cleavage of 1,2-diols - Periodic acid and Lead tetraacetate.

IX. Reductions - Wilkinsons's catalytic hydrogenation, $LiAlH_4$, $NaBH_4$, BH_3, AlH_3 and DIBAL.

X. Synthetic strategies: Target selection, terminology, disconnection approach, C-C bond disconnections.

XI. Heterocyclic chemistry: importance as drugs, nomenclature, classification based on size of the ring,number and nature of hetero atoms. Synthesis and reactivity of Pyrrole, furan, Thiophene, pyridine,Indole, Benzothiophene, Quinoline, Isoqunolines.

XII. Alkaloids and Terpenoids- importance as drugs, isolation of natural products by steam distillation,solvent extraction and chemical methods. Structure determination and synthesis of papverine, nicotineand quinine. General methods in the structure determination of Terpenes, isoprene rule, special isoprenerule, structure determination of a-Terpeniol and camphor.

XIII. Organic photochemistry: photochemical energy, Frank-Condon principle, Jablonski diagram, Electronictransitions, photosensitization, quenching, quantum efficiency, quantum yield, photochemistry ofcarbonyl compounds n?p* and p?p* transitions. Norrish type-I and Norrish type-II cleavages. Paterno-Buchi reactions, Photoreduction, photochemistry of enones-hydrogen abstraction, rearrangements ofa,ß-unsaturated ketones and cyclohexadienones, photochemistry of p-benzoquinones, Dienes - photochemistry of 1,3- butadiene, (2+2) additions, Di-p-methane rearrangement, photochemistry ofaromatic compounds, excited states of benzene and its 1,2-, 1,4- additions.

XIV. Pericyclic reactions: Classification, Stereochemistry of pericyclic reactions, Molecular Orbitals andSymmetry of ethelene, 1,3-butadiene, 1,3,5-hexatriene, allylic, 1,3-pentadienyl and 1,3,5- heptatrienylp- systems. Analysis of pericyclic reactions by PMO, FMO and orbital correlation methods.

XV. Basic principles, concepts of UV, IR, H1NMR, C13NMR and Mass spectroscopic methods – structuredetermination of organic compounds by UV, IR, H1NMR, C13NMR and Mass spectroscopic methods.

XVI. Green chemistry: Principles of Green chemistry, and its approaches.

Main Examination Syllabus for the post of Degree Lecturers in Residential Educational Institution Societies

6. Paper: Botany

I. Phycology, Mycology, Bacteria and Viruses

Phycology : Thallus organization ; cell ultra structure ; reproduction (vegetative, sexual, asexual) ; criteriafor classification of algae : pigments, reserve food, flagella ; classification, salient features of Chlorophyta,Charophyta, Xanthophyta, Bacillariophyta, Phaeophyta and Rhodophyta ; algal blooms and toxic algae,algal biofertilizers ; algae as food,and feed and role of algae in industry.

Mycology : General characters of fungi ; substrate relationship in fungi ; cell ultrastructure ; unicellular andmulticellular organization ; cell wall composition ; nutrition (saprobic, biotropic, symbiotic) ; reproduction(vegetative, asexual, sexual) ; heterothallism ; heterokaryosis parasexuality ; Molecular aspects inclassification.

General account of Mastigomycotina, Zygomycotina, Ascomycotina, Basidiomycotina, Deuteromycotina ;fungi in industry, medicine and as food ; fungal diseases in plants and humans ; Mycorrhizae ; fungi asbiocontrol agents.

Bacteria- ultrastructure and biochemistry of cell wall, nutritional types, reproduction,Plasmids.

Viruses- Characters and ultrastructure of virions and symptomatology and transmission of plant viruses.Mollicuties general characters of spiroplasmas and phytoplasmas Importance of microorganisms : Microbesin medicine, agriculture and environment.

II. Bryophyta, Pteridophyta and Gymnosperms

Bryophyta : Morphology, structure, reproduction and life history ; distribution ; classification., ofMarchantiales, Junger maniales, Anthoceratales, Sphagnales, Funariales and Polytrcales ; economic andecological importance.

Pteridophyta : Morphology, anatomy and reproduction ; classification of Psilo psida, Lycopsida, Sphenopsidaand Pteropsida; evolution of stele ; heterospory and origin of seed habit; general account of fossil pteriodophyts.

Gymnosperms- Introduction and classification, Structure and reproduction of Cycadales, Ginkgoales,Coniferales, Ephedrales, Welwitschiales and Gnetales.

III. Taxonomy Of Angiosperms

The species concept : Taxonomic hierarchy, species, genus, family and other categories ; principles used inassessing relationship, delimitation of taxa and attribution of rank.

Salient features of the International Code of Botanical nomenclature.

Taxonomic tools : Herbarium ; floras ; histological, cytological, phytochemical, serological, biochemicaland molecular techniques ; computers and GIS.

Systems of angiosperm classification : Phenetic versus phylogenetic systems ; cladistics in taxonomy ;relative merits and demerits of major systems of classification.

Study of the following families- Magnoliaceae, Malvaceae, Rutaceae, Apocynaceae, Asclepiadaceae,Lamiaceae, Amaranthaceae and Poaceae.

IV. Plant Anatomy And Embryology

Shoot development: Organization of the shoot apical meristem (SAM); control of cell division and cell tocell communication; control of tissue differentiation especially xylem and phloem ; secretory ducts andlaticifers.

Phyllotaxy and leaf differentiation

Root Development: Organization of root apical meristem (RAM); vascular tissue differentiation; homeoticmutants in Arabidopsis and Antirrhinum,

Male gametophyte: Structure of anthers; microsporogenesis, role of tapetum; pollen development and geneexpression; male sterility; sperm dimorphism and hybrid seed

production; pollen germination, pollen tubegrowth and guidance ; pollen storage ; pollen allergy, pollen embryos.

Female gametophyte: Ovule development; megasporogenesis; organization of the embryo sac, structure ofthe embryo sac cells.

Pollination, pollen – pistil interaction and fertilization : Floral characteristics, pollination mechanisms andvectors; self-incompatibility; double fertilization.

Seed development and fruit growth: Endosperm development during early, maturation and desiccation stages;embryogenesis, cell lineages during late embryo development; storage proteins of endosperm and embryo;polyembryony; apomixes; embryo culture; fruit maturation.

Dormancy: Seed dormancy; overcoming seed dormancy; bud dormancy.

Senescence and programmed cell death (PCD): Types of cell death, PCD in the life cycle of plants, metabolicchanges associated with senescence and its regulation; influence of hormones and environmental factors onsenescence.Embryology related to taxonomy.

V. Plant Resource Utilisation and Conservation

Origin, evolution, botany, cultivation and uses of (i) Food forage and fodder crops (ii) fibre crops (iii)medicinal and aromatic plants and (iv) vegetable oil-yielding crops. Ethnobotany – Scope and objectives ofethnobotany.

Important fire-wood and timber – yielding plants and non-wood forest products (NWFPs) such as bamboos,rattans, raw materials for paper-making, gums, tannins, dyes, resins and fruits.

Role of plants in Medicine- morphology, active principles and medicinal value of the following plants-Andrographis, Asparagus, Phyllanthus, Gymnema.

Principles of conservation; extinctions; environmental status of plants based on International Union forConservation of Nature.

Strategies for conservation – in situ conservation : International efforts and Indian initiatives ; protectedareas in India – sanctuaries, national parks, biosphere reserves, wetlands, mangroves and coral reefs forconservation of wild biodiversity.

Strategies for conservation – ex situ conservation : Principles and practices; botanical gardens, field genebanks, seed banks, in vitro repositories, cryobanks; general account of the activities of Botanical Survey ofIndia (BSI), National Bureau of Plant Genetic Resources (NBPGR), Indian Council of Agricultural Research(ICAR), Council of Scientific and Industrial Research (CSIR) and the Department of Biotechnology (DBT)for conservation, non-formal conservation efforts.

VI. -Plant Ecology

Climate, soil and vegetation patterns of the world: Life zones; major biomes and major vegetation and soltypes of the world.

Vegetation organization: Concepts of community; analytical and synthetic characters of community.

Population characters, interactions of species- positive and negative interactions of species.

Ecological succession: types, changes involved in succession, concept of climax.

Biotic and abiotic interactions, habitat and niche, allopatric and sympatric spaciation.

Ecosystem organization: Structure and functions; primary production methods of measurement of primaryproduction, ; energy dynamics (trophic organization, energy flow Pathways, ecological efficiencies); foodchains, wood web and ecological pyramids, global biogeochemical cycles of C,N, in terrestrial and aquaticecosystems.

Biological diversity: Concept and levels; speciation and extinction; IUCN categories of threat; distributionand global patterns, hot spots; endemism, inventory.

Air, water and soil pollution: Kinds, sources, effects on plants and ecosystems.

Climate change: Green house gases (CO_2, CH_4, N_2O, CFCs: sources, trends and role); ozone layer andozone depletion ; consequences of climate change (CO_2 fertilization, global warming, sea level rise, UVradiation).

Ecosystem stability : Concept (resistance and resilience); ecological perturbations (natural and anthropogenic)and their impact on plants and ecosystems ; ecology of plant invasion ;Biogeographical zones of India, Flora of Telangana – vegetational types.

VII. -Cell Biology

Ultrastructure and functions of cell organelles. Cell wall, Plasma membrane Plasmodesmata, Chloroplast,Mitochondria, Plant Vacuoles, Nucleus, Ribosomes,Cell cycle and apoptosis : Control mechanisms; role of cyclins and cyclin dependent kinases; retinoblastomaand E2F proteins; cytokinesis and cell plate formation; mechanisms of programmed cell death. Mitosis andmeiosis its significance

Other cellular organelles: Structure and functions of microbodies, Golgi apparatus, lysosomes, endo plasmicreticulum.

Techniques in cell biology: Immuno techniques; in situ hybridization, FISH, GISH; Electron microscopy.

VIII. Cytogenetics

Chromatin organization : Chromosome structure and Packaging of DNA, molecular organization ofcentromere and telomere; nucleolus and ribosomal RNA genes ; euchromatin and heterochromatin ; karyotypeanalysis ; banding patterns ; specialized types of chromosomes ; polytene, lampbrush, B-chromosomes andsex chromosomes ; molecular basis of chromosome pairing.

Structural and numerical alterations in chromosomes : Duplication, deficiency, inversion and translocation; autopolyploids ; allopolyploids ; evolution of major crop plants.

Genetics of prokaryotes and eukaryotic organelles : genetic recombination in phage ; genetic transformation,conjugation and transduction in bacteria ; genetics of mitochondria and chloroplasts cytoplasmic male sterility.

Gene structure and expression : Genetic fine structure ; cis – trans test ; Benzer's experiment; introns andtheir significance ; RNA splicing ; regulation of gene expression in prokaryotes and eukaryotes.

Mutations : Spontaneous and induced mutations ; physical and chemical mutagens ; molecular basis of genemutations ; transposable elements in prokaryotes and eukaryotes ; mutations induced transposons ; site-directedmutagenesis ; DNA damage and repair mechanisms.

Plant Breeding: Principles and methods of plant breeding ; Marker assisted breeding.

Biostatistics : Mean, Variance, Standard deviation, Standard error, Student't' test, chi-square and ANOVA.

Molecular cytogenetics : Nuclear DNA content; C-value paradox; cot curve and its significance; restrictionmapping – concept and techniques ; multigene families and their evolution.

IX. Plant Physiology

Energy flow : Principles of thermodynamics, free energy and chemical potential, redox reactions, structureand functions of ATP.

Fundamentals of enzymology : General aspects, allosteric mechanism, regulatory and active sites, isoenzymes,kinetics of enzymatic catalysis, Michaelis – Menton equation and its significance.

Membrane transport and translocation of water and solutes: Plant water relations, mechanism of watertransport through xylem, passive and active solute transport, membrane transport proteins.

Signal transduction: Receptors and G-proteins, phospholipid signaling, role of cyclic nucleotides, calciumcalmodulin cascade, diversity in protein kinases and phosphatases.

Photochemistry and photosynthesis: Photosynthetic pigments and light harvesting complexes, photo oxidationof water, mechanisms of electron and proton transport,

carbon assimilation – the Calvin cycle, photorespirationand its significance, the C4 cycle, the CAM pathway, biosynthesis of starch and sucrose.

Respiration and lipid metabolism : Glycolysis, the TCA cycle, electron transport and ATP synthesis, pentosephosphate pathway, glyoxylate cycle, alternative oxidase system, structure and function of lipids, fatty acidbiosynthesis, synthesis of membrane lipids, structural lipids and storage lipids and their catabolism.

Nitrogen fixation and metabolism : Biological nitrogen fixation, nodule formation and nod factors, mechanismof nitrate uptake and reduction, ammonium assimilation.

Photobiology : Photochromes and cryptochromes, photophysiology of light –induce responses, cellularlocalization.

Plant growth regulators and elicitors : Physiological effects and mechanism of action of auxins, gibberellins,cytokinins, ethylene, abscisic acid, brassinosteroids, polymines, jasmonic acid and salicyclic acid.

The flowering process : Photoperiodism, endogenous clock and its regulation, floral induction anddevelopment – genetic and molecular analysis, role of vernalization.

Stress physiology : Plant responses to biotic and abiotic stress; mechanisms of biotic and abiotic stresstolerance, HR and SAR, water deficit and drought resistance, salinity stress, metal toxicity, freezing andheat stress, oxidative stress.

Coping with biotic stress: Chemical control, Biological control, IPM

X. Biotechnology and Genetic Engineering

Plant Biotechnology – Principles, scope and applications.

Plant cell and tissue culture : General introduction, scope, cellular differentiation, and totipotency.

Organogenesis and adventives embryogenesis : Morphogenesis; somatic embryogenesis.

Somatic hybridization : Protoplast isolation, fusion and culture.

Applications of plant tissue culture : Clonal propagation, artificial seed, production of hybrids and somaclones, production of secondary metabolites / natural products, cryopreservation and germplasm storage.

Recombinant DNA technology : Gene cloning principles and techniques, genomic / c DNA libraries, vectors,DNA synthesis and sequencing, polymerase chain reaction, DNA fingerprinting and DNA markers.

Genetic engineering of plants: Transgenic plants, Methods of gene transfer – Agrobacterium – medicatedand microprojectile, chloroplast transformation, intellectual property rights, ecological risks and ethicalconcerns.

Microbial genetic manipulation : Bacterial transformation, selection of recombinants and transformants,genetic improvement of industrial microbes.

Genomics and proteomics : High throughput sequencing, genome projects, bioinformatics, functionalgenomics, microarrays.

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7. Paper: Zoology

I. General Concepts:

1. Levels of structural organization - Unicellular, multi cellular and colonial forms, Prokaryotic andEukaryotic cells, Levels of organization of tissues, Organs & systems.
2. Acoelomata, Pseudocoelomata, Coelomata, Proterostomia and Deuterostomia.
3. Concepts of species and hierarchial taxa, Biological nomenclature, Classical methods of taxonomy ofanimals.

II. Non-Chordata:

1. General characters and classification of invertebrates up to order level.
2. Protozoa - Locomotion, Nutrition and reproduction in protozoa, Protozoan diseases of man– Kalaazar, Amoebiasis, Malaria, Trypanosomiasis.
3. Porifera - Canal system in Porifera, Skeleton in Porifera, Reproduction in sponges.
4. Coelenterata - Polymorphism, Metagenesis, Coral formation, Obelia.
5. Helminthes - Common Helminthic parasites of Man –Fasciola hepatica, Schistosoma, Taenia solium,Echinococus granulosus, Ascaris, Ancylostoma, Trichinella – their life cycles, Pathogenescity andclinical significance. Parasitic adaptations in Helminths.
6. Annelida- Excretory system in Annelida, Coelom formation, Coelom and coelomoducts, Metamerism.
7. Arthropoda - Mouthparts of insects, Ommatidium, Useful and harmful insects, Metamorphosis ininsects, Apicultur and Sericulture in India, Crustacean larvae, Peripatus.
8. Mollusca - Respiration, Torsion and Detorsion, Pearl formation.
9. Echinodermata - Echinoderm larvae, Water vascular system.

III. Chordata:

1. General characters and classification of chordates up to order level, Origin of chordates, Phylogenyand affinities of Hemichordata, Retrogressive metamorphosis.
2. Vertebrate integument and its derivatives, Comparative account of Digestive, Respiratory, Circulatory,Excretory and Reproductive systems of vertebrates.
3. Pisciculture in India, Common edible fishes.
4. Origin and evolution of Amphibia, Neoteny or Paedogenesis.
5. Important snakes of India, Identification of Poisonous and non- Poisonous Snakes, Poisonous Apparatus,Dinosaurs.
6. Flight adaptations and Migration in birds. Archeopteryx, Poultry.
7. Adaptive radiation in Mammals, Dentition in Mammals.

IV. Cell Biology:

1. Prokaryotic and Eukaryotic cell, Plasma membrane-Ultra structure & function.
2. Structure and function of intracellular organelles - Nucleus, Mitochondria, Golgi bodies, Lysosomes,Endoplasmic reticulum, Peroxisomes, Vacuoles, Cytoskeleton and it’s role in motility.
3. Organization of genes and chromosomes – Operon concept, unique and repetitive DNA, structure ofchromatin and chromosomes, Heterochromatin, Euchromatin, transposons.

4. Cell division- Mitosis and meiosis, Cell cycle & its regulation.
5. DNA replication, Repair and Recombination – Unit of replication, Replication origin and Replicationfork, DNA damage and Repair mechanism, Recombinant DNA technology, Transgenesis & Cloning.
6. Protein synthesis – Genetic code, Initiation, Elongation and termination.
7. Regulation of gene expression – Lac operon.

V. Genetics:

1. Mendel's law of inheritance – Gene interactions, Epistasis and Linkage.
2. Gene mapping methods - Linkage-Complete and Incomplete linkage, Linkage maps, Recombination,Mapping with molecular markers, Somatic cell hybrids.
3. Crossing over - Types (Somatic or mitotic crossing over and Germinal or meiotic crossing over)theories about the mechanism of crossing over, Tetrad analysis and cytological detection of crossingover.
4. Mutations - Types (Spontaneous and Induced), Causes and detection, Mutant types (Lethal, Conditionalbiochemical, Loss of function, Gain of function, Germinal versus somatic mutants), Molecular basisof mutations.
5. Chromosomal aberrations (Deletion, Duplication, Inversion and Translocation, Ploidy and their geneticimplications), Autosomal abnormalities (Down's syndrome, Trisomy-13, -18), Sex anamolies (Turner'ssyndrome, Klinefelter's syndrome, Hermaphroditism).
6. Human genetics - Human karyotyping, Genetic disorders due to mutant genes (Huntington's chorea),Sickle-cell anaemia (SCA), Inborn errors of metabolism-Pheynylketonuria, Alkaptonuria .

VI. System and Cell physiology:

1. Blood and Circulation - Blood corpuscles, Haemopoiesis, Plasma function, Blood groups, Haemoglobin,Haemostasis.
2. Cardiovascular system - Neurogenic, Myogenic heart, Cardiac cycle, Tachycardia and Bradycardia.
3. Respiratory system - Transport of gases, Exchange of gases, Mechanism of respiration.
4. Nervous system - Neuron, Conduction of nerve impulse, Synaptic transmission, Neurotransmitters.
5. Muscle - Ultra structure of skeletal muscle, Mechanism of muscle contraction.
6. Sense organs- Eye and Ear.
7. Excretory system - Structure & function of mammalian Kidney and Nephron, Micturition.
8. Osmoregulation - Osmoregulation in Aquatic & Terrestial animals, Hormonal control ofOsmoregulation.
9. Digestive system - Digestion, Absorption, Assimilation and Egestion.
10. Endocrinology and Reproduction - Endocrine glands, Types of hormones & Mechanism of hormonalaction, Hormonal regulation of reproduction in mammals.
11. Outline classification of organic compounds (Carbohydrates, Proteins and Lipids).
12. Order of protein structure - Primary, Secondary, Tertiary and Quaternary; Ramachandran plot.
13. Glycolysis (EMP), Kreb's cycle (TCA CYCLE), Electron transport system (Oxidative phosphorylation),Pentose phosphate pathway, Gluconeogenesis.

VII. Evolution:

1. Origin of life - Theories and Evidences of organic evolution, The modern synthetic theory.

2. Population genetics (Gene pool, Gene frequency), Herdy weinberg's law.
3. Genetic drift and Convergent evolution, Adaptive radiation.
4. Isolation and Speciation.
5. Evolution of Horse and Man.
6. Zoogeographical realms of the world.

VIII. Developmental biology:

1. Spermatogenesis and Oogenesis.
2. Fertilization, Cleavage, Gastrulation, Formation of germ layers, Parthenogenesis.
3. Formation and Function of Foetal membranes.
4. Placenta – Definition and Function.
5. Types of Placenta.
6. Development of Frog and chick.

IX. Histology:

1. Histology of mammalian Tissues and Organs –Epithelial, connective, blood, bone, cartilage, skin,stomach, intestine, liver, pancreas, kidney, testis and ovary.

X. Ecology:

1. Concepts of Ecosystem.
2. Biogeochemical cycles (Carbon, Nitrogen and Phosphorous).
3. Influence of environmental factors on animals, Energy flow in Ecosystem, Food chains, food web andtropic levels.
4. Animal Associations (Neutralism, Mutualism, Symbiosis, Commensalism, Parasitism, Predation andCompetition).
5. Ecological succession.
6. Environmental pollution- Air, water, land, noise, radioactive, thermal. Effects of pollution on ecosystem,Prevention of pollution
7. Wildlife in India- Conservation, Chipco movement.
8. Biodiversity- Economic significance, Conservation, Hot spots of India.

XI. Immunology:

1. Cells of the immune system- Lymphoid cells, Mono nuclear cells, Granulocytic cells, Mast cells.
2. Organs of the immune system- Primary and secondary lymphoid organs, Lymphatic system.
3. Antigens- Antigenic determinants or epitopes, immunogenicity, Haptens.
4. Humoral immunity -Iimmunoglobulin (fine structure of immunoglobulin and immunoglobulin classes),The complement system, Classical and alternate pathway, Inflammation.
5. Innate (Non-specific immunity) – Anatomical barriers, Phagocytosis, Natural killer cells (NK cells),Interferons.
6. Cell mediated immunity– Mechanism of cell mediated immunity, Brief account on Antigen presentation,Major Histocompatibility complex.
7. Antigen-Antibody interactions- Affinity, Avidity, Cross-reactivity, Precipitation reactions, Agglutinationreactions and ELISA.
8. Brief account on Immunological Hypersensitivity disorders:
    a) Tolerance and Autoimmunity
    b) Transplantation
    c) Immunodeficiency diseases – HIV.
    d) Immunization (Active and Passive immunity)

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8. Paper: Microbiology

I. General Microbiology

History of Microbiology. Contributions of Scientists. Types, application and importance of microscopy.Structure of microbial cells. Methods of sterilization: Physical methods – chemical methods and theirapplication. Pure culture techniques. Preservation methods and Maintenance of Microbial cultures.Microbiological media and cultivation of microorganisms. Microbial identification methods. Principles ofbacterial taxonomy and classification. Microbial growth curve. Measurement of Growth. Synchronous cultures– methods of synchronous culturing. Continuous culturing methods, factors effecting growth. Phenomenonof bacterial sporulation. Microbial nutrition, respiration and fermentation. Distribution, characteristics and

reproduction of algae and fungi.

II. Virology

Structure and Classification of bacterial, plant and animal viruses, Methods of cultivation, detection,Propagation and maintenance of viruses. Some important viruses: Influenza virus, Adeno virus, HBV, HIV,T2 phase, TMV, Replication of viruses, Tumor viruses, Interferons and viral interference.

III. Molecular Biology and Microbial Genetics

DNA structure and replication. Transcription and translation. Concept of ribozyme. Genetic code and Wobblehypothesis, Gene regulation. Cloning and expression vectors. Construction and screening of genomic andcDNA libraries. PCR, Genechips and Microarray. DNA markers, fingerprinting and gene therapy. DNAsequencing. Expression of recombinant proteins Protein-protein and protein-DNA interaction. Applicationsof recombinant DNA technology. Types of mutagens, molecular basis and analysis of mutations, site directedmutagenesis. DNA damage and repair mechanisms. Recombination in bacteria by Transformation,Conjugation, Transduction. Transposable elements. Cell cycle and programmed cell death. Signaltransduction, Protein folding & roles of Molecular chaperones. Databases, Sequence and structure analysisof DNA and Proteins. Primer design. Protein engineering and drug designing.

IV. Biochemistry and Techniques

pH and its biological relevance. Redox potentials, Electron transport, oxidative phosphorylation.Classification, chemical structure of important carbohydrates. Properties of amino acids, structure,confirmation and properties of proteins. Enzyme nomenclature, classification, Enzyme activity and inhibition.Enzyme kinetics - Michelis-Menton kinetics. Optical methods - colourimetry and spectrophotometry,fluorimetry, optical rotation, Circular dichroism, NMR, ESR spectroscopy, X-ray diffraction, types of massspectrometry. Chromatographic techniques , diffusion, dialysis, cell disruption methods, centrifugationtechniques, electrophoreses and blotting techniques. Radio isotopes – detection and measurement.

V. Immunology and chemotherapy

Types of Immunity, primary and secondary organs of immune system, cells of immune system.Types, structure, properties and functions of antigens and antibodies, antigen antibody reactions. MajorHistocompatibility Complex (MHC) and transplantation. Polyclonal and monoclonal antibodies.Hypersensitivity, Autoimmunity. Tumor immunology, Immunological tolerance and immuno-suppression,Immune deficiency diseases. Immunotherapy of infectious diseases, immunization. Types of antimicrobialagents and mode of action. Therapeutic agents, Chemical, non-medicinal antimicrobials- sanitizers,disinfectants, antiseptics. Antibiotics. . Antiviral agents. Microbiological assays.

VI. Industrial Microbiology

Exploitation of microbes in industry. Screening, strain development. Types of fermentations processes, scaleupof fermentations. Up and Down stream process. Fermentation productions-Ethanol, Beer, Wine and otheralcoholic drinks, aminoacids, antibiotics, organic acids, vitamins, enzymes, probiotics, solvents and vaccine.Microbial products from genetically modified (cloned) organisms. QA, QC, GLP, GMP, Patents & IPR

VII. Food Microbiology

Dairy Microbiology and microbial products of milk, Fermented foods, Bacteriological examination of milk,fresh foods and canned foods, Food preservation methods and spoilage. Current and future implicationsconcerning food safety, hazards and risks. Probiotics, Prebiotics and their significance in human beings andanimals.

VIII. Environmental and Agriculture Microbiology

Ecological significance. Microbiology of water and sewage treatment. Role of microorganisms in nutrientcycling, Mineralization, Soil humus formation, Nitrogen metabolism, Phosphate solublization. Biofertilizers,Biopesicides, Biodegradation of pollutants. Plant microbe interactions, Animal-microbe interactions: Rumenmicrobiology, termite microbial communities, Microbes in the production of energy from agricultural anddomestic wastes.

IX. Medical Microbiology

Principles of Medical Microbiology, Normal flora of human body. Properties of pathogenic microorganisms,Principles of diagnostic microbiology, Use of lab animals in diagnostic microbiology. Bacterial and viralinfections (Air born, water born, food born, insect born, zoonotic and direct contact), Mycosis, Toxins.

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9. Paper: Biochemistry

I. Chemistry of Biomolecules: Classification, structure & characteristics of amino acids, carbohydrates andlipids. Classification and structural organization of proteins, polysaccharides and lipids. Biological role andimportance of polypeptides, lipids and polysaccharides. Structure of purines, pyramidines, nucleosides andnucleotides. Stability & formation of phosphodiester bond. Watson & Crick model, Different forms of DNA.DNA super coiling. Types of RNA. Structure of t-RNA. Denaturation & renaturation of DNA, Tm andhyperchromic effect. Chemical and enzymatic susceptibility of nucleic acids. Structure and properties vitamins,Metabolism of amino acids, lipids and nucleotides. Metabolic diseases.

II. DNA replication, transcription and translation. DNA polymerases of pro- and eukaryotes in DNA replication.Genetic code. Transcription in pro and eukaryotes and its regulation. Post transcriptional processing. Operonconcept. Ribosome structure. Protein synthesis. Inhibitors of transcription and translation.

III. Cell structure and organization:Cell structure and organization. ECM. Biomembranes structure and function.Transport across cell membranes. Mechanisms of Muscle contraction and nerve transmission.

IV. Enzymes: Nomenclature & classification of enzymes, cofactors and coenzymes. Enzyme kinetics. Factorsaffecting the rate of the reaction: Catalytic mechanisms of Lysozymes, RNAse, chymotypsin, trypsin, &carboxypeptidase. Law of thermodynamics, biological oxidation, High energy compounds. Electron transportchain. Photosynthesis.

V.Bioanalytical Techniques: Principles & applications of colorimetry & UV-Visible spectrophotometry.Fluorimetry, Principle and applications of ORD, CD, MS, AAS, Microscopy, Flowcytometry, electrophoresis,centrifugation. Application of isotopes in biochemical analysis. Counting radioactivity. Chromatographictechniques: Principles & applications of techniques based on partitioning, Ion-exchange and affinitychromatography.

VI. Molecular methods: Polymerase chain reaction (PCR), Real-time PCR. Fluorescent in situ hybridization(FISH), RFLP, RAPD. DNA finger-printing, DNA microarrays. DNA sequencing. DNA probes. Blottingtechniques and their applications.

VII. Endocrinology & Physiology: Organization of the endocrine system. Classification and mechanism ofaction of hormones. Structure and organization of Muscle and nervous system. Clinical Biochemistry andNutrition: Abnormal electrolyte composition of blood in disease. Major cardiac, liver and thyroid diseases.Disorders of kidneys. Cardiac function tests, Liver function tests, Renal function tests, Gastric, pancreaticand intestinal function tests. Thyroid function tests.

VIII. Microbiology and Molecular Biology: Classification of bacteria, Gene transfer mechanisms in bacteria,Bacteriophages: Structure, composition and life cycle of bacteriophages. Viruses: General features, Cultivationof viruses in animals & tissue culture. Life cycles of animal viruses (SV-40, Adenovirus, Poliovirus,Retroviruses (RSV / HIV). Plant viruses -TMV. Gene organization and regulation in prokaryotes & eukaryotes.

IX. Genetic Engineering: Restriction endonucleases, Cloning and expression Vectors, overview of cloningmethods, Methods of isolation of DNA, ligation, introduction of rDNA, genomic and cDNA libraries,selection of clones. Fusion proteins. Expression of recombinant protein in bacteria, yeast and cultured animalcells.

X. Immunology: Components of immune system, Classification, structure & biological properties ofimmunoglobulin. Isotype, allotype and idiotypic variations. Theories of antibody formation, generation ofantibody diversity. Hurmoral & cell mediated immune response. Complement activation and types (alternate,classical, lectin pathways) and its regulation. Immune disorders, Type I, II, III and IV Hypersensitivity.Auto-immune diseases, ELISA,RIA and monoclonal antibodies.

XI. Bioinformatics: Introduction to Biological databases. Sequence based approach (Pair-wise alignment, multiplesequence alignments), SNPs in human diseases.

XII. Transcriptome, genomic comparison. Antisense Oligos. siRNA/RNAi in expression analysis. Proteomics:Protein sequencing methods, structure, modeling, Protein motif & domain prediction: phylogenetic comparison& analysis. Protein arrays LC-MS-MALDI analysis.

XIII. Cell Signaling and Cancer: Cell growth and Cell cycle, Cell cycle regulation and cancer. tumor promotersand tumor suppressors. Stem cells. Cell differentiation: Fibroblast and muscle cell differentiation. Growthfactors (EGF, NGF, IGF, PDGF, erythropoietin). Totipotency. Cell Signaling: Basic concepts of signaltransduction. Classification of different signaling molecules. G-proteins, Second messengers-. Signalingcascades & regulation of growth, proliferation. Inhibitors of cell signalling pathways & Apoptosis. Cancer:Tumor suppressors and tumor promoters. Discovery of oncogenes, proto-oncogenes. Modes of action ofoncogenes – G proteins. Stress signaling in plants (biotic), Stress signaling in plants (abiotic), Plants hormonesand their mechanism of action, Signaling in yeast, STAT pathway in yeast. animal cell culture and theirapplications.

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10. Paper: History

I. Ancient India:

1. History; Definition, Scope, Nature, Sources and Methods.
2. Pre and Proto History – Stone ages and Chalcolithic Cultures.
3. Harappan Civilization – Characteristic features, Major cities – socio-economic conditions, HarappanScript, Religious practices –Decline.
4. Iron Age –Aryan Migrations – Second Urbanization.
5. India in 6th Century BC; Early States, Sixteen Mahajanapadas, Rise and Growth of Magadha – Society,Economy – Jainism, Buddhism, Ajivikas and Lokayatas.
6. Mouryan Age: Chandragupta Mourya and Ashoka, Mouryan Polity, Administration, Dhamma, Socio-Economic conditions – Decline.
7. Pre Satavahanas: Sangam Age and Satavahana Age; Political history, Administration, Society, Economyand Culture- Post Satavahana period – Chedi (Kharavela) Ikshvakus, Vakatakas, Abiras, Kshatrapasand Vishnukundis, Kushans (Kanishka).
8. Gupta Age: Political History, Administration, Socio-Economic conditions, Growth of Culture, Art andArchitecture, Literature – Decline.
9. India in the Seventh Century A.D.; Pushyabhutis (Harsha), Pallavas, Chalukyas and Rashtrakutas –Political History, Society, Economy and Culture.

II. Medieval India:

10. India between 650 A.D. to 1200 A.D.- Rajputs, Arab and Turkish Invasions - Later Pallavas, Chalukyas,Chola Art, Architecture and Chola Administration – Society, Economy and Culture.
11. Age of Delhi Sultanate1206 A.D. -1526 A.D. – Political History, Administrative System, Changes inSociety and Economy- Bhakti and Sufi Movements
12. Age of Vijayanagara - Origin, Political History, Krishnadevaraya, Socio and Economic conditions,Culture, Art, Architecture, Decline – Bahamanis.
13. Moghul Age (1526-1707) – Political History, She Shah, Akbar, Administration, Society, Economy,Culture- Decline – Marathas and Shivaji.

III. Modern India

14. Establishment of British Power in India –Early resistance – Hyder Ali, Tippu Sultan.
15. British paramountcy in India-Policies of Governor Generals, Impact of British policy on IndianAgriculture and Economy.
16. Socio – Religious Reforms Movements –Brahmo Samaj –Arya Samaj, Satyashodhak Samaj and others– Educational policies of the British and their Impact.
17. 1857 Revolt; Causes Results and Significance.
18. 18. Rise and Growth of Indian National Movement –Nationalist Movement I Phase from 1885 A.D. -1905A.D. – Indian National Congress; Moderates, Extremists and Early Revolutionaries II phase at 1905-1920 – Vande Mataram Movement Home Rule - Role of Tilak and Anie Beasant- Later phase ofRevolutionary Movement. III Phase 1920-1947 -Non Co-operation Movement, Emergence of Gandhi,Civil Disobedience, Salt Satyagraha, Quit India Movement- Subhash Chandra Bose – ConstitutionalReforms- Dr.B.R.Ambedkar - Declaration of Independence – Role of Women in Indian NationalMovement.

IV. Modern World:

19. Industrial Revolution- Significance and Results.

20. American War of Independence – Causes, Results, Significance.
21. French Revolution – Causes, Effects, Significance.
22. National Liberation Movements in Italy and Germany in the 19th Century – Mazzini, Cavour, Garibaldi,Bismarck.
23. World War-I – Causes and Effects – League of Nations.
24. The Russian Revolution of 1917 – Causes, Results and Significance.
25. The world between the Two World Wars – Nazism in Germany, Fascism in Italy, Turkey under MustafaKamal Pasha.
26. Developments in China 1911-1949 – Nationalist Revolution of 1911 – Communist Revolution of1948 – Japan under Meiji Era –Vietnam Revolution.
27. World War-II – Causes and Effects – United Nations Organisation.

V. History of Telangana

28. Pre History
29. Pre Satavahana, Satavahana, Post Satavahana - Ikshvakus, Vakatakas, Abiras and Vishnukundis.
30. Telangana from 7th Century to 11th Century- Chalukyas of Badami, Vemulavada, Mudigondi andKalyana.
31. Age of Kakatiya's; Origin, Political History, Administration, Socio Economic, Religious conditions,Art and Architecture and Literature and their Subordinates.
32. Padma Nayaka's and Musunoori.
33. Qutubshahis – Administration, Religion, Art, Architecture and Literature.
34. Asafjahis – Administration, Economy, Culture and Society, British Paramountcy on Hyderabad State.
35. Freedom Movement in Telangana, Telangana Armed Struggle.

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11. Paper: Economics

I . Micro Economics

1. Demand Analysis

Definitions, Nature and Scope of Economics – Micro and Macro Economic Analyses – Concepts of Demandand Law of Demand – Determinants and Types of Demand – Demand Function – Shifts in Demand –Concepts of Supply and Law of Supply – Market Equilibrium – Elasticity of Demand: Concept and Types– Price, Income and Cross Elasticities of Demand – Measurement Methods of Price Elasticity of Demand

2. Utility Analysis

Cardinal and Ordinal Utility Approaches – Law of Diminishing Marginal Utility – Law of Equi-MarginalUtility – Consumer Surplus – Indifference Curve Analysis: Assumptions, Properties, Budget Line andConsumer's Equilibrium – Derivation of Demand Curve with the help of Indifference Curves – Price,Income and Substitution Effects – Hicks and Slutsky Versions – Revealed Preference Theory

3. Production Analysis

Production, Production Function and Factors of Production – Law of Variable Proportions – Isoquant, IsocostCurves and Producer's Equilibrium – Laws of Returns to Scale – Economies and Diseconomies of Scale –Cost Analysis: Cost Curves in Short Run and Long Run – Revenue Analysis – Relationship among AverageRevenue, Marginal Revenue and Elasticity of Demand

4. Market Structure Analysis

Concepts of Firm, Industry and Market – Classification of Markets – Objectives of the Firm – Equilibriumof a Firm – Shut-Down Point – Perfect Competition: Concept, Characteristics, Equilibrium of Firm andIndustry – Optimum Firm – Monopoly: Concept, Types, Characteristics and Equilibrium of the Firm – PriceDiscrimination – Bilateral Monopoly – Monopolistic Competition: Concept, Characteristics, Equilibrium

of the Firm and Selling Costs

5. Oligopoly, Duopoly and Factor Pricing Analysis

Oligopoly: Concept, Characteristics and Price Rigidity – Oligopoly Models – Duopoly: Concept andCharacteristics – Duopoly Models – Marginal Productivity Theory of Distribution – Distribution Theoriesof Rent, Wages, Profit and Interest

II . Macro Economics

1. National Income Analysis

Concept, Nature & Scope and Importance of Macro Economics – Concept of Circular Flow of Incomes– National Income Analysis: Concepts and Components – Methods of Measurement of National Income– Importance of and Difficulties in the Estimation of National Income – Limitations of National Incomeas a Measure of Welfare – Social Accounting

2. Theories of Income and Employment

Classical Theory of Employment: Say's Law of Markets and Pigou's Wage Cut Policy – KeynesianTheory of Income and Employment: Effective Demand, Aggregate Demand Function and AggregateSupply Function – Consumption Function: Average Propensity to Consume and Marginal Propensityof Consume – Factors Determining Consumption Function – Savings Function: Average Propensity toSave and Marginal Propensity to Save – Concepts of Multiplier, Accelerator and Super-Multiplier

3. Theories of Investment and Interest Rate

Capital and Investment – Types and Determinants of Investment – Marginal Efficiency of Capital –Ex-Post and Ex- Ante Investment and Savings – Classical, Neo-Classical

and Keynesian Theories ofInterest – Simultaneous Determination of Interest and Real Income through IS-LM Framework

4. Supply of Money and Demand for Money

Meaning, Functions and Classification of Money – Measures of Money Supply – Demand for Money– Classical Theories of Money: Fisher's and Cambridge Versions of Quantity Theory of Money –Keynesian, Baumol and Milton Friedman Approaches to Demand for Money

5. Inflation and Trade Cycles

Inflation: Concept and Types – Causes and Measurements of Inflation – Effects (Consequences) ofInflation – Measures to Control Inflation – Phillips Curve, Deflation and Stagflation – Trade Cycles:Concept, Nature and Causes – Phases and Remedial Measures of Trade Cycles – Models of BusinessCycles : Samuelson, Hicks and Kaldor

III . Public Finance

1. Introduction to Public Finance

Role of State in Economic Activities, Planning and Development – Nature, Scope and Evolution ofPublic Finance – Public, Private and Merit Goods – Multiple Theory of Public Household – Principleof Maximum Social Advantage

2. Public Revenue and Taxation

Public Revenue: Sources and Classification – Direct and Indirect Taxes – Progressive, Proportionaland Regressive Taxes – Canons of Taxation – Characteristics of a Good Tax System – Impact andIncidence of Taxation – Effects of Taxation – Approaches to Taxation

3. Public Expenditure and Public Debt

Public Expenditure: Classification and Principles – Determinants of Public Expenditure – Theories ofPublic Expenditure: Wagner and Peacock-Wiseman – Effects of Public Expenditure – Public Debt:Nature, Sources and Classification – Effects and Redemption of Public Debt – Debt Trap

4. Fiscal Policy and Federal Finance

Fiscal Policy: Concept, Objectives and Tools – Fiscal Policy and Monetary Policy – Federal Finance: Concept and Features – Centre-State Financial Relations – Transfer of Resources from Centre toState and Local Bodies – Functions of Finance Commission – Current Finance Commission'sRecommendations

5. Budget

Budget: Concepts, Classification and Types – Revenue Account and Capital Account – Budget Deficits:Concepts, Types and Implications – Fiscal Responsibility and Budget Management (FRBM) – Budgetingin India

IV. International Economics

1. Theories of International Trade

International Trade and Inter-Regional Trade – Inter-Industry Trade – Gains from Trade – Trade as anEngine of Economic Growth – Role of International Trade in Economic Development – Classical andNeo-Classical Theories of International Trade – Theory of Factor Price Equalisation – Heckscher-Ohlin Theory of International Trade

2. Terms of Trade and Barriers to Trade

Concepts of Terms of Trade – Factors Affecting Terms of Trade – Uses and Limitations of Terms ofTrade – Secular Deterioration Hypothesis of Terms of Trade: Singer and Prebish – Gunnar MyrdalViews on Terms of Trade – Tariffs, Quotas and Subsidies: Their Effects – Impact of Tariffs on Partialand General Equilibrium Analyses – Political Economy of Non-Tariff Barriers and Their Implication

3. Balance of Payments

Concepts of Balance of Trade and Balance of Payments – Factors Affecting Balance of Trade –Differences Between Balance of Trade and Balance of Payments –

Components of Balance of Payments– Equilibrium and Disequilibrium in Balance of Payments – Types of Disequilibrium – Causes andConsequences of Disequilibrium in Balance of Payments – Remedial Measures for CorrectingDisequilibrium in Balance of Payments – Devaluation – Recent Trends in India's Balance of Payments

4. Exchange Rates

Foreign Exchange Market – Exchange Rates: Concept and Types – Relative Merits and Demerits ofFixed and Flexible Exchange Rates – Theories of Exchange Rates Determination: Mint Parity andPurchasing Power Parity (PPP) – An Overview of Different Methods of Exchange Rate Determinationin India

5. International Monetary System and International Finance

International Liquidity – Lending Operations of International Financial Institutions: IMF, World Bank(IBRD), IDA, IFC, ADB and BRICS – Euro-Dollar and Euro-Currency Markets – International TradeInstitutions: GATT and WTO – Impact of WTO on Indian Economy

V. Economics Of Development And Growth

1. Socio-Economic and Institutional Aspects of Economic Development

Concepts of Economic Growth, Development, Underdevelopment and Deprivation – DistinctionBetween Growth and Development – Objectives of Economic Development – Sustainable Developmentand Inclusive Growth – Indicators (Measures) of Economic Development

2. Factors of Economic Development

Factors Hindering Economic Development – Factors Promoting Economic Development – Populationand Economic Development – Population Explosion – Theories of Demographic Transition – MalthusianPopulation Theory – Optimum Theory of Population – Human Resource Development and EconomicDevelopment- -–Natural Resources and Economic Development – International Aspects of EconomicDevelopment

3. Theories of Growth and Development

Classical Theories of Economic Growth: Adam Smith, Ricardo and J. S. Mill – Karl Marx Theory ofEconomic Development – Schumpeter's Theory of Economic Development – Rostow's Theory ofEconomic Growth – Hansen's Theory of Secular Stagnation

4. Strategies of Economic Development and Growth

Big Push Theory – Balanced Growth Strategies of Rodan, Nurkse and Lewis – Unbalanced GrowthStrategy of Hirschman – Critical Minimum Effort Thesis – Low Level Equilibrium Trap – Theories ofSocial and Technological Dualism

5. Growth Models

Harrod-Domar Growth Model – Kaldor's Growth Model – Joan Robinson's Growth Model – GunnarMyrdal's Model – Choice of Techniques: AK Sen – Technical Progress: Hicks and Harrod

VI. Indian Economy

1. Basic Structure and Demographic Features of Indian Economy

Basic Features of Indian Economy: Growth, Trends and Structural Changes in Indian Economy –Demographic Features of Indian Population – Size, Growth and Composition of Population and TheirImplications on Indian Economy – Concepts of Demographic Transition and Demographic Dividend– Secoral and Occupational Distribution of Population in India – Population Policy of India – HumanResource Development: Education and Health – Human Development Index

2. National Income, Income Inequalities, Poverty and Unemployment

Estimation of National Income in India – Trends and Composition of National Income in India –Income Inequalities in India: Magnitude, Causes, Consequences and Remedial Measures – Poverty inIndia: Concept, Types, Trends, Causes and Consequences – Unemployment in India: Concept, Types,Trends, Causes and Consequences – Poverty Alleviation and Employment Generation Programmes inIndia

3. Planning and Public Policy

Concept, Types and Importance of Planning – Major Objectives of Five Year Plans in India – Reviewof Five Year Plans : Achievements and Failures – Current Five Year Plan – NITI Aayog – EconomicReforms: Liberalisation, Privatisation and Globalisation – A Critical Evaluation of Economic Reforms– Regional Imbalances: Causes, Consequences and Remedial Measures – Rural-Urban Disparities:Migration

4. Agricultural Sector

Nature and Importance of Agriculture in Indian Economic Development – Trends in AgriculturalProduction and Productivity – Agricultural System in India and Land Reforms – Green Revolution –Cropping Pattern – Agricultural Finance – Agricultural Marketing – Agricultural Pricing – Food Securityin India

5. Industrial and Service Sectors

Structure, Growth, Trends and Importance of Indian Industry – Problems of Indian Industry – Medium,Small Scale and Micro Enterprises (MSME) : Growth, Role and Problems (Including Sickness Problem)– Industrial Policies of 1948, 1956 and 1991 – FEMA and Competition Commission of India –Disinvestment Policy – Foreign Direct Investment – Concept and Components of Service Sector –Infrastructural Development: Transport, Energy, Communication and Information Technology

VII . Telangana Economy

1. Telangana Economy: Human Resources

Economic History of Telangana – Economic Features of Telangana – Demographic Features ofTelangana – Occupational Distribution of Population in Telangana – Sectoral Distribution of Population– Migration – Human Resource Development: Education and Health

2. Gross State Domestic Product, Poverty and Unemployment

Growth and Trends in Gross State Domestic Product and Per Capita Income in Telangana: DistrictwiseAnalysis – Sectoral Contribution to Gross State Domestic Product – Inequalities in the Distributionof Income and Wealth – Poverty in Telangana: Trends, Causes and Consequences – Unemployment inTelangana: Trends, Causes and Consequences – Poverty Alleviation and Employment GenerationProgrammes in Telangana – Other Welfare Programmes in Telangana

3. Agricultural Sector

Growth of Agriculture in Telangana Economy – Trends in Agricultural Production and Productivity –Determinants of Agricultural Productivity – Cropping Pattern – Agrarian Structure and Land Reforms– Irrigation: Sources and Trends – Mission Kakatiya – Agricultural Credit and Rural Indebtedness –Agricultural Marketing – Food Security in Telangana

4. Industrial Sector

Structure of Telangana Industry – Growth and Pattern of Industrial Development in Telangana –Industrial Policy of Telangana State – Special Economic Zones (SEZ) – Role of Small Scale Industriesin Telangana Economy – Problems & Remedial Measures of Small Scale Industries: Issue of Sickness– Industrial Finance in Telangana

5. Service and Infrastructural Sectors

Growth and Trends in Tertiary Sector in Telangana – Growth and Pattern of Development of ServiceSector in Telangana – Infrastructural Development in Telangana: Transport, Energy, Communication& Information Technology and Tourism – Regional Imbalances: Causes, Consequences & Remedial

Measures

VIII. Quantitative Methods For Economic Analysis

1. Mathematical Foundations of Economic Analysis

Need and Importance of Quantitative Methods in Economics – Meaning and Basic Concepts of Mathematics: Constants and Variables – Functions: Linear, Non-Linear

Functions – Equations andGraphs of Linear, Quadratic and Cubic Functions – Concept of Derivative –- Rules of Differentiationwith respect to Cost, Revenue, Price and Demand Functions –Application of Maxima and Minima inEconomic Analysis

2. Introduction to Statistics

Meaning, Basic Concepts and Uses of Statistics – Population and Sample – Frequency Distribution,Cumulative Frequency – Graphic and Diagrammatic Representation of Data – Types of Data: Primaryand Secondary Data – Methods of Collecting Data: Census and Sampling Methods (Random andNon-Random Sampling Methods)

3. Measures of Central Tendency and Dispersion

Measures of Central Tendency: Mean, Median, Mode, Geometric Mean and Harmonic Mean –Properties of Good Average – Comparison of Different Averages – Measures of Dispersion – Absoluteand Relative Measures of Dispersion: Range, Quartile Deviation, Mean Deviation, Standard Deviation,Coefficient of Variation and Variance

4. Correlation and Regression

Correlation: Meaning and Types – Karl Pearson's Correlation Co-efficient – Spearmen's RankCorrelation – Regression: Meaning and Uses of Regression – Estimation and Interpretation ofRegression Line

5. Index Numbers and Time Series Analysis

Index Numbers: Meaning and Uses – Types of Index Numbers – Methods of Index Numbers: Laspayer,Paasche and Fisher – Analysis of Time-Series: Meaning and Uses – Components of Time SeriesAnalysis: Secular, Seasonal, Cyclical and Irregular Variations – Methods of Measurement of SecularTrends: Graphic, Semi-Averages, Moving Averages and Least Squares Methods

IX . Banking And Economics Of Infrastructure

1. Commercial and Central Banking

Commercial Banks: Concept and Types – Functions and Principles of Commercial Banks – BalanceSheet of Commercial Banks – Process of Credit Creation – Social Responsibility, Importance andGrowth of Commercial Banks in India – Central Banking – Functions of Reserve Bank of India –Concept and Objectives of the Monetary Policy – Instruments of Monetary Policy – Financial SectorReforms in India

2. Financial and Investment Banking

Concept, Types, Functions and Growth of Non-Banking Financial Intermediaries – Their Impact onIndian Economy – Measures Taken to Control Their Operations – Development Bank: Concept,Functions and Importance – Functioning of Different Development Banks – Investment Banking –Merchant Banking

3. Money Market and Capital Market (Financial Markets)

Money Market: Concept and Characteristics – Components and Sub-Markets of Money Market –Functions of Money Market – Recent Trends and Importance of Money Market in India – CapitalMarket: Concept, Functions and Importance – Components of Capital Market: Primary and SecondaryMarkets – Stock Exchange: Concept and Functions – SEBI and Its Functions

4. Infrastructure and Economic Development

Concept of Infrastructure – Infrastructure as a Public Good – Special Characteristics of Public Utilities– Importance of Infrastructure in Economic Development – Trends in the Growth of Infrastructure inIndia – Classification of Infrastructure: Social and Physical Infrastructure – Social Infrastructure:Education, Health and Hygiene – Human Resource Development: Concept, Scope and Importance –Education in India: Planning, Policies and Financing – Trends in the Growth of Education in India –Health in India: Planning, Programmes and Importance

5. Physical Infrastructure

Types of Physical Infrastructure – Concept of Energy – Sources of Energy: Renewable & Non-Renewable and Conventional & Non-Conventional Energy – Sources of

Commercial Energy: Coal,Oil & Gas and Electric Power – Transport – Modes / Categories of Transport: Roadways, Railways,Airways and Waterways – Role of Transportation in Economic Development – Information andCommunication Technology (ICT): Concept, Growth, Trends and Importance

X . Economics Of Environment

1. Introduction to Environmental Economics

Concepts of Ecology and Environment – Interaction Among Ecology, Environment and Economy –Micro Economic Theory of Environment – The Pricing of the Environ-mental Variables – ParetoOptimality and Market Failure in the Presence of Externalities – Bio-Diversity: Meaning, Uses, Effectsand Conservation

2. Resource Allocation

Natural Resources: Meaning, Features, Classification and Importance – Economics of Exhaustible,Non-Exhaustible Resources – Problems of Resource Allocation – Natural Resources Depletion:Optimal Rate of Depletion – Common Property Resources: Problems – Conservation of Resources –Implications of Ecological Imbalances

3. Environmental Valuation

Valuation of Non-Market Goods and Services: Measurement Methods – Environmental Degradation:Concept and Causes – Valuation of Environmental Degradation – Direct and Indirect Methods –Degradation of Land (Soil), Forest and Natural Resources: Causes and Effects – Cost-Benefit Analysisof Environmental Policies and Regulations

4. Sustainable Development

Impact of Environment on GNP – Limits to Growth – Sustainable Development: Concept and Rules –Modern and Neo-Classical Views on Sustainable Development – Peoples Movement for SustainableDevelopment – Development vs Sustainable Development

5. Environmental Pollution and Policies

Environment and Economy Interaction – Industrial and Agricultural Technology: Its Impact onEnvironment – Different Types of Pollution: Their Causes and Effects – Environmetal Policy andConservation and Protection of Eco-System – Implementation of Environmental Policies in India –Global Environmental Issues.

Main Examination Syllabus for the post of Degree Lecturers in Residential Educational Institution Societies

12. Paper: Political Science

I. Political Science – Basic Concepts

- Political Science: Nature and Scope – Inter disciplinary Character.
- Key Concepts: State, Sovereignty, Power, Nation.
- Political Ideas: Rights, Liberty, Equality, Law and Justice.
- Democracy: Meaning and Theories and Democracy, Electoral System.
- Forms of Government: Unitary and Federal, Parliamentary and Presidential.

II. Political Theory

- Political Ideologies: Liberalism, Neoliberalism, Marxism, Socialism and Fascism.
- Role of Ideology and end of Ideology.
- Nationalism and Internationalism.
- Theories of Development: Marxian, Liberal and Gandhian

III. Political Thought

- Greek Political Thought: Plato and Aristotle.
- Medieval Political Thought: Aquinas and St. Augustine.
- Modern Political Thought: Machiavelli and Bodin.
- Contractual Political Thought: Hobbes, Locke and Rousseau
- Indian Political Thought: Manu, Kautilya, Buddha, Gandhi, Phule and Ambedkar

IV. Comparative Politics

- Comparative Politics: Nature, Scope and Approaches.
- Constitutionalism: Western and Non- Western.
- Organs of Government: Legislature, Executive and Judiciary.
- Party Systems and Pressure Groups
- Power, Authority and legitimacy.

V. Political Sociology

- Political Socialization and Political Culture
- Political Development and Political Modernization.
- Political Elite and Theories.
- Political Communication: Changing Role of Media.
- Political Stratification: Caste, Class and Gender.

VI. Indian Government and Politics

- Nationalist Movement and Making of the Constitution.
- Salient Features and Ideological foundations of Indian Constitution.
- Federalism and Centre - State Relations.
- Development Strategies in India: Planning
- Union Executive, Legislature and Judiciary: President, Prime Minister,^/ Council of Ministers, LokSabha and Rajya Sabha, Supreme Court and Judicial Review
- Contemporary Socio- Political Movements: Peasant, Dalit, Tribal Backward, Environmental,Regional and Sub: Regional Movements. Statehood Movements

VII. State and Local Governments

- Frame work for the study of State Politics.
- State Executive & Legislature: Governor, Chief Minister and State Legislature
- Panchayati Raj: Genesis and Development - Structure and Functions, 73rd Amendment of IndianConstitution
- Urban Local Government: Structure and functions, 74th Amendment of Indian Constitution

VIII. Public Policy and Political Analysis

- Public Policy: Nature, Scope and Importance - Public Policy as a Policy Science.
- Theories of Public Policy: Group theory, Incrementalism, Elite theory, Decision-making theory.
- Policy making Institutions: Legislature, Executive and Judiciary - Planning Commission
- Policy Process: Role of Media, Political Parties and Pressure Groups.
- Policy Evaluation.

IX. International Relations

- Approaches to the study of International Relations.
- Colonization and Decolonization: Rise of Third world, Problems & Prospects
- Elements of National Power.
- International Security: Disarmament, Arms control, Diplomacy, Cold War, war and Conflict Resolution.
- International Organization

A. UNO: Aims, objectives, structure and its changing role in the contemporary world.

B. SAARC, ASEAN and EU

- Indian Foreign Policy: Non-Alignment, Relations with neighbors and security concerns andGlobalization.
- Contemporary issues in International Relations: Human Rights, Environmental Issues, climate Changeand Terrorism
- International Financial Institutional: World Bank, IMG & WTO.

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13. Paper: Commerce

I. Financial Management: Meaning, Nature, Objectives and Scope of Financial Management – CapitalBudgeting, Process, Techniques – Sources of Finance, Cost of Capital – Cost of various sources of finance– Leverages: Operating and Financial leverages - Capital Structure Theories – Dividend decisions – WorkingCapital Management – Cash, Receivables and Inventory Management.

II. Financial and Management Accounting: Accounting Standards - Corporate Reporting – Accounting forprice level changes – Human Resource Accounting – Responsibility Accounting – Analysis of FinancialStatements – Techniques: Comparative and Common Size statements, Trend analysis, Ratio analysis, FundsFlow and Cash Flow analysis – Marginal Costing and Decision Making.

III. Cost Accounting and Control: Cost concepts and Classification – Installation of costing system – Elementsof Cost: Material, Labour and Overheads – Methods of Costing – Techniques of costing: CVP, StandardCosting and Budgetary control – Uniform costing - Inter-firm comparisons and Activity Based costing –Cost Control, Cost Reduction and Cost Audit.

IV. Managerial Economics: Meaning, Nature and Scope of Managerial Economics – Demand Analysis, Productionand Cost Analysis- Market Structure: Perfect and Imperfect Markets.

V. Organisation Theory and Behaviour: Organisation concept and theories – Individual vs. Group Behaviour –Motivation and Morale – Communication: Types and Barriers – Leadership: Styles and Theories.

VI. Marketing Management: Meaning, Concepts, Nature and Scope – Marketing Environment – ConsumerBehaviour and Market Segmentation – Product, Price, Promotion and Channel management.

VII. Human Resource Management: HR Functions – HR Planning – Job analysis – Recruitment and JobEvaluation – Training and Development methods – Performance Appraisal Methods – Trade Unions andCollective Bargaining.

VIII. Business Environment: Meaning and Components of Business Environment – Industrial Policies (includingTelangana State Industrial Policy) – Liberalisation, Privatisation and Globalisation – Indian Capital andMarkets – Foreign Direct Investment - FEMA and WTO.

IX. Quantitative Techniques: Correlation and Regression – Sampling and Sampling methods – Probability andProbability Distributions – Hypothesis Testing – Parametric Tests (Z, t-test and ANOVA) and Non-parametricTests (Chi-square test).

X. IT and e-Commerce: e-Commerce business models – Internet and web technologies – e-payment methods, e-cash, e-cheques, credit cards, smart cards and debit cards.

Main Examination Syllabus for the post of Degree Lecturers in Residential Educational Institution Societies

14. Paper: COMPUTER SCIENCE

Computer Organization: Memory Organizations, CPU Organisation, Assembly Language, Microprogramming, Input-Output Organization, Intel 8086 Computer.
Programming: Programming in C, Object oriented programming concepts including classes, Polymorphism, Inheritance, and Programming in C++, Java and Python.
Data Structures: Arrays, Records, Linked Lists, Trees, Binary Tree Traversal, Binary Search Trees, and Graphs.
Design and Analysis of Algorithms: Algorithm complexity, Algorithms Design Techniques – Divide and Conquer, Greedy Method, Dynamic Programming, Backtracking, Branch and Bound, NP-Hard and NP-Complete Problems.
Principles of Programming Languages: BNF, Variables, Data Types, Control Structures, Scope and Extent, Data Abstraction, Concurrency concepts, Exception Handling, Functional Programming, and Logic Programming.
Compiler Design: Types of grammar, Phases of compiler, Lexical Analysis, Parsing Techniques, Code generation and Optimization.
Operating Systems: Introduction, Process and CPU Scheduling, Process Synchronization, Deadlocks, Disk and Memory Management, Virtual Memory, File System Interface and Implementation, Protection and Security.
Database Management Systems: Introduction, Relational Model and Languages, Data Modeling, Database Design Theory and Methodology, SQL/ PLSQL, Transaction Processing & Concurrency control and Database Recovery & Security.
Computer Graphics: Line Drawing, Graphic Primitives and Polygons, 2D Transformations, Windows and Clipping, 3-D Graphics, Curves and Surfaces.
Computer Networks: Introduction, Seven Layers in OSI Model, Network Protocols, Internetworking, and TCP/IP Model.
Distributed Operating Systems: Goals, Client-Server Model, Synchronization in distributed systems, Distributed Process Management and File Systems, Distributed Shared Memory.
Software Engineering: Software Characteristics, Software Process Models, Analysis, Design, Coding, Testing, and Software Quality Assurance.

Object oriented Analysis and Design: Introduction to UML, Basic Structural Modeling, Classes and Object Diagrams, Behaviour Modeling and Architecture Modeling.
Network Security: Data Encryption and Decryption, Symmetric Key algorithms like DES, IDEA and AES, Public Key Cryptography, RSA algorithm, Digital Signatures & Authentication, Firewalls and VPN.

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15. Paper: STATISTICS

1. Probability: Sample space, events, relations among events, classical and relative frequency definitions of probability, probability as a measure. Basic results on probability of events. Conditional probability and Baye's theorem. Independence of events.

Random variables (discrete and continuous). Distribution function and its properties. Joint distribution of two and more random variables. Marginal, conditional distributions and densities. Expectation of random variables, moments and generating functions. Conditional expectation. Characteristics function and its properties. Inversion theorem. Statement of continuity theorem.

Convergence of a sequence of events. Borel – Cantelli lemma, Borel 0-1 law and statement of Kolmogorov 0-1 law with applications. Convergence of a sequence of random variables. Convergence in law, in probability, with probability one and in quadratic mean and other inter-relationships. Convergence in law of $X_n + Y_n$, X_nY_n and X_n/Y_n. Definition and examples of weak law of large numbers. Khintchene's theorem and strong law of large numbers.

Statement of CLT. Lindberg-Levy and Liapunov forms of central limit theorems, statement of Lindberg – Feller form of CLT with simple illustrations.

Stochastic processes with examples. Markov Chains transition probability matrix and classification of states of a Markov chain with examples.

2. Distribution Theory : Theoretical distribution – Binomial, Poisson, negative binomial, geometric, hypergeometric, multinominal, rectangular, normal, lognormal, exponential, gamma, beta, Cauchy, weibull and Pareto distributions with properties.

Transformation of random variables. Distribution of Chi – squares, t and F distributions and their properties. Distribution of $\overline{X}$ and s^2 for samples coming from normal population. Distribution of order statistics and range. Joint and marginal distribution of order statistics. Distribution of sample quantiles.

Multivariate normal distribution and its marginal and conditional distribution with examples. Simple correlation and lines of regression.

3. Estimation: Unbiasedness, sufficiency, consistency and efficiency of a point estimate with examples. Statement of Neyman's factorization criterion with applications. Minimum variance unbiased estimation, Crammer – Rao lower bound and its applications. Rao – Blackwell theorem, completeness and Lehman – Scheffe theorem. Estimation by method of maximum likelihood, moments and statement of its properties. Confidence intervals for the parameters of normal, exponential, binomial and Poisson distribution.

4. Testing of Hypotheses: Concepts of tests of statistical hypothesis, types of error, level of significances, power, critical region and test function. Concepts of MP and UMP tests. Neyman – Pearson lemma and its applications, one parameter exponential family of distributions. Concepts of unbiased and consistent tests. Likelihood ratio (LR) criterion with simple applications (including homogeneity of variances). Statements of asymptotic properties of LR tests. Large sample tests of population means, proportions and correlation coefficients. Relation between confidence intervals, and hypothesis testing. Wald's SPRT for testing a simple null hypothesis against simple alternative hypothesis and its OC and ASN functions. SPRT procedure for binomial, Poisson, normal and exponential distributions.

5. Non – Parametric Tests : Non – parametric tests for (i) one sample case: sign test, Wilcoxon signed rank test for symmetry, runs test for randomness, Kolmogorov – Smirnov (k-s) test for goodness of fit (ii) two sample case: sign and Wilcoxon tests for

paired comparisons. Wilcoxon - Mann Whitney test and K –S test and test for independence based on spearman's rank correlation. Kruskal-Wallis test and Friedman's test.

6. Multivariate Tests: Principal Component Analysis, Factor analysis, Canonical Correlation, Cluster analysis. Multivariate tests based on Hotelling's T^2 and Mahalanobis D^2 statistics for one sample problem, two sample problem and classificatory problems between two normal populations based on Fisher's discriminant function.

7. Sampling Techniques: Estimation of population mean, population total and variance of the estimator in the following sampling methods: simple random sampling with and without replacements and equal and unequal probabilities. Horwitz Thompson and Yates and Grundy estimators. Selection of sample and determination of sample size. Stratified random sampling, proportional and optimum allocations and comparisons. Systematic sampling with N=nk and comparisons in populations with linear trend. Cluster sampling with clusters of equal and unequal sizes. Two stage sampling with equal and unequal first stage units. Ratio and regression estimation in case of simple random sampling and stratified random sampling. Non – sampling errors.

8. Linear Models and Analysis of Experimental Designs: Gauss – Markov linear model, BLUE for linear functions of parameters Gauss – Markov theorem, analysis of multiple regression models, multiple and partial correlations. Tests of hypothesis on regression and correlation parameters, tests of sub – hypothesis. Aitken's generalized least squares. Concept of multicollinearity.

Introduction of selecting the best regression equation, all possible regressions: backward, stepwise regression procedures. Variations on these methods. Probit and logit analysis, Introduction to non-linear regression model building, least squares in non-linear case, estimating the parameters, non-linear growth models.

Statement of Cochran's theorem for quadratic forms, analysis of variance one – way classification model, two – way classification model with one - observation per cell with more than one (equal) observations per cell with interaction. Fisher's least significance difference (LSD) method. Analysis of covariance one-way and two – way classification. Fundamental principles of experimental designs. Analysis of completely randomized design (CRD), Randomized Block Design (RBD), and Latin Square design (LSD). Analysis of RBD and LSD with one and more than one observation missing.

Estimation of main effects, interactions and analysis of 2^2, 2^3, 2^4, 2^n and 3^2 factorial experiments. Total and partial confounding of 2^2, 2^3, 2^4 and 3^2 factorial designs. Concept of balanced partial confounding. Fractional factorial designs. Split plot design and its analysis.

Balanced incomplete block design (BIBD) - parametric relations, Intra – block analysis and recovery of inter block information. Partially balanced incomplete block design with two associate classes (PBIBD (2)) – parametric relations and intra –block analysis. Youden Square design, Lattice design and intra – block analysis of simple lattice design.

9. Optimization Techniques - I : Meaning and scope of Operations research, formulation of Linear programming problem (LPP), rule of steepest ascent, and θ-rule, optimum solution for Linear programming problem by graphical method and simplex algorithm using artificial variables (Big M/penalty method and two phase simplex methods). Dual of a symmetric Linear programming problem and reading the optimal solution to the dual from the optimum simplex table of primal. Complementary slackness theorem, dual simplex algorithm.

Definition of transportation problem, initial basic feasible solution by North West, matrix minimum methods and VAM. Optimal solution through MODI tableau for balanced and unbalanced transportation problem, degeneracy in transportation problem, transportation problems as a special case of linear programming problem. Assignment

problem as a special case of transportation problem and LPP. Optimal solution using Hungarian method.

Sequencing: Optimal sequence of ‘n’ jobs on two and three machines without passing.

10. Optimization Techniques - II : Non–linear programming problem – Formulation, generalized Lagrange multiplier technique, Kuhn - Tucker necessary and sufficient conditions for optimality of an NLPP.

Game theory: 2 person zero sum game, pure strategies with saddle point, principles of dominance and games without saddle point.

Introduction to simulation, generation of random numbers for uniform, Normal, Exponential, Cauchy and Poisson distributions. Estimating the reliability of the random numbers, simulation to queuing and inventory problem.

Queuing Theory: Introduction, essential features of Queuing system, operating Characteristics of Queuing system (transient and steady states). Queue length, General relationships among characteristics. Probability distribution in queuing systems, distribution of Arrival and inter arrival. Distribution of death (departure) process, service time .Classification of Queuing models and solution of Queuing models; M/M/1: ∞/FIFO and M/M/1: N/FIFO.

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16. Paper: GENETICS

Unit-I:

Principles of Genetics - Mendel's Law, Extension to Mendelian Genetics (Epistasis), co dominance, incomplete dominance, penetrance and expressivity. Linkage, Recombination and Gene Mapping in neurospora, tetrad analysis, Mitotic crossing over – Drosophila. Sex Determination and sex linked inheritance, sex determining mechanism in birds, Drosophila , plants and man, sex chromatin and inactivation of X chromosomes, sex linked inheritance, holandric genes, incompletely linked genes, sex linked genes, sex limited genes, sex influenced genes, gynandromorphs. Extranuclear inheritance, cytoplasmic inheritance, chloroplast and mitochondrial (genomes) inheritance, their evolutionary significance.

Unit-II:

Cell cycle and Cell division - phases of cell cycle G0, G1, S and G2 phases Genes that determine the cell cycle – cyclins, CDK proteins, role of p^{53} in cell cycle. Mitosis – Stages in mitotic cell division- significance of mitosis. Meiosis - Formation of Synaptonemal complex, crossing over, chiasma formation, significance of meiosis. Cell death: Apoptosis (Intrinsic and Extrinsic pathways), necrosis and autophagy.

Unit- III:

Chromosome Organisation - Components of chromatin - Chromosome structure & function, Euchromatin and Heterochromatin. Chromatin organization - Structure and organization of nucleosome in chromatin, solenoids, loops and scaffolds, nucleosome phasing, active and inactive states of chromatin. Chromatin Modifications – Histone modifications and their effect.

Unit- IV:

Genome Organisation and DNA structure - Prokaryotic genome organization. Eukaryotic genome organization, Extrachromosmal genetic elements (plasmids, mitochondrial genome, chloroplast genome), Horizontal gene transfer (transformation, transduction, conjugation. Genome islands),Transposable elements and their implication in genome evolution, Bacteriophages (lambda phage). Double helical structure of DNA (Watson and Crick Model), B-DNA and Z-DNA.

Unit-V:

Gene Replication, Mutation and Repair Mechanism, DNAreplication,Bacterial chromosomal replication, Eukaryotic chromosomal replication, Plasmid eplication, Replication of mitochondrial and chloroplast genomes, Regulation of genome replication, Replication associated errors. Whole genome duplication, Segmental duplication, Single nucleotide variations, Homologous recombination, Non-homologous end joining, Site-specific recombination, Transposon and repeats mediated rearrangements, Gene conversion.

Internal and external agents causing DNA damages - DNA damages (Oxidative damages, Depurinations, Depyrimidinations, O6- methylguanines, Cytosine deamination, single and double strand breaks), Mechanisms of DNA damage (transition, transversion, frameshift, nonsense mutations), Repair mechanisms (Photo reactivation, excision repair, mismatch repair, post replication repair, SOS repair).

Unit –VI:

Gene structure, Gene expression and Regulation. Structure of prokaryotic genes,Organization of prokaryotic genes into operons, Structure of eukaryotic genes (introns, exons, UTRs, core and proximal promoters, enhancers), Number of genes in prokaryotes and eukaryotes, RNA coding genes (rRNA, tRNA), Regulatory small RNA coding genes (miRNAs).

Transcription machinery in prokaryotes and eukaryotes, Transcription process (initiation, elongation, termination, processing of transcripts),Translational machinery in prokaryotes and eukaryotes,Translation process (initiation, elongation, termination, folding, processing),Co-ordinated regulation of gene expression in prokaryotes and eukaryotes.Regulation of transcription (proximal promoter, specific transcription factors, enhancers, multiple promoters, alternate transcription initiation sites, multiple PolyA sites),Post transcriptional regulation of gene expression (pre-mRNA splicing, miRNA based regulation), Alternate transcript formation (Exon skipping, intron inclusion, alternate splice sites, 5' end variations, 3' end variations), Regulation of translation (codon usage/bias, 5'UTR based signals, upstream ORFs, upstream, start codons, alternate splicing in UTRS, 3'-UTR based regulation), Post translational regulation of gene expression.

Overview of epigenetic regulation- Promoter DNA methylation and gene expression, Chromatin remodelling and gene expression, Histone modifications and gene expression, Small RNA based epigenetic regulation, Propagation of epigenetic regulation (genome imprinting).

Unit- VII:

Recombinant DNA Technology and Genetic Engineering - Restriction Enzymes and Cloning Vectors- Host controlled restriction modification, Restriction endonucleases, types and classification, Modifying enzymes used in molecular cloning, methylase, polymerase, ligases, kinases, phosphatases and nucleases, Plasmid vectors (PBR322, PUC19, PET), Lambda phage vectors (Replacement & Insertional vectors), Cosmid vectors, Yeast vectors, BAC.

Selection of Recombinant Clones **-** Genetic Selection - insertional inactivation, alpha complementation, Labeling of nucleic acids, Immunological probes, Selection of recombinant clones: Hybridization techniques (Southern, Northern, Western, South-Western and Zoo blot), colony hybridization and library screening, Hybrid arrest and Hybrid release translation, DNA Sequencing methods, Maxam and Gilbert, Sangers and Next Generation Techniques, Applications of rDNA Technology.

Unit- VIII:

Immunogenetics and Human diseases - Types of Immunity- Innate immunity and Adaptive immunity - Anatomic barriers, Physiological barriers, Phagocytic barriers, Endocytic barriers, Inflammation, Anti microbial substances, Acquired immunity-Active and passive immunity, Hematopoiesis and differentiation, Cells of the Immune System – lymphoid cells (B & T Lymphocytes; T-cell sub-sets; NK cells), Mononuclear phagocytes (Monocytes, macrophages), Granulocytes (neutrophils, eosinophils, basophils, mast cells, dendritic cells).

Organs of the System: Primary lymphoid organs (Bone marrow and Thymus); Secondary lymphoid organs (lymph nodes, spleen and mucosal-associated lymphoid tissue, cutaneous associated lymphoid tissue).

Antigens- Immunogenicity versus Antigenicity, Factors that influence immunogenicity

Epitopes - Properties of B-cell and T-cell epitopes. Haptens and the study of Antigenicity, Haptens and hapten-carrier conjugates, types of antibodies, Immunoglobulins : Structure and Functions. Major Histocompatibility Complex; T Cell – Mediated Immune Responses. Autoimmunity and Mechanisms of auto-immune disorders-InsulinDependent diabetes, Rheumatoid Arthritis and Systemic Lupus Erythematosus. Immuno-deficiency disorders- Congenital Immunodeficiency disorders [Severe combined Immunodeficiency (SCID), Digeorge Syndrome and Ataxia Telangiectasia]. Acquired Immunodeficiency Disorders- AIDS, T-cell responses to infections.

Unit –IX:

Plant Genetics and Molecular Biology - Specific Breeding Methods, Breeding for disease resistance. Genetics of pathogenecity; Genetics of disease resistance; Methods of breeding for disease resistance-Breeding for insect resistance: Mechanisms of insect resistance; Breeding methods for pest resistance, Breeding for abiotic stress tolerance, Breeding for drought, salinity, temperature and flood tolerance. Breeding for nutritional improvement, Nutritional quality, Improved protein content and Improved oil quality.

Biotechnological Approaches for Crop Improvement- Plant tissue culture techniques in crop improvement. Introduction to plant cell-tissue culture techniques, Haploids and di-haploids, Somaclonal variation, Protoplast fusion, Micro propagation, Transgenics in crop improvement: Gene transfer methods in plants; Production of transgenics for biotic and abiotic stress tolerance; Transgenic male-sterility systems and development of hybrids; Cis-genic approaches, Gene silencing: RNAi and its applications for crop improvement, Molecular plant breeding tools, Molecular markers, Marker assisted breeding, Genome mapping – QTL mapping.

Unit-X:

Microbial Genetics and Application-Recombination and mapping of genes in Bacteria – Structure and Life cycle, Recombination and gene mapping in Bacteria, Transformation, Conjugation. Genetics of Bacteriophages-Structure and classification, Lytic cycle– Infection of host cells, formation of viral components, maturation and release of virus particles. Lysogeny – nature of lysogeny: life-cycle of lambda, integration of viral genome into host genome, lysogenic stage and prophage cycle, factors governing lysogeny.

Fine structure analysis of gene – One gene-one enzyme hypothesis – arginine biosynthesis in *Neurospora crassa*, Collinearity between gene-protein-Tryptophan synthase gene in *E. coli*., Analysis of r-II locus of T4-phage – genetic recombination in phage crosses – deletion mutants – elucidation of fine structure of r-II locus using point mutants and deletion mutants.

Regulation of bacterial gene expression-General features of regulation,Regulation of Lactose utilization, Regulation of Tryptophan biosynthesis,Translational control of r-proteins.

Unit- XI:

Biostats, Bioinformatics and IPR Sampling and Experimental design - Descriptive analysis of data: Types of variables, Data alignment and representation, Measures of central tendency, Measures of dispersion-Concepts of probability: Axioms of probability, Probability distributions : Binomial, Poisson, Normal distribution, Hypothesis testing: Null and alternate hypothesis, test of significance, Type I and Type II errors, confidence intervals and confidence levels, Estimates and test statistics: Chi-square test (test for goodness of fit, homogeneity test, linkage, test of independence), Z test (for proportions and means), t- test (students t test, paired t test), ANOVA - One way and Two-way Anova (F- test).Correlation and regression (Simple regression, multiple regression, logistic regression).

Genome Databases/Genomics - Primary databases – DDBJ, EMBL, NCBI, DNA and protein sequence formats – Genbank, Fasta, PIR,Gene predictions – Extrinsic and intrinsic, Comparative genomics – map viewer, COGs.

Protein Databases/Proteomics-Introduction to amino acids and single letter notations,Structural classification of amino acids,Structural organization of proteins – primary, secondary and tertiary, Protein sequence and structural databases – Swissprot, SCOP and CATH, Protein sequencing –Sangers, Mass spectroscopy. Sequence Analysis-Concepts of sequence alignments – pairwise and multiple sequences,Sequence similarity search by BLAST and FASTA, Concepts of Phylogeny – Maximum parsimony and maximum likelihood,Structural analysis of proteins – Protparm, GOR, Swiss-plot.

Intellectual Property Rights and patents – Understanding of intellectual property rights, introductoin , history of patent protection,rationale behind patent system, An over view of IPR regime, trademarks, copy rights, industrial designs, trade sectrets, Importance of IPR,s in the field of science and technolo, Patenting in India and international patent regimes (America and Euprean patent regimes), Procedure of obtaining patents-Rights of patents- infringement issues in patents, Business model patents- e commerce and biotech patents.

Main Examination Syllabus for the post of Degree Lecturers in Residential Educational Institution Societies

17. Paper: Geology

1. Geomorphology & Field Geology: Fundamental concepts of geomorphology, Geomorphic processes, Weathering, soils, mass wasting, Streams and valleys, drainage patterns and their significance, groundwater, glacial cycle, wind, lakes, seas, earthquakes, volcanoes and mountains, application of geomorphology to various fields of earth sciences.

Field Geology: Toposheet, geological map, field work and sampling, compass, geological mapping procedures. Surveying Principles and methods surveying, chain survey, prismatic survey, plane table survey and theodolite survey. Dumpy's level.

2. Crystallography, Mineralogy& Optical Mineralogy: External symmetry of crystals: symmetry elements, classification of crystals into systems and classes, diffraction of crystals, Braggs' law. Physical properties of minerals, classification of minerals, structural and chemical principles of crystals / minerals, physical and optical characters and paragenesis of mineral groups- Olivine, pyroxene, amphibole, feldspars, quartz, chlorite, mica, spinel, epidote and garnet groups, optical properties of common rock forming silicate minerals.

3. Structural geology and Geotectonics: Stress-strain relationship of elastic, plastic and viscous materials. Principles of geological mapping, measurement of strike and dip, Structural analysis of folds, cleavages, lineation's, joints, and faults, superposed deformation, mechanism of folding and faulting, Unconformities, structural behavior of igneous rocks, diapirs and salt domes, fundamentals of petrofabric analysis.

Earth and solar system, planetary evolution of earth and its internal structure, Heterogeneity of the earth's crust, Major tectonic features of the oceanic and continental crust, Continental drift, mid oceanic ridges, deep sea trenches, continental shield areas and mountain chains. Paleomagnetism, seafloor spreading and plate tectonics, Island arcs, oceanic islands and volcanic arcs, isostacy, orogeny, geosynclines, and seismic belts of the earth, seismicity and plate movements, Geodynamics of the Indian plate.

4. Palaeontology & Stratigraphy: Micro-palaeontology, origin and evolution of life, classification and uses of micro fossils. Plant fossils: Gondwana flora and their significance, Invertebrate and vertebrate palaeontology, fossils and their morphology, distribution with geological time period.

Principles of Stratigraphy, geological time scale, modern methods of stratigraphic correlation, Precambrian Stratigraphy of India, Stratigraphy of the Palaeozoic, Mesozoic and Cenozoic formations of India. Gondwana system and Gondwana land, origin of Himalaya and evolution of Siwalik basin, Deccan traps, Quaternary Stratigraphy, rock record, paleoclimates and paleogeography.

5. Igneous Petrology & Geochemistry: Origin of magmas, phase equilibrium in igneous systems, Bowen's reaction principle, Magmatic evolution and differentiation, Structures and textures of igneous rocks, Classification of igneous rocks, Magmatism and tectonics, Igneous rock suites- Ultramafic rocks, Basic rocks, Intermediate rocks, Acidic rocks and Alkaline rocks.

Geochemistry, Elements, Meteorites, Primary geochemical differentiation of earth, Goldschmidt's geochemical classification of elements, Periodic table, Magmatism as geochemical process, Major elemental distribution in igneous rocks, Trace element distribution in igneous rocks, Sedimentation as a geochemical process, Metamorphism as a geochemical process, Isotope geochemistry, Atmospheric geochemistry.

6. Metamorphic Petrology & Thermodynamics: Metamorphism, factors and kinds of metamorphism and metamorphic processes; Classification of metamorphic rocks and nomenclature, Structures and textures, zones, grades, and facies of metamorphism, Phase relations and phase diagrams for metamorphic mineral assemblages, processes and products of Contact, Regional, thermal, dynamo-thermal metamorphisms, metasomatism, granitization, typical Indian rocks.

Objectives of thermodynamics, inter-relationship between petrogenetic processes and thermodynamics, Role of thermodynamics in geochemistry, Phase rule, 'pressure-temperature-depth relations' among various metamorphic facies and ultra metamorphism, Paired metamorphic belts, Metapelitic and metabasic minerals and mineral assemblages, First law of thermodynamics, Second law of thermodynamics, P-T diagrams, geothermobarometry, pressure(P)-temperature(T)-time(t) paths.

7. Sedimentology & Petroleum Geology: Sedimentary environments- fluvial, glacial, eolin and lacustrine environments, transitional environments including deltaic, beach and tidal flats, marine environments including shelf (clastic and non-clastic) and deep sea sedimentary environment, Evolution of sedimentary basins, Tectonic setting of sedimentary basins.

Petroleum Geology, Constitution and Genesis of hydrocarbons, conversion of organic matter to petroleum, variety of petroleum hydrocarbons and gas hydrates, Reservoir rocks, Migration and accumulation of oil, structural traps, stratigraphic traps and combination traps, salt domes, methods of Exploration and exploitation of petroleum, Geographic and stratigraphic distribution of oil and gas, global distribution, petroliferous basins in India.

8. Ore Genesis, Mineral Deposits and Mineral economics: Modern concept of ore genesis, principal ore mineral groups, plate tectonics and ore deposits, ore textures, Paragenetic sequences and zoning in metallic ore deposits, ore microscopy, application of geothermobarometry, fluid inclusions in ores, Role and application of stable isotopes in ore genesis, Petrological ore associations with Indian examples, orthomagmatic ores of mafic-ultramafic association, diamonds in kimberlites, REE in carbonatites, chromite in chromitites and basic rocks, PGE in ultramafic and basic rocks, Chemical and clastic sedimentation, stratiform and stratabound ore deposits (Mn, Fe, non-ferrous ores), placer concentrations, Ores related to weathering and weathered surfaces, laterite, bauxite and manganese nodules.

Study of geology, nature of occurrence and the genesis of the following ore deposits with special reference to India- Iron, Chromite, Manganese, Copper, gold, Lead and Zinc, Bauxite, Magnesite, Barites, Mica, Asbestos, decorative stones, *Mineral based Industries:* Iron and steel; *Refractories:* Ceramic, electrical and insulators, glass.

Stragetic, critical and essential minerals. Indias status in mineral production. Change in pattern of mineral consumption, National Mineral Policy. Mineral concession rules, Marine mineral resources and law of sea, Conservation and substitution of minerals.

9. Environmental Geology: Concepts and principles, Natural hazards, preventive/precautionary measures-floods, landsides, earthquakes, rivers and coastal erosion. Impact assessment of anthropogenic activities such as urbanization, open-cast mining and quarrying, river-valley projects, disposal of industrial radioactive waste, excess withdrawal of groundwater, use of fertilizers, dumping of ores, mine waste and flyash, Organic and inorganic contamination of groundwater and their remedial measures, soil degradation and remedial method, Environmental protection-legislative measures in India, factors for groundwater subsidence.

10. Engineering Geology Mechanical properties of rocks and soils, Geological investigations for river-valley projects-dams and reservoirs, tunnels-types, methods and problems, Bridges-types and foundation problems, shoreline engineering, landslides-classification, causes, prevention and rehabilitation, Earthquake resistant structure, Problems of groundwater in engineering projects and Geotechnical case studies of major projects in India.

11. Mineral Exploration and Fuels: Methods of surface and subsurface exploration, prospecting for economic minerals and fuels-drilling, sampling, and assaying. Geophysical techniques – gravity, electrical, magnetic, air borne, and seismic surveys, Instrumental techniques of detection and measurement of radioactivity, Radioactive methods for prospecting and assaying of mineral deposits. Geomorphological and remote sensing techniques, Geobotanical and geochemical methods. Bore hole logging and survey. Origin of coal, Stratigraphy of coal measures, Fundamentals of coal petrology, peat, lignite, bituminous and anthracite, Industrial application of coal, Indian coal deposits,

Origin, accumulation, migration and entrapment of natural hydrocarbons, characters of reservoir rocks, structural, stratigraphic and mixed traps, geographical and geological distribution of petroliferous basins of India. Gas hydrates and Coal Bed Methane occurrences, Mineralogy and geochemistry of radioactive minerals, distribution of radioactive minerals in India, Radioactive methods in petroleum exploration-well logging techniques, nuclear waste disposal-geological constraints.

12. Hydrogeology: Origin of water, Hydrological cycle, water table, Rock properties affecting groundwater, Types of aquifers, Porosity, permeability, specific yield and retention, hydraulic conductivity, trasmitssivity, storage and storage coefficient. Water

level fluctuation and causative factors, methods of pumping tests and analyses, evaluation of aquifer parameters, artificial recharge of groundwater, groundwater legislation, groundwater quality and groundwater pollution, arsenic and fluoride problems, quality criteria for groundwater use, salt water intrusion in coastal aquifers and remedial methods, surface geophysical methods-seismic, gravity, geoelectrical and magnetic, subsurface geophysical methods-well logging for delineation of aquifers and estimation of water quality, Watershed management.

13. Photo Geology, Remote Sensing, GIS and GPS: Elementary idea about photogeology: electro-magnetic spectrum, types & geometry of aerial photographs; factors affecting aerial photography; Fundamentals of remote sensing; remote sensing systems; remote sensing sensors; signatures of rocks, minerals and soils. Application of remote sensing in geosciences and geomorphological studies, Types of Indian and Foreign Remote Sensing Satellites, Digital image processing; fundamental steps in image processing; elements of pattern recognition and image classification, Geographic Information System (GIS), components of GIS; product generation in GIS; tools for map analysis; integration of GIS with remote sensing. Geographic positioning system (GPS), scope of GPS, advantages and uses of GPS in different fields.

14. Mining Geology: Alluvial, open- pit and underground mining methods; mine organization and operation; mine hazards. Sampling techniques, drilling methods, estimation of ore reserves, Cost of mining; future costs and profits; life of mine; present value of mine. Environmental issues with mining.

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18. Paper: NUTRITION & DIETETICS

I. Nutritional Biochemistry & Metabolism

Carbohydrates - Classification, sources, functions and requirements, Digestion and absorption, Transport, utilization and storage, Glycolysis, TCA cycle, Pentose phosphate pathway, Glycogenesis, glycogenolysis, gluconeogenesis, Electron transport chain, alcohol metabolism, Inborn errors of Carbohydrate Metabolism- Glycogen storage diseases, Lactose intolerance, Galactosemia, Fructose intolerance.

Amino Acids - Classification, Functions, Utilization of amino acids, Urinary excretion.

Proteins - Classification, sources and functions, Digestion and absorption, Transport and storage, Deamination, transamination, Decarboxylation, deamidation, Urea cycle, Inborn errors of amino acid metabolism – PKU, Tyrosinemia, Maple syrup urine disease, Homocystinuria, Alkaptonuria.

Nucleic acids - Types (DNA , RNA) and Functions, Components of Nucleic acids, Structure of DNA & RNA, Types of RNA, Protein synthesis, Post transcriptional changes.

Lipids - Classification, sources and functions, Digestion and absorption, Deposition and storage, Role of essential fatty acids, Lipoproteins, Triglycerides, Cholesterol. Oxidation of fatty acids, Synthesis of fatty acids, Biosynthesis of triglycerides and phosphatides, Cholesterol metabolism, Bile pigments, Ketosis, Inborn errors of Lipid Metabolism- Gaucher's disease, Niemann's picks disease, Tay-sach's, Fabry's disease.

Fat Soluble Vitamins - Physiological action, transport, utilization, storage, sources, functions and deficiency of Vitamins A, D, E, K.
Water Soluble Vitamins - Physiological action, transport, utilization, storage, sources, functions and deficiency of Thiamin, Riboflavin, Niacin, Vitamin B12, Pantothenic acid, Folic Acid, Pyridoxine, Vitamin C.

Minerals, Trace elements - Absorption, utilization, sources, functions and deficiency of calcium, phosphorous, iron, iodine, Flourine, Zinc, Copper, Selenium.

Water - Functions, Distribution, Requirements, Role of solutes (Sodium and Potassium) in maintaining the volume of the fluid compartments.

II. Human Physiology

Digestive and Excretory system - Structure and functions of gastrointestinal tract, liver, Gut flora, role of prebiotics and probiotics in the maintenance of health of digestive system. Structure and functions of kidney, Urine formation, water and electrolyte balance.

Structure and functions of heart and blood vessels, Pulmonary, Systemic and Portal circulation' Blood pressure, Regulation of Cardiac output, Composition of blood, Plasma proteins; Functions, role in fluid balance, Blood Lipids – Chylomicrons, VLDL, LDL, HDL, Cholesterol, Triglycerides, Blood coagulation.

Endocrine glands - Formation and secretion of hormones, Control of hormone secretion, mechanism of hormone action, Pituitary gland: Hormones secreted and their functions, abnormalities, Thyroid gland: Structure of thyroid gland, formation of thyroid hormones, functions of thyroid hormones, hypothyroidism, hyperthyroidism, Adrenal gland: Structure of adrenal gland, secretions of adrenal cortex and their functions, hypoadrenalism, hyperadrenalism, Secretions of adrenal medulla and their functions, Parathyroid gland: Structure of parathyroid gland, functions of parathormone, hypo and hyper secretion of parathormone, Islets of Langarhans: Structure of islets of Langarhans, functions of Insulin, deficiency of insulin, functions of glucagon, Testes:

Structure of testes, functions of testosterone, deficiency of testosterone, Ovaries: Structure of ovaries, functions of estrogens and progesterone.

III. Nutrition during Life Cycle

Principles of Nutrition - Energy value of foods, Estimation of energy value of foods by Bomb Calorimeter and by Benedict's oxy Calorimeter, Factors affecting energy requirements; Factors affecting BMR, SDA, Physical activity, RDA, and derivation of RDA. Reference man, Reference woman. Basic five food groups, Nutritional contribution from each group, Balanced diet, Food Pyramid, Basic principles of meal planning, Steps in meal planning, food cost.

Nutritional requirements of adult man, Nutritional requirements of adult woman
Pregnancy, lactation & Infancy – Pregnancy - Physiological changes, Growth of fetus from conception till term, complications of pregnancy , Increase in Nutritional requirements during pregnancy.

Physiology of lactation, Nutritional component of colostrum and mature milk, Increase in Nutritional requirements during lactation, Growth and development during infancy, milk
Breast feeding Vs bottle feeding, Feeding of Low birth weight and premature infants, Weaning, Homemade foods Vs commercial foods.

Preschoolers - Milestones and Growth Chart, Nutritional requirements.
School going children - Nutritional requirements, Packed lunch.
Adolescents - Sequence of developmental changes, Role of hormones on growth, development and maturation, Nutritional requirements during adolescence, eating disorders, teenage pregnancy.

Geriatric - Physiological changes in aging, Nutritional requirements and Dietary modification.

IV. Introduction to Dietetics

Role and responsibilities of Dietitian – Administrative, Community, Hospital, Clinical methods to assess nutritional status - SGA, MNA, MUST, Biochemical method: Serum Albumin, Serum Transferrin, Albumin/ Globulin Ratio. Modification of normal diets, Types of hospital diets – clear fluid, full fluid, soft diet.

Enteral Nutrition - Nasogastric, Nasoduodenal, Nasojejunal, Gastrostomy, Percutaneous Endoscopic Gastrostomy, Percutaneous Endoscopic Jejunostomy, Formula feeds.
Parenteral Nutrition - Total Parenteral Nutrition, Peripheral Parenteral Nutrition.

Obesity - Definition, types, etiology, assessment and complication, Management of obesity – exercise, diet, behavior modification, pharmacotherapy and surgery
Leanness - Etiology, complications, Dietary management.

Gastrointestinal Disorders:
Etiology, symptoms, diagnosis, treatment and dietary management of Gastritis, Peptic ulcer, Diarrhea, Constipation, Malabsorption syndrome: ulcerative colitis, Crohn's disease, irritable bowel disease, lactose intolerance and celiac disease, Diverticular diseases.

Fevers - Metabolic changes during fever, Short duration ,Intermittent duration, Long duration – Dietary Management.

Surgery - Physiological response, endocrine and metabolic changes, Nutritional care in pre and post operative conditions.
Burns - Severity of burns, Metabolic changes in burns, Nutritional support.

V. Advanced Dietetics

Liver - Etiology, symptoms, diagnosis/functional test and dietary management of Jaundice – Types – hemolytic, obstructive and infective, Viral Hepatitis – Types – A, B, C, D, E and G, Fatty liver, Cirrhosis, Alcoholic liver disease, Hepatic Coma, Liver Transplant.

Gall Bladder - Etiology, symptoms, diagnosis and dietary management of Cholecystitis, Cholelithiasis.

Kidney - Etiology, symptoms, diagnosis and dietary management of Acute and Chronic Glomerulonephritis, Nephrosis, Acute & Chronic Renal Failure, Kidney Transplant, Urinary calculi, Dialysis – Hemodialysis &Peritoneal dialysis- Advantages, disadvantages and Dietary management.

Pancreas - Etiology, symptoms, diagnosis and dietary management: Acute & Chronic Pancreatitis.

Diabetes **–** Classification, metabolic changes, Etiology, symptoms, diagnosis, Complications, Treatment – exercise, hypoglycemic drugs, insulin and diet. Glycemic index, Glycemic load.

Disorders of circulatory system - Dietary management of Hypotension, Hypertension, Dietary management of Cardio Vascular Diseases - Ischemic Heart Disease- Arteriosclerosis, Atherosclerosis, Coronary Artery Disease, Myocardial Infarction, Angina, Heart Failure.

Cancer - Types, Etiology, metabolic changes, treatment (drugs, chemotherapy and radio therapy), Nutritional management of cancer
AIDS - Causes, symptoms, metabolic changes, diagnosis, Treatment and dietary management.

VI. Food Science

Cereals – Structure of the grain, Nutrient composition, Starch: functions and properties, Gelatinization, factors affecting gelatinization, gel formation, retrogradation, syneresis, gluten formation.

Pulses – Nutrient composition, germination and fermentation of pulses, Anti-nutritional factors.
Milk - Composition and Nutritive Value, Pasteurization of milk, role in cookery.
Egg - Composition and Nutritive Value of egg, role in cookery.
Meat - Post mortem changes in meat – rigor mortis, curing, ageing and tenderization, Changes during cooking of meat, Poultry - Advantages of white meat, Fish - Classification, Characteristics of fresh fish, Spoilage, Nutritional importance of fish.
Fruits & Vegetables – classification, nutrient contribution, pigments, ripening, browning reactions.
Fats & Oils – Properties, Emulsions, Fat as emulsifying agent, Rancidity – types, mechanism and prevention. Sugar – Types, crystallization and caramelization, Beverages, Spices & Herbs, Leavening agents.

VII. Community Nutrition
Assessment of nutritional status – Anthropometry, Clinical Examination, Biochemical Investigations & Diet surveys.

Magnitude of malnutrition in India, Consequences of malnutrition in India, PEM, Anaemia, Iodine Deficiency Disorder and Vitamin A Deficiency, Dental caries, Fluorosis
Measures to combat malnutrition - ICDS, Mid-day meal program, SNP, IDDCP, Vitamin A Prophylaxis Programme, Anemia Prophylaxis Programme, Role of National & International organizations in combating malnutrition, Nutrition and Health Policies.

Nutrition and Health Education - Audio aids, Visual aids, Audio-visual aids, Types of approaches - personal, group and mass, advantages and disadvantages.

Food security. Concepts and definitions agriculture and food security. Nutrition and health urbanisation Food security and food systems.

Contribution of national and International organizations for agricultural development.

VIII. Food Microbiology

Microorganisms and their general characteristics - Fungi (molds and yeast), Bacteria, Protozoa, Viruses.
Factors affecting microbial growth – Intrinsic & Extrinsic.
Sources of contamination, Spoilage of cereals and cereal products,Spoilage of milk and milk products, Spoilage of meat and meat products – aerobic and anerobic, Spoilage of fish and other sea foods, poultry and eggs. Spoilage of fresh fruits and vegetables.
Spoilage of canned products – spoilage by spore forming and non spore forming bacteria.
Spoilage of sugar products.
Fermentation – Indian, Oriental foods, Fermented beverages.
Principles and methods of food preservation.
Food Packaging, Labeling, Packages with special features.

IX . Food Safety & Quality Control
Sanitary procedures for preparation, handling and storage of foods
Food poisoning & Food borne diseases – Classification, Mode of transmission, Viral and parasitic infections, Control of food borne illnesses. Preventive methods.
Naturally occurring toxicants in foods - Toxic amino acids, toxic alkaloids, Cyanogenic glycosides, trypsin inhibitors, Haemogglutinins, flatulence factors, mycotoxins
Chemical contaminants in foods - Pesticide residues, Packaging residues, Toxic metals - Pb, Hg, Cd, As.
Food safety regulations – FSSAI, Prevention of Food Adulteration Act, Essential Commodities Act, Bureau of Indian standards, AGMARK, Standards of Weights and Measures Act, Export Quality Control Inspection Act, Consumer Protection Act, Certification Marks, Food and Drug Control Authority, International Standards – WTO, ISO, SPS, CODEX ALIMENTARIUS, HACCP.
Food adulteration, Food additives, Preservatives, Coloring agents, Stabilising agents, anti-oxidants, emulsifying agents.

X. Advanced Nutrition

Sports Nutrition, Nutraceuticals & Phytochemicals, Functional foods, Anti-oxidants, GM foods, Space foods, Fat replacers Single cell proteins, Extruded foods, Instant and Ready to Eat foods, Nanotechnology, Microencapsulation.
Drug – Nutrient Interaction,
Disaster Management
Nutrigenomics, Nutrition & Immunity,
Protein Quality, Factors affecting bio-availability of vitamins & minerals.
Food Analysis – Principles, techniques and application of colorimetry, spectrophotometry, atomic absorption spectrophotometry, Flourimetry, Flame photometry, Chromatography.

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19. Paper: PHYSICS (with Electronics Specialization)

(Syllabus for the post of **Electronics)**

I- Mathematical Physics and Classical Mechanics

Vector algebra and vector calculus- Linear algebra, matrices, Linear ordinary differential equations of first & second order,

Special Functions: Legendre's polynomials, Bessel functions,Hermite polynomials.. Laplace equation and wave equation

Integral Transforms: Fourier Transforms and applications, Laplace transforms and applications.

Tensor Analysis: Tensor Algebra**,** Metric Tensor & Christoffel Symbols

Mechanics of a system of particles: Lagrangian Mechanics, Lagrange's equations, Hamilton's principle, Hamiltonian Mechanics, canonical Transformations and Hamilton-Jacobi Theory, and Poisson's Brackets.

Numerical Methods: Numerical Interpolation, Numerical Differentiation, Numerical Integration, Solutions of Equations and Numerical solutions of Ordinary Differential Equations.

II- Statistical Mechanics and Quantum Mechanics

Introduction to Statistical Mechanics: Statistical Mechanics- Thermodynamics, Ensembles, Density distribution- Liouvilles theorem, Postulates of classical statistical Mechanics, Micro canonical Ensemble, MaxWell-Boltzman Statistics, Canonical and grand canonical ensembles.

Quantum Statistics: Postulates of Quantum Statistical Mechanics, Quantum Statistics-Be and F-D Statistics

Principles Of Quantum Mechanics: Birth of Quantum Mechanics, Eigen values and Eigen functions Dirac's Bra and ket vectors Eigen functions and uncertainty principle.

Schrodinger Equations and Angular Momentum Theory: Schrodinger wave equation, Applications of Schrodinger's equation to one dimensional problems, Angular momentum, Application of Schrodinger's equation to three dimensional problems, Hydrogen atom, spin and angular momentum, Addition of angular momenta, Clebsch-Gordan coefficients

Approximation Methods: Time independent perturbation theory, variation method, Time dependent perturbation theory

Relativistic Quantum Mechanics: Klein Gordon relativistic equation and applications, Dirac's relativistic equation and applications

III-Solid State Physics

Crystalline State and Crystal Structure: Crystalline State and Crystal Structure, non crystalline state, elements of X-ray diffraction, experimental techniques for structure determination.

Imperfection in Crystals: Imperfection in Crystals, diffusion,dislocations.

Free electron theory and band theory of solids: Free electron theory, band theory of solids, semiconductors, solid state lasers.

Lattice vibrations and thermal properties: Elastic waves in solids, Infra red absorption ionic crystals, and lattice heat capacity.

Dielectrics and ferroelectrics: Macroscopic descriptions of dielectrics, measurement of dielectric constant, ferroelectrics.

Magnetism and Super conductivity: Magnetism, spontaneous magnetization, occurance of superconductivity, super conductivity-theoretical explanations.

IV - Semiconductor Devices- Analog and Digital Electronics

Semiconductor Diodes, Transistors and Amplifiers: Semiconductor diods, Transistors, Power supplies, Feed beck amplifiers, RC coupled amplifiers and it's frequency response, Oscillators and Multivibrators

Operational Amplifiers: Operational Amplifier, its characteristics, and its parameters, Operational Amplifier-configurations, Operational Amplifier-Frequency response, Operational Amplifier-Linear applications, Operational Amplifier- non linear applications, Operational Amplifier- Wave form generators.

Digital Electronics: Introduction to Digital electronics and logic gates, Applications of EX-OR gate,De-Morgan's Theorems and Fundamental products,Karnaugh map,Flip-flops,Shift Registers,Counters,Multiplexer and De-multiplexer.

Converters: Digital to Analog Converters, Analog to Digital Converters

V- Nuclear Physics and Analytical Techniques

Nuclear decay process: Alpha Spectrum, Gamow's theory of α-decay. β- Spectrum, Neutrino hypothesis, Fermi theory of Alpha-decay, Fermi-Kurie Plots, selection rules for β-decay. Γ-emission – Multiple radiation – selection rules for γ-decay. Classification of elementary particles – Fundamental interactions – Conservation laws. Interaction of charged particles and Gamma radiation with matter, Radiation detectors.

Nuclear forces and Nuclear Models: Properties of Nucleus-nuclear radius, nuclear mass and binding energy, Angular momentum ,nuclear statistics, parity and Symmetry, Magnetic dipole moment, electric quadruple moment, Nature of nuclear forces, two body problem, bound and spin states of two nucleons, Theory of deuteron, Tensor forces, exchange forces, meson theory of nuclear forces, Nuclear models, liquid drop model, formula for total binding energy of the nucleus, Weizsacher's semi empirical mass formula, values of the empirical coefficients, Shell model-Experimental Evidence, predictions, spin orbit coupling and achievements of the shell-model.

Nuclear Reactions

Types of nuclear reactions, conservation laws, Kinematics of nuclear reactions, Q-value, Nuclear cross section, compound nuleaus,Descrete energy levels of nucleus, Breit-Winger formula, Basic properties of neutrons, classification of neutrons, slowing down of neutrons,logarithamic decrement in energy, moderating ratio, neutron diffusion-neutron current density, neutron leakage current, Fermi age equation,Bohr and wheeler theory of fission, four-factor formula

Materials Characterization Techniques: Phase contrast microscopy ,Principle, theory, instrumentation Applications, Electron microscopy ,principle, scanning electron microscope ,instrumentation, Transmission electron microscope,instrumentation,applications of electron microscopes, advantages of SEM over TEM.Thermo gravimetric aalyser,principle,instrument control,Applications,Differential scanning calorimetry,principle,instrumentation,Power compensated DSC,Heat flux DSC,Temperature control methods, the average temperature control, Differential temperature control. Theory of Mossbauer effect, Recoil-less emission and absorption of gamma rays-nuclear, resonance experimental technique to observe Mossbauer effect, Mossbauer nuclides, Mossbauer parameters-Isomer shift,Quadrupole splitting, magnetic hyperfine splitting, simple applications

Resonance Spectroscopy: NMR theory-simple and classical, Relaxation mechanisms-spin-spin and spin-lattice. Bloch equations, complex susceptibility,NMR instrumentation related to absorption and induction techniques, chemical shift,spin-spn coupiling,ethyl and methyl alcoholNMR spectra, Major areas of NMR.Principles of ESR,conditions for resonance,ESR spectrometer, interpretation of spectra, Hyperfine interactions, applications of ESR.Nuclear quadruple Moment, electric field gradients, Nuclear quadruple resonance,energylevelsindifferentFGsymmetries,NQRspectrometer,Applications,review on NMR,ESR and NQR

VI- Electromagnetic Theory and Spectroscopy

Electromagnetic Theory: Electrostatic field, Magneto statics, Electro dynamics,EM waves in matter, Electromagnetic radiation,Lienard-Wiechert Potentials, Radiated power
Atomic Spectra: Fine structure,Zeeman,Paschem-back and Stark Effects, vector atom model L-s and jj coupling of two electron states, two electron system,lande'G' factor
Molecular spectra: Rotational Spectra of Diatomic molecules, vibrational spectra, Electron spectra, Frank-Condon principle, Dissociation enalgies, Frank Condon Principle

VII- Memory Devices and Microprocessors

Logic Families: Logic families and their performance characteristics, Emitter Coupled Logic (ECL, PMOs, CMOs Logic and Tri state Logic), Comparisons of Logic families

Semiconductor memories: Classification and Characteristics of Memories, Memory organization and expression.

INTEL 8085 Microprocessor Organization and Architecture: Microprocessor Organization and Architecture, Pin Configuration of Intel 8085 Micro Processor, Timing diagrams.

Addressing Modes and Programming of 8085 Microprocessors: Addressing modes and instruction set of Intel 8085, Programming of Micro Processor Intel 8085, Assembly Language Programming using Loops.

Peripheral Devices and Interfacing :I/O Interfacing& Data Transfer Schemes,Intel 8053 Programmable interval Timer, Programmable Peripheral Interface (8255), Priority Interrupt Controller (8259).

INTEL 8086 Microprocessor: Intel 8086 Micro Processor, Addressing Modes and Instruction set of Intel 8086 Micro Processor, Pin Configuration of Intel 8086 Micro Processor.

Advanced Microprocessors: Architecture of Micro Processors 80286, 80386, 80486, the Pentium Microprocessor

VIII- Communication Systems

Analog Communication: Need for modulation, Amplitude modulation, Frequency spectrum for sinusoidal A.M, Average power for sinusoidal and non-sinusoidal A.M, Generation of A.M. waves- Collector modulator, Balanced modulator, A.M transmitter (Block diagram approach), Detection of A.M waves – Square law detector, Frequency and Phase modulation, Frequency spectrum for sinusoidal F.M, Average power for sinusoidal F.M, Varactor diode F.M modulator, Balanced slope F.M detector, Ratio F.M detectors.

Digital Communication: Sampling theorem, Pulse amplitude modulation (PAM), Natural sampling, Flat-top sampling, Signal recovery through holding, Quantization of signals, Quantization error, Pulse Code Modulation (PCM), Companding, Multiplexing PCM signals, Differential PCM.Digital modulation techniques: Amplitude Shift Keying (ASK), Phase Shift Keying (PSK), Frequency Shift Keying (FSK) and Differential Phase Shift Keying (DPSK) and their generation and detection (qualitative).

Transmission lines: Introduction, Primary line constants, Phase velocity and line wavelength, Characteristic impedance, Propagation coefficient, Phase and group velocities, Standing waves, Lossless line at radio frequencies, VSWR, Slotted-line measurements at radio frequencies, Transmission lines as circuit elements, Smith chart.

Microwave devices: Introduction to rectangular and circular wave guides, Solution of wave equations in cylindrical coordinates, TE and TM modes, Power transmission and loss in circular wave guides, Excitation of modes in circular wave guide, Microwave tunnel diode, Gun effect diode (GaAs), Microwave generation and amplification.

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20. Paper: PSYCHOLOGY

UNIT I.

Introduction: Schools of Psychology: Structuralism, Functionalism, Psychoanalysis, Behaviorism, and Gestalt, Methods of Psychology: Introspection, Observation, Case Study, Interview, Survey and Experimental Method, Contemporary Approaches to Psychology - Cognitive Approach, Humanistic Approach and Existential Approach, Goals and Fields of Psychology (Pure and Applied).

Biological Basis of Behavior:Nervous System - The Structure of Neuron, Central Nervous, Autonomic Nervous System, and Hormonal Basis of Behavior - The Major Endocrine Glands and their Functions, Influence of Heredity and Environment on Behavior.

Sensation: Sensory Thresholds; Characteristics of Sensation; Types of Sensation; Measurement of sensations(Absolute Threshold, Signal detection theory, Difference Threshold, Sensory Adaptation), Attention - Nature and concept of Attention, Different Aspects of Attention – Span, Division, Distraction and Fluctuation, Voluntary and Involuntary Attention, Determinants of Attention – Internal and External Factors.

Perception:Principles of Perceptual Organization, Perceptual Constancies and Depth Perception - Monocular and Binocular Cues, Movement Perception, Internal and External factors influencing Perceptual Experience, Distortions in Perception: Illusions & Hallucinations.

Learning:Concept of Learning Curve, Theories of learning- Classical and Instrumental Conditioning, Sign learning, Learning by Insight and Observation, Role of Motivation, Reward and Punishment in Learning, Transfer of Learning, Efficient Methods of Learning.

UNIT II.

Memory: Meaning and Significance of Memory, Types of Memory, Methods of Measuring Memory, Information Processing Model of Memory, **Forgetting:** Curve of Forgetting, Theories of Forgetting: Decay theory and Interference Theory, Methods of Improving Memory,

Thinking: Nature and types of thinking, Theories – Bruner & Sullivan, Reasoning – Deductive Reasoning (Conditional, Syllogistic) and Inductive Reasoning (Causal Inferences, Categorical Inferences); aids and obstacles toreasoning, **Problem Solving** – Problem cycle, types of problem solving, Impediments to Problem Solving, Problem solving strategies – algorithm, heuristics and biases, Means-End Analysis, Computer simulation, **Creativity -** Characteristics of Creative People; Stages of Creative Thinking.

Emotion and Motivation: Definition and Nature of Emotions, Development of Emotions, Theories of Emotion – James-Lange, Cannon-Bard and Schachter-Singer, Concept, Theories of motivation.

Intelligence: Brief history of Testing Movement – contribution of Binet, Theories of Intelligence – Thorndike, Spearman, Thurstone, Sternberg, and Gardener, Measurement of Intelligence- Concept of IQ, Types of Intelligence Tests, Individual differences in Intelligence (Heredity and Environment)

Personality: Concept of Personality, Personality Assessment - Interviews, Projective tests, Behavioural Assessment, and Personality Inventories, Theoretical approaches to personality **-** Type Theories, Trait theories and Type cumTrait Theories; Psychoanalytic Approach; Humanistic Approach; Cognitive Behavioural Approach, Big Five Factor Theory.

UNIT III.

Statistics in Psychology: Measures of Central Tendency and Dispersion; Characteristics of a Distribution- Skewness and Kurtosis; Meaning of Probability; Normal Distribution-Characteristics and Applications; Methods of Sampling-Probabilistic

and Non Probabilistic sampling; Sampling Distribution; Sampling error and non-sampling error; Hypothesis-meaning and types; Type I and Type II errors; Procedure for testing of Hypothesis; Test of Significance (large sample andsmall sample) - for single mean and differences of mean; Test of Significance for singleproportion and differences of proportion. Analysis of variance (ANOVA) one way ANOVAand two way ANOVA; Linear Correlation – Product moment and Rank correlation. Specialcorrelations – Bi-serial Correlation, and Point Bi-serial correlation; Partial correlation andMultiple correlation. Simple Regression and Multiple regression. Interpretation ofregression coefficients. Non Parametric Statistics – Chi Square test, Sign test, and Median test. Analysis of Covariance.

UNIT IV.

Social Psychology: Nature and scope of Social Psychology, levels of social behaviour, mechanisms of social andinteraction. Brief introduction to concepts and application of S-R theory, field theory and roletheory.Social perception, theories of attribution social attitudes, their formation anddevelopment.Theories of attitude changes. Prejudice and methods of reducing prejudice.Types of group processes - cohesiveness conformities dynamic, Prosocial behaviour,Leadership, leadership styles and effectiveness. Decision making.Emotionalintelligence and interpersonal relations.Applications of Social Psychology – Ruraldevelopment - human factors in rural development attitudinal basis of rural developmentfactors in acceptance of innovative practices.Social Psychological basis of education. Socialfactors in academic achievement, Cognitive functioning and intelligence Psychological basisof poverty and Deprivation, studies of Disadvantaged groups, method of alleviating poverty,Educational problems of students from Disadvantaged sectors. Environmental Psychology-Concepts and issues of attitudes, awareness and information of environmental pollution.Steps in protecting environment and reducing less pollution.

UNIT V.

Experimental Psychology: Different concepts used in Experimental Psychology(including variables & operationaldefinitions); Psychophysical methods, Lab Report writing as per APA Guidelines(including Citations); Introduction toother Guidelines and style Manuals; Techniques of Experimental Control; Application of Research Designs and interpretation of research problems/studies .

UNIT VI.

Experimental Design: Meaning of Experiment, and Experimental Design; Advantages and disadvantages of experimental designs, Types of Experimental design: Completely randomized design, Randomized Block design, Factorial design, Latin square design; Internal validity andexternal validity of experimental designs, factors that influence the internal validity andexternal validity of experimental designs; Meaning of confounding, Types of confounding,Methods of controlling extraneous variables in Experimental design. Concomitant Variation;Single case experimental designs; Ex-post-facto research designs; Non experimentaldesigns; Advantages and Disadvantages of Experimental designs over Non Experimentaldesigns; Types of Non experimental designs – Quasi experimental designs, Co relationaldesigns, Contrast designs, and Case study designs.

UNIT VII.

Abnormal Psychology: Adjustment and Maladjustment **-** Concept of Adjustment and Maladjustment**,** Causes of Maladjustment; Conflicts – Types; Stress – Nature; Types of Stress, Sources of Stress; Immune System & Stress; Personality & Stress; Coping with Stress – Types of Coping**;** Extreme Maladjustment- Dimensions; Classification – DSM V and ICD 10**;** Anxiety related**-** Post Traumatic Stress Disorder, Phobias and panic disorder, Generalized Anxiety Disorder, Obsessive Compulsive Disorder, Somatic symptom Disorder, Conversion Disorders, Dissociative Amnesia, Dissociative Identity Disorder, Mood **Disorders -** Depression – Characteristics and Symptoms, Bipolar Disorder **-** Characteristics and Symptoms, Schizophrenia – Symptoms**-** Positive, Negative and Cognitive Deficits; Types

UNIT VIII.

Approaches and Treatment: Biological Approaches – Brain Dysfunction, Biochemical Imbalances, Genetic Abnormalities, Drug Therapies, ECT& Brain stimulation techniques, Psychosurgery.Psychological Approaches – Psychodynamic, Behavioural, Cognitive, Humanistic, Family Systems Approach, Sociocultural Approaches – Cross cultural issues; Culturally specific therapies, Prevention Programs; Common elements in Effective treatments, Suicide – Type of attempts, gender differences, Risk factors-Mental disorders, Negative life events, Suicide contagion, Personality and Cognitive factors, Biological factors, Prevention.

UNIT IX.

Child Psychology: Principles of Development, Hereditary and Environmental Influences on Development, Aspects of Prenatal and Post-natal Development – Milestones of Development, Hazards of Development and Developmental Delays, Physical Development.Cognitive development: perspectives of Piaget and Vygotsky, Language development, Information Processing; Intelligence, Emotional development, Moral development – Kohlberg's Theory, Personality development – Overview of Freud and Erikson, Emergence of self and development of self-concept and self-esteem; Development of Gender Roles.

UNIT X.

Adolescent Psychology:

Importance of adolescent psychology, Characteristics and principles of adolescence development, Havinghurst – developmental tasks of adolescence, Puberty - Growth Spurt, Sexual maturation, Psychological effects of pubertal development-concerns about body image. Challenges to early and late development.Changes in the adolescent brain. Sleep patterns in adolescence.Adolescent health – importance of nutrition and exercise. Adolescent sexuality – sexual orientation, sexual morality, sexual behaviour, need for adequate sex education.

Cognitive development – Piaget's formal operational stage. Changes in reasoning, thinking and decision making. Metacognition – aid to self regulatory learning. Development of identity –Erikson's stage of identity vs role confusion, Marcia's ego identity statuses, Rosenberg's model of identity, Importance of self concept and self esteem in adolescence, factors affecting self-concept. Sex role identity.Moral development – Kohlberg's post conventional morality.Peers – functions, peer pressure; friends – stability of friendship. **Issues, Challenges, & Problems -** Risk Behaviours: STDs; Teenage Pregnancy, Addiction to Technology, Substance abuse; Juvenile delinquency; Violence and rape; Poverty and low educational attainment; Adolescent stress- external and internal stressors, Obesity and eating disorders.

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21. Paper: BIOTECHNOLOGY

I. CELL BIOLOGY: Diversity of cell size and shape. Cell theory, microscopic techniques for study of cells. Sub-cellular fractionation and criteria of functional integrity. Cellular organelles-Plasma membrane, cell wall, Mitochondria, Chloroplast, Nucleus and other organelles and their organization, structure and functions. Cell motility-cilla, flagella of eukaryotes. Transport of nutrients, ions and macromolecules across membranes. Liposomes, drug delivery systems, cellular energy transactions-role of mitochondria and chloroplast. Molecular assemblies like membranes; structure and functional aspects. Ribosome's, extra cellular matrix. Cell cycle – Overview of eukaryotic cell cycle, regulation of cell cycle by cell growth and extra cellular signals. Cell cycle check points. Regulators of cell cycle progression – MPF, cyclins and cyclin-dependent kinases. Cell death and proliferation – Apoptosis: definition, differences between apoptosis and necrosis and mechanism. Cancer: Types and Classification, Development and Properties of Cancer cells. Somatic mutations in cancer cells. Mechanisms of biotic (bacterial, fungal, insect) and abiotic (salt, drought and temperature) stress in plants. Signal transduction: types of receptors, second messengers (calcium, phoshoinositides, MAP kinase pathway, and Nitric oxide). Meiosis, Gametogenesis, fertilization and Development of chick embryo.

II. BIOMOLECULES AND ANALYTICAL TECHNIQUES: - Chemical foundations of Biology water, pH, pK, acids, bases, buffers, weak bonds, covalent bonds. Principles of thermodynamics. Classification, structure and functions of carbohydrates, amino acids, proteins, nucleic acids and lipids. Chromatography Methods; partition, ion exchange, and affinity methods, criteria for purity, proteins and nucleic acids sequencing methods, Hormones, vitamins and minerals.

Analytical techniques: Principle, instrumentation and applications of VIS/UV, IR, NMR, LASER Raman Spectroscopy MASS Spectroscopy, Fluorescence Spectroscopy, Differential colorimetry, X-ray Crystallography, Ultra centrifugation, Electron Cryomicroscopy and Scanning Tunneling microscopy. Methods of cell study; confocal microscopy, Flowcytometry and FACS (fluorescence activated cell sorter) and atomic force microscopy. Radiochemical methods; Stable and radioactive isotopes, measurement of radioactivity by Liquid scintillation counting, Radio immune assay, GM counters and autoradiography, ELISA. Specific activity and precursor-product relationship. Tracer studies and Effect of radiation on cells.

III.MOLECULAR BIOLOGY: - DNA Structure, replication, repair and recombination, Transcripition, regulation and post transcriptional modifications in Prokaryotic and Eukaryotic genomes. Transcriptional and post-transcriptional gene

silencing. Translation and regulation in Prokaryotes and eukaryotes, co-translation and post-translational modifications of proteins. Protein Localization-Synthesis of secretory and membrane proteins, import into nucleus, mitochondria, chloroplast and peroxisomes, Biology of Cancer-Oncogenes and Tumour Suppressor genes, Structure, function and mechanism of action of pRB and p53 tumor suppressor proteins.

Antisense oligonucelotides, molecular targets of drug action and Ribozyme Technology. Homologous Recombination-Holliday model gene targeting, gene disruption, FLP/FRT and Cre/Lox recombination RecA and other recombinases. Molecular Mapping of Genome, Genes, mutation and mutagenesis, site directed mutagenesis and Human genome project, Transposons

IV.BIOSTATISTICS: - Frequency distribution, Distribution of data bionomial, poission and normal. Measures of central tendency-mean, median, mode and standard deviation-probability distribution-regression-correlation- Analysis of variance-tests of significance- T-test, F-test, Chi-square test.

BIOINFORMATICS-:-Biological databases, ORF finding, EST analysis, gene identification, microsatellite repeat patterns, BLAST, FASTA, Mutation matrix, global Vs local alignments, Dot plots, PAM and BLOSUM matrices, Multiple sequence modeling, alignments dendrograms, phylograms, protein structure prediction methods, molecular modeling, Primer design, QSAR, Drug designing.

V. MICROBIOLOGY: - Discovery of the microbial world; Distinguishing features of prokaryotic and eukaryotic genomes; general role of microorganisms in transformation of organic matter and in the causation of diseases; Microbial taxonomy; Classification, Nomenclature and new approaches to microbial taxonomy; Pure culture techniques; sterilization methods; Principles of microbial nutrition and composition of culture media; culture enrichment techniques; Growth and its mathematical expression; synchronized cultures, Culture collection and maintenance of cultures; Purple and green bacteria Ricketsias; Chlamydia and Mycoplasma. Archea; Viruses: structure and replication of viruses; DNA viruses and RNA viruses; Viroids and Prions; Viruse and their Genetic System; Bacteriophages; RNA phages; Retroviruses, Biomass and Bioenergy, Biofuels from microbes, biofertilizers and biopesticides.

VI. GENETICS

Mendel's principles, applications of Mendel's principles, Chromosome Theory of Heredity (Sutton-Boveri), Inheritance patterns, phenomenon of Dominance, Inheritance patterns in Human (Sex-linked, Autosomal, Mitochondrial, Unifactorial, Multi-factorial). . Linkage & Crossing over - Chromosome theory of Linkage, kinds of linkage, linkage groups, types of Crossing over, mechanism of Meiotic Crossing over, kinds of Crossing over, theories about the mechanism of Crossing over, cytological detection of Crossing over, significance of Crossing over. Allelic

Variation & Gene function – Multiple allele, Genetic interaction, Epiststic interactions, Non-Epistatic inter-allelic genetic interactions, Atavism/Reversion, Penetrance (complete & incomplete), Expressivity, Pleiotropism, Non-Mendelian inheritance – Evidences for Cytoplasmic factors, cytoplasmic inheritance, Epigenetics, extranuclear inheritance (mitochondrial, chloroplast), non-chromosomal inheritance, maternal inheritance, uniparental inheritance.

VII. IMMUNOLOGY:- Phylogeny of immune System; Innate and acquired immunity; Hematopoietic and differentiation, cells and organs of the immune system; Lymphocyte trafficking; Antigencity and super antigens; Immunoglobulin types, structure and function, Antigen-antibody interactions; Blood groups, Cell migration and Homing, Immunoglobulin and gene organization. Major histocompatibility complex, BCR and TCR and generation of diversity; Complement system, Antigen processing and presentation, generation of humeral and cell mediated immune responses; Activation of B-and T- lymphocytes, Cytokines and their role in immune regulation; Cell mediated cytotoxic, Hypersensitivity, Autoimmunity, Transplantation, Tumor Immunology, AIDS and other Immunodeficiency; Hybridoma Technology, Psychoneuro-immunology,
Single chain antibodies, theories of antibody diversity, Vaccines – Concept of immunization, routes of vaccination. Types of vaccines – Whole organism (attenuated and inactivated) and component vaccines (synthetic peptides, DNA vaccines, recombinant vaccines, subunit vaccines, conjugate vaccines. Vaccine delivery systems.

VIII.BIOPROCESS ENGINEERING:- Fermentation-types of fermentors and bioreactor design, cell concentration and stirring. Filtration, methods of cell disruption. Downstream processing, industrial applications of bioprocess. Synchronized and continuous culturing. Industrial production of glutamic acid, citric acid, ethanol, penicillin , lactic acid, α-amylase, protease,tetracycline, vitamin B12 and riboflavin. Purification and crystallization of products.

ENZYME TECHNOLOGY:- Discovery classifications and nomenclature of enzymes. Techniques of enzymes isolation and assay, Intracellular localization of enzymes, Isoenzymes, Multienzyme complexes and multifunctional enzymes Physico-chemical characterization of enzymes, Enzymes kinetics, kinetics of enzymes of inhibition. Allosterism, Enzyme memory, Various techniques used for the immobilization of enzymes and their applications in Biotechnology. Purification of enzymes and their applications, Single cell proteins. Industrial application of enzyme, applications in biosensors.

IX. ENVIRONMENTAL BIOTECHNOLOGY:- Ecological balance, resiliency of ecosystem and sustainable development, environmental pollution and global problems, water, air, soil pollution and their impacts on environment. Biotechnological approaches for management of pollution, waste water treatment:

aerobic and anaerobic processes, bioremediation of contaminated soils and waste land, biotechnological treatment for industrial effluents and solid wastes. GEMS (Genetically Engineered micro organisms) for bioremediation.

X. GENETIC ENGINEERING:- Discovery, properties and application of Restriction enzymes, Cloning and expression vectors, Purification of plasmids, genomic DNA and mRNA. Genomic and cDNA Library construction and screening of recombinants by hybridization methods, Reporter assays, protein engineering-site directed mutagenesis, adding disulfide bonds – changing asparagines to other amino acids modification of metal cofactor requirements. Increasing of specific activity Stability to thermal and salinity conditions, Phage Display library and yeast two hybrid system. Gene transfer methods, gene tagging, Role of gene tagging analysis; Gene Therapy, Gene silencing methods (RNA interference), Biochips and functional genomics.

XI. PLANT BIOTECHNOLOGY:- Selection of explants, micropropagation techniques in plant tissue culture suspension culture, single cell. Anther, pollen and ovary culture for production of haploid plants. Cryopreservation for germplasm conservation. Plant Transformation technology, Transgene stability and gene silencing. Application of plant Transformation for productivity and performance. Metabolic Engineering and Industrial products: Plant secondary metabolites, industrial enzymes, biodegradable plastics, therapeutic proteins, antibodies, edible vaccines. Molecular marker assisted selection and Breeding: RFLP maps, SSR markers, STS, microsatellites, SCAR (sequence characterized amplified regions), SSCP (single stand conformational polymorphism), AFLP, GM Crops

XII. ANIMAL BIOTECHNOLOGY: - Animal cell culture technology, simple and complex growth media, cell culture techniques, primary and established cell lines. Biology and characterization of the cultured cells, measuring growth parameters, maintenance of cell culture, Measurement of viability and cytotoxicity, cell separation. Scaling–up of animal cell culture. Cell synchronization. Cell cloning and micromanipulation. Cell transformation. Stem cell cultures, embryonic stem cells and their applications. Cell culture based vaccines. Organ and histotypic cultures. Apoptosis, measurement of cell death. Biodegradation of Toxicants, Diagnostic aids, organ perfusion studies,Embryo transfer, stem cell biology, GM animals.

Principles and preparation of DNA and RNA probes and their applications: Study and expression of cloned genes in prokaryotes and eukaryotic systems. Microbial production of interferon, human growth hormone, insulin in *E.coli*. Genetic Engineering – Social, ethical and moral implications, national and international guidelines/regulations. Biotechnology patents and safeguarding human and animal health.

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22. Paper: SOCIOLOGY

Part I: Sociological Concepts

- Nature and Scope of Sociology, Sociological Perspectives
- Human Society, Individual and Society, Social Group, Community, Association
- Social Structure,Status and Role, Norms,Culture, Socializationand its agencies and theories, Social Institutions, Social Control
- Social Process: Associative and DissociativeSocial Process
- Inequality, Social Differentiation, Social Stratification and its theories and dimensions, Social Mobility
- Social Change: Factors and Theories of Social Change, Evolution, Development, Progress

Part II: Sociological Thought and Theory

- Sociological Thought: Nature, Development and Social Context
  Contributions of Auguste Comte, Karl Marx, Herbert Spencer, Emile Durkheim, Max Weber and Vilfredo Pareto
- Sociological theory: Nature and types- Paradigms in Sociology
- Structural Functionalism: Radcliffe Brown, Bonislaw Malinowski, Talcott Parsons and Robert K Merton
- Neo Functionalism: Jeffrey Alexander
- Structuration and Post Modernism: Anthony Giddens, Jacques Derrida and Michel Foucault
- Conflict and Neo Marxism: Karl Marx, Georg Simmel, Lewis Coser, Ralf Dahrendorf, Randal Collins, Jürgen Hebermas, Louis Althuser
- Interactionist Perspective:
  - Symbolic Interactionism: George Hebert Mead, Charles Horton Cooley, Herbert Blumer
  - Phenomenology: Alfred Shultz, Peter Berger, Niklas Luhmann
  - Ethnomethodology: Harold Garfinkel, Erving Goffman
  - Exchange Theory: George Homans, Peter Blau

Part III: Indian Society

- Composition of Indian Society: Cultural, Religious, Regional and Linguistic Diversity, Unity in Diversity
- Foundations of Indian Society: Hindu View of Life, Purusharthas, Varna Dharma and Ashram Dharma
- Marriage and Family in India: Types and Forms of Hindu Marriage, Hindu Marriage as a Sacrament, Marriage Legislation, Marriage among Muslims and Christians, Types of family, Family in rural and urban setting, Changing trends in marriage and family
- Caste, Religion, Economy and Polity: Varna, Jati and Caste- Theories, Features and Functions of Caste system, Cultural and Structural view of Caste System, Social mobility in Caste System, Changing Trends and Future of Caste System, Religion and Ritual System, Socio-Religious Movements, Jajmani System, Land Reforms, Leadership and Polity
- Social change in contemporary India: Sanskritization, Westernization, Modernization and Secularization, Great and Little Tradition, Tradition and Modernity
- Development: Economic development, Human Development, Social Development, Sustainable Development, Nation Building

- Indian experience of development- Five Year Plans- Social consequence of Economic Development- Socio cultural repercussions of Globalization- Social Tensions and Social Resilience
- Contemporary Issues and Debates
  Population Explosion, Poverty, Slums, Displacement, Ecological Degradation, Environmental Pollution, Health Problems and Health Care Delivery, Familial Problems: Gender Inequality, Domestic Violence, Dowry, Divorce and Inter-Generational problems, Crime and Delinquency, White Collar Crime, Corruption, Drug Addiction, Youth Unrest, Suicides, Issues of Migration

Part IV Research Methodology

A. Nature of Social Phenomenon, Scientific Method, Applicability of Scientific Method to Social Phenomenon, Objectivity and Subjectivity, Reliability and Validity, Theory, Fact and Hypothesis
B. Selection of Research Problem, Social Survey, Research Design and its types, Field work, Pre-test, Sample and is types
C. Techniques and Methods data Collection: Observation, Questionnaire, Schedule, Interview, Participant Observation, Case Study, Content Analysis, Life History, Historical Method
D. Techniques of Data Analysis, Classification and Tabulation, Diagrammatic and Graphic Presentation
E. Statistics in Social Research: Measures of Central Tendency, Measures of Dispersion, Correlation Analysis, Measures of Association and Test of Significance
F. Research Report

Part –V: Rural Sociology

- **Approaches to the study of Rural Society:**
  Rural –Urban differences
  Rurbanism
  Peasant studies
- **Agrarian Institutions:**

  Land ownership and its types
  Agrarian relations and Mode of production debate
  Jajmani system and Jajmani relations
  Agrarian class structure
- **Panchayati Raj System:**
  Panchayat before and after 73rd Amendment
  Rural Leadership and Factionalism
  Empowerment of people
- **Social Issues and Strategies for Rural Development:**

  Bonded and Migrant Labourers
  Pauperization and Depeasantisation
  Agrarian unrest and Peasant movements
- **Rural Development and Change:**

  Trends of Changes in rural society
  Process of change: Migration – Rural to Urban and Rural to Rural
  Mobility: Social / Economic
  Factors of change

Part-VI: Industry and Society

- Industrial Society in the Classical Sociological Tradition:
  Division of Labour
  Bureaucracy
  Rationality
  Production relations
  Surplus value
  Alienation
- **Industry and Society:**

Factory as a social System
Formal and informal organization
Impact of Social structure on industry
Impact of industry on society

- **Industrial Relations:**
  Changing profile of labour
  Changing labour-management relations
  Conciliation, adjudication, arbitration
  Collective bargaining
  Trade unions
  Workers' participation in management (Joint management Councils)
  Quality circles
- **Industrialization and Social change in India:**
  Impact of industrialization on family, education and stratification
  Class and class conflict in industrial society
  Obstacles to and limitations of industrialization
- **Industrial Planning:**

  Industrial Policy
  Labour legislation
  Human relations in industry

Part-VII: Sociology of Development

- **Conceptual Perspectives on Development:**
  Economic growth
  Human development
  Social development
  Sustainable development
- **Theories of Underdevelopment:**
  Liberal: Max Weber, Gunnar Myrdal
  Dependency: Centre-perphery (Frank), Uneven development (Samir Amin), World-System theory (Wallerstein)
- **Paths of Development:**
  Modernization, Globalisation
  Socialist
  Mixed
  Gandhian
- **Social Structure and Development:**
  Social Structure as a facilitator/ inhibitor
  Development and socio-economic disparities
  Gender and development
- **Culture and Development:**
  Culture as an aid / impediment
  Development and displacement of tradition
  Development and upsurge of ethnic movements

Part-VIII: Population and Society

- **Theories of Population Growth:**
  Malthusian
  Demographic transition
- **Population Growth and Distribution in India**:
  Growth of Indian population since 1901
  Determinants of population
- **Concepts of Fertility, Mortality, Morbidity and Migration:**
  Age and Sex composition and its consequences
  Determinants of fertility
  Determinants of mortality, infant, child and maternal mortality
  Morbidity rates
  Determinants and consequences of migration
- **Population and Development:**

  Population as a constraint on and a resource for development
  Socio-cultural factors affecting population growth

- **Population Control:**
  Population policy: Problems and perspectives
  Population education
  Measures taken for population control.

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23. Paper: Communication and Journalism

(Syllabus for the Post of **Journalism)**

Unit-I Communication concepts, models and theories

Communication concepts, theories (-effects, attitude, critical, cultivation, Marxist, normative, agenda setting, framing, diffusion of innovations, uses and gratifications, etc). Communication models .Semeiotics.

Unit-II History of Media

Historical understanding of media in the world. Origin growth and present status of press, film, radio, television and new media in India.Origin, growth and present status of media in Telangana. Contribution of prominent social reformers, freedom fighters and journalists to growth of press in India. Reports of various committees and commissions on communication/media related issues and their impact.

Unit-III Reporting

Journalism- basic concepts and terms. Concept of news. editing techniques and practices, Typography, principles of design, headlines, photo editing,basics of photo journalism, printing processes, trends in newspapers and magazines, readership surveys, ownership patterns, media and various social, political and cultural movements. Reporting: Agriculture, poverty, health, environment, science & technology, defence, industry.

Unit-IV International Communication:

History of international communication. NWICO debate. MacBride Commission Report. International Communication in the context of globalization and cultural imperialism. International Communication Organizations, intercultural communication.

Unit-V Broadcasting systems

Public service broadcasting, growth of private TV and radio channels, trends, policy issues, regulatory mechanisms, globalization, cultural issues, development issues, and gender issues, ethical and political issues. Broadcasting vs. Narrowcasting, News Broadcasters Association.

Unit-VI Communication Research

Types of research, steps in research process, Communication research methodology-proposal writing, content analysis, semeiotics, survey, sampling techniques, qualitative methods, case study, experimental research, ratings research; formative, process and summative research, statistical analysis including various tests and report writing. Online research. Research in different areas of communication-print, broadcasting, advertising, PR, and ICTs

Unit-VII Development Communication

Trends in development communication, experiences and case studies at national and international level, Theories and models of development communication, human development, development indices, sustainable development, traditional folk media, community radio, role of NGOs in development and health communication.

Unit-VIII New Media Technologies.

New media technologies and their impact on various fields in society, digital divide, blogging, podcast, online journalism, pornography and cyber law.

Unit-IX Advertising

Advertizing industry in India and world, marketing research; social, economic and cultural impact of advertising on Indians society and Internet advertising.

Unit X Public Relation

Changing trends in public relations, process and models of public relations, experiences and case studies of corporate communications. Corporate communication-principles, practices and trends. Organizational communication, case studies.

Unit-XI Film Theory and Criticism

Origin and growth of film medium. Brief history of Indian cinema.Film theories and criticism, social, political, cultural and gender issues in Indian films. Film genres and trends; and prominent film personalities and their contribution.

Unit-XII Media Law and Ethics

Various provisions relating to media in Indian Constitution. Acts, Ordinances and IPC sections relating to media, Right to Information Act, Press Council and ethics of journalism.

Unit-XIII Radio Production

Radio production: Programmes for various audiences, Different Programme formats, creating audio space, sound perspective, voice casting, types of music, use of sound effects. Production crew and their functions: Role of producer. Production planning and execution. Radio studio, acoustics, recording equipment, types and use of microphones, Use of Digital Technology in production.

Unit-XIV Television Production

Television technology: broadcasting standards, TV Studio lay out, Production equipment- TV production-studio and field production, TV staff and crew, their functions. Programmme formats, Proposal writing, Script writing.TV Production process.TV language and grammar. Classification of shots.Television news production, Editing: Linear and Non-linear, voice over, dubbing, mixing and final mastering.

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24. Paper: BUSINESS ADMINISTRATION

UNIT – 1: MANAGEMENT: Meaning –Role & Importance – Functions of Management – Planning & Types of Plans – Decision Making – Organizing – Formal and Informal Organization Structure - Span of Management - Delegation of Authority - Centralization and Decentralization – Communication – Process, Channels & Barriers - Leadership – Styles & Theories – Coordination – Controlling.

UNIT – 2: ORGANIZATIONAL BEHAVIOUR (OB): Concept & Significance – OB Models – Understanding and Managing Individual Behaviour – Perception – Values – Attitudes - Learning - Understanding and Managing Group Behaviour – Interpersonal Relations - Group Dynamics & Team Building - Organization Culture – Concept & Determinants – Managing Change – Conflict Management –Stress Management.

UNIT – 3: MANAGERIAL ECONOMICS: Fundamental Concepts – Law of Demand - Demand Analysis – Demand Forecasting – Production Function – Cost Function - Market Structure and Pricing – Perfect Market, Imperfect Market, Monopoly & Oligopoly - Pricing Policies and Methods – Profit Concepts & Measurement – Break Even Point.

UNIT – 4: BUSINESS ENVIRONMENT: Meaning – Constituents of Internal & External Environment – Liberalization – Privatization –Globalization – Foreign Trade and EXIM Policy – Foreign Capital & Collaborations – Monetary & Fiscal Policies – Free Trade Vs Protectionism – Cartelization – WTO.

UNIT – 5: HUMAN RESOURCE MANAGEMENT: Meaning – HRM Vs HRD – Human Resource Planning – Job Analysis – Job Description – Recruitment and Selection – Induction – Training and Development – Job Evaluation – Concept & Methods – Performance Appraisal – Meaning & Methods – Motivation – Concept, Theories, & Techniques – Compensation Management.

UNIT – 6: STRATEGIC MANAGEMENT: Meaning & Importance – Mc Kinsey 7S Framework – Corporate Governance - Strategy Analysis & Strategy Formulation – Business Portfolio Analysis - Strategic Control & Evaluation – Strategic Alliances.

UNIT – 7: MARKETING MANAGEMENT: Concepts of Market & Marketing – Marketing Environment - Marketing Mix – Consumer Behaviour – Determinants & Models – Market Segmentation – Targeting & Positioning - Branding – Product Life Cycle – Promotion Mix – Services Marketing –Marketing Research –New Trends in Marketing.

UNIT – 8: PRODUCTION MANAGEMENT: Role & Scope of Production Management – Product Selection – Process Selection – Facilities Location – Lay out Planning – Work and Job Design – Operation Planning and Control – Mass Production – Batch Production and Job Shop Production – Planning and Control Process – Network Analysis – PERT & CPM - Value Engineering – Business Process Re-engineering - Quality Assurance – Supply Chain Management-Concept.

UNIT – 9: QUANTITATIVE TECHNIQUES: Relevance of QT in Decision-Making – Research Process - Central Tendency – Dispersion – Data Collection (including Sampling Methods) - Probability Distributions – Concepts; Discrete Probability Distributions; & Continuous Probability Distributions –– Test of Hypothesis – Chi-square Test & ANOVA – Business Forecasting Methods – Correlation, Regression, & Time Series Analysis – Report Writing.

UNIT – 10: OPERATIONS RESEARCH: Meaning – Importance – Role – Linear Programming – Minimization and Maximization Methods – Graphic Method – Transportation and Assignment Problems – Goal Programming – Dynamic Programming – Inventory Control Models – Queuing Models – Decision Theory – Game Theory – Simulation.

UNIT – 11: FINANCIAL, COST & MANAGEMENT ACCOUNTING: Accounting Concepts – Principles – Conventions - Accounting Standards – Indian Accounting Standards (IND AS)– Cost Accounting – Classification of Cost – Cost Sheet – Standard Costing – Process Costing – Job & Batch Costing - Preparation and Analysis of Financial Statements – Inflation Accounting – Cost-Volume-Profit Analysis.

UNIT – 12: FINANCIAL MANAGEMENT: Meaning & Importance – Objectives – Sources of Finance – Investment Decisions - Financing Decisions - Dividend Decisions – Ratio Analysis - Working Capital Management – Cash Management - Receivables Management - Inventory Management.

UNIT – 13: INFORMATION TECHNOLOGY FOR MANAGERS: Hardware & Software – Operating Systems – Functions & Types - DBMS – Network Topologies – Types of Networks – Management Information System – SDLC – Data Analytics.

Main Examination Syllabus for the post of Degree Lecturers in Residential Educational Institution Societies

25. Paper: PUBLIC ADMINISTRATION

1. Public Administration – Genesis and growth, meaning, nature, scope and significance; Public and Private Administration; New Public Administration- Minnowbrook I, II & III.

2. Theories of Public Administration – Oriental, Classical, Scientific Management, Bureaucratic, Human Relations, Behavioural, Socio-Psychological, Ecological, New Public Management, New Public Service and Social Justice Approach.

3. Principles of Administration – Hierarchy, Span of Control, Unity Of Command, Delegation, Decentralization, Coordination, Line and Staff, Supervision, Communication, Public Relations.

4. Comparative Public Administration – Nature, Scope and Evolution, Comparative study of the Administration of UK, USA, and India. Development Administration - Nature, Scope, Elements, Models, Changing Dynamics of Development Administration in India, Millennium and Sustainable Development Goals.

5. Union Government and Administration in India – Evolution- Mauryan, Gupta, Moghul, British period; President, Prime Minister, Council of Ministers, Prime Minister's Office, Central Secretariat, Cabinet Secretariat, Election Commission, Finance Commission, Comptroller and Auditor General.

6. State Administration – Governor, Chief Minister, Council of Ministers, Secretariat, Chief Secretary, Departments and Directorates.

7. District Administration – Organisation of District Administration, Role of District Collector in Development, Reorganisation of Districts in Telangana State.

8. Local Government – Meaning, Nature, Scope; 73rd and 74th Constitutional Amendment Acts; Organisation, Powers and functions of Local Government Institutions, Challenges to Local Government Institutions in India, Working of Panchayat Raj Institutions and Urban Local Bodies in Telangana state

9. Personnel Administration – Objectives of personnel administration, classification of services, recruitment, Union Public Service Commission and Telangana State Public Service Commission - Training, Promotion, Discipline, Morale; Staff Associations, Employer - Employee relations

10. Financial Administration - Budget, Principles of Budget, Forms of Budget, Preparation and Execution of Budget, Finance Ministry, Parliamentary Committes- Public Accounts Committee, Estimates Committee.

11. Control over Administration - Legislative, Executive, Judicial control and Citizen control; Good Governance - Transparency and Accountability in Administration – Right to Information Act, Citizen Charter; Public Grievances and Redressal machinery in India – Central Vigilance commission, Central Bureau of Investigation, Lokpal, Lokayukta, Anti-Corruption Bureau and Consumer Protection Mechanism; Administrative Reforms.

12. Welfare Administration- Centre and State Social Welfare institutions and Constitutional bodies; Social Welfare National, State policies and programmes – SC, ST, OBC, Minorities, Women, Child, Differently abled and Old age.

13. Public Policy - Introduction to Public Policy, Theories- Systems, Structural-Functional, Incremental, Elite, Group Theory; Public Policy Making: Role of Legislature, Executive, Judiciary, Bureaucracy, Political Parties, Pressure

Groups, Mass Media; Policy Impact and Policy Evaluation- Land Reforms, Irrigation, Education, Health, Food Security and Social Security Policies.

14. Research Methodology - Social Science Research - Importance and Objectivity in Social Science Research; Research Methods – Historical, Analytical, Descriptive, Exploratory, Case Study Method; Research Design; Data Collection - Primary and Secondary Sources; Data Analysis, Interpretation and Report Writing.

15. Emerging Trends in Public Administration – Values and Integrity in Public Administration, Citizen driven administration, Public-Private Partnership, Disaster Management.

Main Examination Syllabus for the post of Degree Lecturers in Residential Educational Institution Societies

26. Paper: FOOD SCIENCE

I. Food Chemistry:

Food chemistry: Carbohydrates -Structure and functional properties of mono, oligo and polysaccharides including starch, cellulose, pectic substances, gums and dietary fibre; Proteins – Classification and structure of proteins in food. Lipids-Classification and structure of lipids, Rancidity of fats. Pigments-Carotenoids, chlorophylls, flavanoids anthocyanins, tannins , haemoglobin and myoglobin. Enzymes- classification and applications Enzymatic and non-enzymatic browning in different foods.

II. Food Bio chemistry and Nutrition:

Digestion and absorption of carbohydrates, proteins and fats; metabolism of carbohydrates: glycolysis, TCA cycle, gluconeogenesis, glycogenolysis and glycogenesis.

Lipids: biosynthesis and oxidation of fatty acids; proteins; bio-synthesis, oxidation of amino acids and urea cycle.

Functions of food, Balanced diet, Essential amino acids and essential fatty acids, Water soluble and fat soluble vitamins and minerals: functions and deficiency diseases.

Water, sources, functions and water balance.

III. Food Microbiology:

Characteristics of microorganisms: Morphology, structure and general characteristics of bacteria, yeast, mold and viruses. Microbial growth in food, Intrinsic' and extrinsic factors affecting growth; Death kinetics, rapid methods for detection of micro organisms.

Food spoilage: Microbial spoilage of milk and milk products, meat and meat products, sea foods, poultry, cereals and their products, vegetable and fruits, eggs, canned foods, sugar and sugar products.

Foodborne diseases: infections and intoxications.

IV. Food Biotechnology:

Need and importance, benefits of fermentation, methods of fermentation, control of fermentation. Fermented foods: traditional and modern fermented foods: Buttermilk, yoghurt, cheese, sausages, alcoholic beverage- wine, beer, whisky ; fermented soya products : tofu, natto ,soya sauce; fermented cereal products: ankak, puto; combination of cereal and pulse products: idly , dosa and vada , Fermented vegetables: sauerkraut , cucumber ,olives and dill pickle.

V. Food Technology:

Cereals and millets:
Composition, nutritive value, processing methods and products ; rice, wheat, maize, barley, oats, minor millets: ragi, jowar, sorghum
Legumes: Composition, nutritive value, processing methods and products : Bengal gram, red gram, green gram, black gram, chick peas.
Nuts and oilseeds: Composition, nutritive value, processing methods and products: Ground nut, soya bean, sunflower & other nuts and oil seeds.

Fruits, vegetables and plantation crops: Extraction, clarification concentration and packaging of fruit juice , Production of jam, jelly, marmalade, squash, candies, and pickles, pectin from fruit waste; processing of tea, coffee, chocolate. Processing of essential oils from spices.

Meat, fish, and poultry: Post mortem changes of meat, freezing, aging, pickling, smoking and tenderization of meat, Drying and canning of fish.

Eggs: Structure, composition, nutritive value and functional properties of eggs and its preservation by different methods, quality evaluation of eggs.

Milk and milk products: Milk processing flow sheet, filtration/clarification, storage of milk, standardization, simple problems in standardization, Homogenization, pasteurization- types of pasteurization process. Manufacture of Cream, Butter, Ghee, Milk powder, Cheese.

VI. Food preservation;

Need and importance, principles underlying food preservation, methods and mechanisms of food preservation: drying, dehydration, low temperature, refrigeration ,freezing and freeze drying. Preservation by sugar and salt, pickling, chemical preservation, irradiation, ultra high temperature pasteurization, canning, concentration and evaporation. Non thermal food processing: high pressure, pulse electic field , hurdle technology ,effect of preservation on nutritive value of foods.

Food additives;

Definition, classifications, functions and applications: preservatives, anti oxidants, colors flavors, emulsifying agents, sweeteners, humectants, stabiliser, anti caking agents and antifoaming agents.

Bakery ;

Principles of baking, role of ingredients in baking, types of bakery products; biscuits, cakes , cookies , bread,muffins.

Confectionary: Quality characteristics of confectionery ingredients; Technology for manufacture of Hard Boiled Sweets, candies, chocolate, and special confectionary products; Colour, flavour and texture of confectionary.

Extrusion technology;

Definition, methodology, classification of extruders, merits and demerits, uses of extruders, types of extruded foods.

VII. Food packaging;

Definitions, need, importance, different packaging materials: wood, paper, glass, metal, plastic and tetra packs, forms and structures, caps and closures. Packaging laws, development of packaging materials, testing methods and techniques, modern and innovative packages, retort packaging, CAP and MAP, bio sensors of food packing, food labelling and nutritional labeling: need, importance and claims.

VIII. Food Engineering:

Fluid mechanics: Nature of fluids, flow properties of fluids, flow through pipes & fittings, flow measurement, transportation of fluids – pumps, compressors and blowers.

Heat transfer: Heat transfer by conduction, convection, radiation, boiling and condensation, steady & unsteady state heat transfer.

Other unit operations: size reduction, homogenization, filtration, sedimentation, centrifugation, sieving, mixing, extraction, crystallization, evaporation, drying and extrusion. Types of equipment used in each unit operation, their selection, applications in food industry.

IX. Food Quality & Standards:

Food quality: Food Quality and Quality Attributes-Classification of Quality Attributes and their role in food Quality. Quality Assessment of Food materials – Fruits and Vegetables, Cereals and pulses, dairy products, Meat, Poultry, Egg and Processed food products. Sensory Evaluation of Food Quality and its methods. Food Adulteration and Food Safety.

Standards: FSSAI / Scope; definitions & standards of quality. Codex alimentaris FSMS -22000:2005-Various elements included in the standard, Introduction to the family of ISO 22000 standards, Comparison of ISO 9001:2008 vs. ISO 22000:2005, HACCP-Terminology, Principles, Identification of CCPs, Application of HACCP System and the logic sequence involved.

X. Food product development and marketing;

Need and importance, new food product development, definition, classification, characteristics, factors affecting product development, stages of product development, shelf life testing and sensory evaluation, marketing and sales promotion, intellectual property rights.

XI. Waste disposal and sanitation;

Types of food wastes, biological oxygen demand of different wastes, treatment of food industry wastes, bio utilization of food industry wastes from dairy industry, bakery, fruit processing units, meat and other food production units.

ANNEXURE - IV

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. If any candidate takes away Answer Sheet of OMR based 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.

B) INSTRUCTIONS REGARDING OFFLINE OMR BASED EXAMINATION FOR CANDIDATES

1) The candidates have to report 30 minutes before to the examination venue to record their thumb impression on Biometric system.
2) The candidates should go through the instructions given on the cover page of test booklet and carefully write his/her Register Number, Subject / Subject Code, Booklet Series, Name of the Examination Centre etc., in the Answer Sheet, which will be provided to him/her in the examination hall.
3) Since the answer sheets are to be scanned (valued) with Optical Mark Scanner system, the candidates have to USE BALL POINT PEN (BLUE/BLACK) ONLY FOR MARKING THE ANSWERS. The candidates will be supplied OMR Sheet consists of two copies i.e., the Original Copy (Top Sheet) and Duplicate Copy (Bottom Sheet). The candidate is required to use Ball Point Pen (Blue or Black) for filling the relevant blocks in the OMR Sheet including bubbling the answers. **After writing the examination the candidate has to handover the original OMR sheet (Top Sheet) to the invigilator in the examination hall, if any candidate takes away the original OMR Sheet (Top Sheet) his/her candidature will be rejected. However the candidate is permitted to take away the duplicate (Bottom Sheet) OMR Sheet for his/her record**. The candidates should bring Ball Point Pen (Blue/Black and smooth writing pad) to fill up relevant columns on the Answer Sheet. The candidate must ensure encoding the Register Number, Subject/Subject Code, Booklet Series, Name of the Examination Centre, Signature of the Candidate and Invigilator, etc., on the O.M.R. Answer sheet correctly, failing which the Answer sheet will be rejected and will not be valued. **Use of whitener on OMR Sheet will lead to disqualification.**
4) The OMR Sheet is to bubble only by Ball Point Pen (Blue/Black). Bubbling by Pencil / Ink Pen / Gel Pen is not permitted in this examination.
5) The candidates should satisfy the Invigilator of his identity with reference to the signature and photographs available on the Nominal Rolls and Hall Ticket.
6) No candidate should leave the examination hall till expiry of fulltime.
7) The Commission would be analyzing the responses of a candidate with other appeared candidates to detect patterns of similarity. If it is suspected that the responses have been shared and the scores obtained are not genuine/ valid, the Commission reserves the right to cancel his/ her candidature and to invalidate the Answer Sheet.
8) (i)Wherever Written Examination is held, only those candidates who are totally blind are allowed to write the examination with the help of scribe and 10 minutes extra time is permitted to them per hour.
   (ii) 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.
   (iii) 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.
   (a) 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.

(b) The candidate as well as the scribe will have to give a suitable undertaking confirming the rules applicable

9) If the candidate noticed any discrepancy printed on Hall ticket as to community, date of birth etc., they may immediately bring to the notice of Commission's officials/Chief Superintendent in the examination centre and necessary corrections be made in the Nominal Roll, in the Examination Hall against his/her Hall Ticket Number for being verified by the Commission's Office.

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) Date and Time of the Examination as per Hall-Ticket
3) The examination link with the login screen will already be available on your system. Please inform the invigilator if this is not the case.
4) 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.
5) Invigilator will announce the password at 09.50 AM and 02.20 PM.
6) 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.
7) 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.
7) You have to use the mouse to answer the multiple choice type questions with FOUR alternative answers.
8) To answer any numerical answer type question, you need to use the virtual numeric key pad and the mouse.
9) On the online exam question screen, the timer will display the balance time remaining for the completion of exam.
10) 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.*
11) After answering a question, click the SAVE & NEXT button to save your response and move onto the next question.
12) Click on Mark for Review & NEXT to mark your question for review, and then go to the next question.
13) To clear any answer chosen for a particular question, please click on the CLEAR RESPONSE button.
14) 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.
15) 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.
16) You may view INSTRUCTIONS at any point of time during exam, by clicking on the INSTRUCTIONS button on your screen.
17) The SUBMIT button will be activated after 150 Minutes. It will continue for an additional 50 Minutes for PWD candidate eligible for compensatory time. Please keep checking the timer on your screen.
18) 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.
19) 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.
20) 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.
21) Please inform the invigilator in case of any technical issues.
22) Please do not talk to or disturb other candidates.
23) In case you are carrying articles other than the admit card, photo identity proof and pen, please leave them outside the exam room.
24) You cannot leave exam room before submitting the paper. Please inform the invigilator if you want to use the wash room.

ANNEXURE-V
LIST OF SCHEDULED CASTES AND SCHEDULED TRIBES

(G.O. MS. NO. 5 Scheduled Castes Development (POA.A2) Dept., Dt. 08/08/2015 read with G.O. Ms. No. 11, Scheduled Castes Development (POA.A2) Dept., Dt. 17/09/2014 and G.O. Ms. No. 2 Scheduled Castes Development (POA.A2) Dept., Dt. 22.01.2015)

LIST OF SCHEDULED CASTES

1. Adi Andhra
2. Adi Dravida
3. Anamuk
4. Aray Mala
5. Arundhatiya
6. Arwa Mala
7. Bariki
8. Bavuri
9. Beda (Budga) Jangam
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. Ellamalawar, Yellammalawandlu
22. Ghasi, Haddi, Relli, Chanchandi
23. Godari
24. Gosangi
25. Holeya
26. Holeya Dasari
27. Jaggali
28. Jambuvulu
29. Kolupulvandlu, Pambada, Pambanda, Pambala
30. Madasi Kuruva, Madari Kuruva
31. Madiga
32. Madiga Dasu, Mashteen
33. Mahar
34. Mala, Mala Ayawaru
35. Mala Dasari
36. Mala Dasu
37. Mala Hannai
38. Malajangam
39. Mala Masti
40. Mala Sale, Nethani
41. Mala Sanyasi
42. Mang
43. Mang Garodi
44. Manne
45. Mashti
46. Matangi
47. Mehtar
48. Mitha Ayyalvar
49. Mundala
50. Paky, Moti, Thoti
51. Pamidi
52. Panchama, Pariah
53. Relli
54. Samagara
55. Samban
56. Sapru
57. Sindhollu, Chindollu
58. Yatala
59. Valluvan

LIST OF SCHEDULED TRIBES

1. Andh, Sadhu Andh
2. Bagata
3. Bhil
4. Chenchu
5. Gadabas, Bodo 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. Kondareddis
16. Kondhs, Kodi, Kodhu, Desaya Kondhs, Dongria Kondhs, Kuttiya Kondhs, Tikiria Kondhs, Yenity Kondhs, Kuvinga
17. Kotia, Bentho Oriya, Bartika, Dulia, Holya, Sanrona, Sidhopaiko
18. Koya, Doli Koya, Gutta Koya, Kammara Koya, Musara Koya, Oddi Koya, Pattidi Koya, Rajah, Rasha Koya, Lingadhari Koya (ordinary), Kottu Koya, Bhine Koya, Rajkoya
19. Kulia
20. Manna Dhora
21. Mukha Dhora, Nooka Dhora
22. Nayaks (in the Agency tracts)
23. Pardhan
24. Porja, Parangiperja
25. Reddi Dhoras
26. Rona, Rena
27. Savaras, Kapu Savaras, Maliya Savaras, Khutto Savaras
28. Sugalis, Lambadis, Banjara
29. Thoti (in Adilabad, Hyderabad, Karimnagar, Khammam, Mahbubnagar, Medak, Nalgonda, Nizamabad and Warangal districts)
30. Yenadis, Chella Yenadi, Kappala Yenadi, Manchi Yenadi, Reddi Yenadi
31. Yerukulas, Koracha, Dabba Yerukula, Kunchapuri Yerukula, Uppu Yerukula
32. Nakkala, Kurvikaran.

LIST OF SOCIALLY AND EDUCATIONALLY BACKWARD CLASSES

As per G.O. Ms. No. 16 Backward Classes Welfare (OP) Department, Dated:11.03.2015 and read with G.O.MS.No. 34, Backward Classes Welfare (OP) Department, Dated: 08/10/2015, G.O. Ms. No. 4 Backward Classes Welfare (OP) Department, Dated: 30/01/2016

STATE LIST OF BCs
(List of Backward Classes of Telangana State)
GROUP-A
(Aboriginal Tribes, Vimuktha Jathis, Nomadic and Semi-Nomadic Tribes etc.)

1 Agnikulakshatriya, Palli, Vadabalija, Bestha, Jalari, Gangavar, Gangaputra, Goondla, Vanyakulakshatriya (Vannekapu, Vannereddi, Pallikapu, Pallireddi) Neyyala, Pattapu.
2 Balasanthu, Bahurupi
3 *[Bandara]
4 Budabukkala
5 Rajaka (Chakali, Vannar)
6 Dasari (formerly engaged in Bikshatana i.e., Beggary)
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 ST list vide. G.O.Ms.No.149, SW, Dt.03.05.1978)
14 Medari or Mahendra
15 Mondivaru, Mondibanda, Banda
16 Nayi-Brahmin/Nayee-Brahmin (Mangali), Mangala and Bhajantri
17 Nakkala (deleted vide. G.O.Ms.No.21, BCW (C2) Dept., Dt.20.06.2011, since it is included in the list of Scheduled Tribes at Sl.No.34 vide. Scheduled Castes and Scheduled Tribes Order (Amendment) Act, 2002 (Central Act No.10 of 2003)
18 Vamsha Raj / Pitchiguntla
19 Pamula
20 Pardhi (Nirshikari)
21 Pambala

22 Peddammavandlu, Devaravandlu, Yellammavandlu, Mutyalammavandlu, Dammali / Dammala / Dammula / Damala
23 Veeramushti (Nettikotala), Veerabhadreeya
24 Valmiki Boya (Boya, Bedar, Kirataka, Nishadi, Yellapi, Pedda Boya), Talayari, Chunduvallu (Yellapi and Yellapu are one and the same as clarified vide. G.O.Ms.No.61, BCW (M1) Dept., Dt.05.12.1996)
25 Yerukalas in Telangana area (deleted and included at Sl.No.31 in the list of STs)
26 Gudala
27 Kanjara – Bhatta
28 *[Kalinga]
29 Kepmare or Reddika
30 Mondepatta
31 Nokkar
32 Pariki Muggula
33 Yata
34 Chopemari
35 Kaikadi
36 Joshinandiwalas
37 Odde (Oddilu, Vaddi, Vaddelu), Vaddera, Vaddabhovi, Vadiyaraj, Waddera
38 Mandula
39 Mehtar (Muslim)
40 Kunapuli
41 Patra
42 *[Kurakula]
43 *[Pondara]
44 *[Samanthula /Samantha/ Sountia / Sauntia]
45 Pala-Ekari, Ekila, Vyakula, Ekiri, Nayanivaru, Palegaru, Tolagari, Kavali (area confined to Hyderabad and Rangareddy Districts only)
46 Rajannala, Rajannalu (area confined to Karimnagar, Warangal, Nizamabad and Adilabad Districts only)
47 Bukka Ayyavars
48 Gotrala
49 Kasikapadi / Kasikapudi (area confined to Hyderabad, Rangareddy, Nizamabad, Mahaboobnagar and Adilabad Districts only)
50 Siddula
51 Sikligar/ Saikalgar
52 Poosala (included vide. G.O.Ms.No.16, BCW(C2) Dept., Dt.19.02.2009 by deleting from Sl.No.24 under Group-D)
53 *[Aasadula / Asadula]
54 *[Keuta / Kevuto / Keviti]
55 Orphan and Destitute Children who have lost their parents before reaching the age of ten and are destitute; and who have nobody else to take care of them either by law or custom; and also who are admitted into any of the schools or orphanages run by the Government or recognised by the Government.

GROUP-B
(Vocational Groups)

1 *[Achukatlavandlu]
2 Aryakshatriya, Chittari, Giniyar, Chitrakara, Nakhas
3 Devanga
4 Goud [Ediga, Gouda (Gamalla), Kalalee, Gounda, **[*Settibalija of Visakhapatnam, East Godavari, West Godavari and Krishna districts]** and Srisayana (Segidi)
5 Dudekula, Laddaf, Pinjari or Noorbash
6 Gandla, Telikula, Devathilakula
7 Jandra
8 Kummara or Kulala, Salivahana
9 Karikalabhakthulu, Kaikolan or Kaikala (Sengundam or Sengunther)
10 Karnabhakthulu
11 Kuruba or Kuruma
12 *[Nagavaddilu]
13 Neelakanthi
14 Patkar (Khatri)
15 Perika (Perika Balija, Puragiri kshatriya)
16 Nessi or Kurni
17 Padmasali (Sali, Salivan, Pattusali, Senapathulu, Thogata Sali)
18 Srisayana (Segidi) (deleted vide. G.O.Ms.No.63, BCW (M1) Dept., Dt.11.12.1996 and added to Sl.No.4 of Group-B)
19 Swakulasali
20 Thogata, Thogati or Thogataveerakshatriya
21 Viswabrahmin (Ausula, Kamsali, Kammari, Kanchari, Vadla or Vadra or Vadrangi and Silpis), Viswakarma
22 *[Kunchiti / Vakkaliga / Vakkaligara / Kunchitiga]
23 Lodh/ Lodhi/ Lodha (area confined to Hyderabad, Rangareddy, Khammam and Adilabad Districts only)
24 Bondili
25 Are Marathi, Maratha (Non-Brahmins), Arakalies and Surabhi Natakalavallu

26 Neeli (included vide. G.O.Ms.No. 43, BCW (C2) Dept., Dt.07.08.2008 by deleting from Group D at Sl.No.22)
27 Budubunjala / Bhunjwa / Bhadbhunja (area confined to Hyderabad and Rangareddy Districts only)
28 *[Gudia / Gudiya]

GROUP-C
(Harijan Converts)

1 Scheduled Castes converts to Christianity and their progeny

GROUP-D
(Other Classes)

1 *[Agaru]
2 Arekatika, Katika, Are-Suryavamshi
3 *[Atagara]
4 Bhatraju
5 Chippolu (Mera)
6 *[Gavara]
7 *[Godaba]
8 Hatkar
9 *[Jakkala]
10 Jingar
11 *[Kandra]
12 Koshti
13 Kachi
14 Surya Balija (Kalavanthula), Ganika
15 Krishnabalija (Dasari, Bukka)
16 *[Koppulavelamas]
17 Mathura
18 Mali (Bare, Barai, Marar and Tamboli)
19 Mudiraj, Mutrasi, Tenugollu
20 Munnurukapu
21 *[Nagavasam (Nagavamsa)]
22 Nelli (deleted vide. G.O.Ms.No.43, BCW(C2) Dept., Dt.07.08.2008 and added at Sl.No.26 in Group 'B')
23 *[Polinati Velamas of Srikakulam and Visakhapatnam districts]
24 Poosala caste (deleted vide. G.O.Ms.No.16, BCW(C2) Dept., Dt.19.02.2009 and included at S.No.52 under Group-A)
25 Passi
26 Rangarez or Bhavasara Kshatriya
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
30 *[Turupukapus or Gajulakapus]
31 Uppara or Sagara
32 Vanjara (Vanjari)
33 Yadava (Golla)
34 Are, Arevallu and Arollu
35 *[Sadara / Sadaru]
36 *[Arava]
37 Ayyaraka (area confined to Khammam and Warangal Districts only)
38 Nagaralu (area confined to Hyderabad and Rangareddy Districts only)
39 Aghamudian, Aghamudiar, Agamudivellalar and Agamudimudaliar (including Thuluva Vellalas) (area confined to Hyderabad and Rangareddy Districts only)
40 *[Beri Vysya / Beri Chetty]
41 *[Atirasa]
42 Sondi / Sundi
43 Varala
44 Sistakaranam
45 Lakkamarikapu
46 Veerashaiva Lingayat / Lingabalija
47 Kurmi

GROUP-E
(Socially and Educationally Backward Classes of Muslims)
(Subject to outcome of Civil Appeal No(s).2628-2637/2010 etc., pending before the Hon'ble Supreme Court of India)

1 Achchukattalavandlu, Singali, Singamvallu, Achchupanivallu, Achchukattuvaru, Achukatlavandlu
2 Attar Saibulu, Attarollu
3 Dhobi Muslim/ Muslim Dhobi/ Dhobi Musalman, Turka Chakla or Turka Sakala, Turaka Chakali, Tulukka Vannan, Tsakalas, Sakalas or Chakalas, Muslim Rajakas
4 Faqir, Fhakir Budbudki, Ghanti Fhakir, Ghanta Fhakirlu, Turaka Budbudki, Darvesh, Fakeer
5 Garadi Muslim, Garadi Saibulu, Pamulavallu, Kani-Kattuvallu, Garadollu, Garadiga
6 Gosangi Muslim, Phakeer Sayebulu

7 Guddi Eluguvallu, Elugu Bantuvallu, Musalman Keelu Gurralavallu
8 Hajam, Nai, Nai Muslim, Navid
9 Labbi, Labbai, Labbon, Labba
10 Pakeerla, Borewale, Deera Phakirlu, Bonthala
11 Qureshi, Kureshi/ Khureshi, Khasab, Marati Khasab, Muslim Katika, Khatik Muslim
12 Shaik/ Sheikh
13 Siddi, Yaba, Habshi, Jasi
14 Turaka Kasha, Kakkukotte Zinka Saibulu, Chakkitakanevale, Terugadu Gontalavaru, Thirugatigantla, Rollaku Kakku Kottevaru, Pattar Phodulu, Chakketakare, Thuraka Kasha

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* omitted vide G.O Ms.No.3, BCW(OP) Dept., Dated:14.08.2014

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.