

**STATE LEVEL POLICE RECRUITMENT BOARD
ANDHRA PRADESH, MANGALAGIRI, GUNTUR DIST.**

Rc.No.83/SLPRB/Rect.1/2026

Date:16-09-2026

In pursuance of G.O.Ms. No. 81 Finance (HR-I Plg, & Policy) Department dated: 22.08.2026, State Level Police Recruitment Board, Andhra Pradesh (hereinafter referred to as SLPRB, AP) invites applications for the following posts, through **ONLINE** (<https://slprb.ap.gov.in>) mode only. The number of vacancies indicated above is only provisional and is liable for change without giving any notice.

Direct Recruitment:

S.No	Post Code	Name of the Post	No of Vacancies
1	61	Scientific Assistant (Physical)	10
2	62	Scientific Assistant(Chemical)	13
3	63	Scientific Assistant (Biology/Serology)	20
Total			43

2. SLPRB, AP, reserves the right to notify the modifications with regard to any aspect of recruitment any time during the process of recruitment. Candidates must read the notification carefully, understand and accept all the terms and conditions specified therein before submission of application form. By submission of application form by the candidate, it is construed that he / she has read the notification and shall abide by the terms and conditions laid down there under.

3. The candidate will be required to submit (upload) a copy of **passport size photo, signature, SSC certificate, community certificate (for BC/SC/ST candidates), EWS and Non-Creamy Layer certificate**, if applicable, while submitting Online Application Form.

4. The desirous eligible Candidates may apply ON-LINE by satisfying themselves with the terms and conditions of this recruitment. The Candidates applying for Scientific Assistants should select **only one appropriate Post** code i.e. 61 or 62 or 63 basing on their eligibility of educational qualifications. **Submission of more than one application form will be taken as disqualification for eligibility. Selecting multiple codes and submitting multiple applications will be taken as disqualification**

and such application will be rejected and such persons will not be given any hall ticket Number.

5. The exact dates for submission of the Online Application Form will be notified separately through a Press Release and will be published on the official website shortly. Only candidates who fulfil all the prescribed eligibility conditions and other requirements shall be eligible to apply. Candidates are advised to carefully verify and satisfy themselves regarding their eligibility before submitting the application. The application shall be submitted **online only** through the official website (<https://slprb.ap.gov.in>).

6. RULES GOVERNING THE POSTS:

The recruitment to the posts of Scientific Assistants are being made as per the provisions of the Andhra Pradesh Police (Forensic Science Laboratory) Rules issued by the Government of Andhra Pradesh in G.O. Ms. No 38 Home (Pol.C) Dept. dated 02-02-1994 and subsequent amendments thereon.

7. The rule of Special Representation (reservation) i.e., EWS, BC-A, BC-B, BC-C, BC-D, BC-E, SC(Group-I, Group-II and Group-III) and ST as provided in Rule 22 of A.P. State & Subordinate Service Rules, 1996 and further amendments thereon..

8. WOMEN RESERVATION:

Under direct recruitment, 33 ¹/₃ % of vacancies in each category, including EWS, are reserved for women for the Post Code No. 61, 62 & 63 in each category. The reservation will be **a horizontal reservation** following principle of sufficiency i.e., the reservation of women candidates shall be adjusted proportionately in the respective category to which the women candidate belongs, in relaxation to relevant rules relating to Andhra Pradesh State and Subordinate Service Rules 1996. In the event of non-availability of eligible and suitable women candidates in a particular year, the vacancies reserved for them shall not be carried forward to the subsequent year and shall be filled up by men candidates of respective communal category.

9. BC RESERVATION & NON-CREAMYLAYER:

Candidates belonging to the Backward Classes shall produce the Community Certificate and a valid Non-Creamy Layer (NCL) Certificate

issued by the competent authority of the Government of Andhra Pradesh for claiming reservation and age relaxation. The NCL Certificate shall have been issued on or after 01.04.2026.

Candidates who fail to produce a valid Non-Creamy Layer (NCL) Certificate at the time of Certificate Verification shall be considered under the Open Category (OC), subject to fulfilment of all other prescribed eligibility conditions, such candidates shall not be permitted, under any circumstances, to subsequently change their category or claim reservation or age relaxation under the Backward Classes category at their option.

Candidates belonging to the Backward Classes who fall under the Creamy Layer shall not be entitled to claim reservation or age relaxation admissible to Backward Classes (Non-Creamy Layer).

Pertaining to Backward Classes, Relaxation in upper age limit (as given in para 13(b)(ii), and / or reservation to 'BC-E group' or 'any category in BC-E group' will be subject to the adjudication of the litigation pending before the Honourable Courts. However, relaxation in upper age limit (as given in para 13(b)(ii)) and / or reservation to 'BC-E group' is applicable to Sl. No. 1 to 14 of BC-E group as per interim order dated 25-03-2010 in Civil Appeal No(s). 2628-2637 of 2010 of Hon'ble Supreme Court of India. As per the G.O.Ms.No.23, Backward Class Welfare Dept., dated 07.07.2007, the castes mentioned in Sl. No. 15 are treated as 'OC' category.

10. SC/ST RESERVATION:

The candidates belonging to Scheduled Castes and Scheduled Tribes should submit the Latest Community certificate, issued by the competent authority of A.P. State to claim reservation and age relaxation. The candidates belong to SC community should submit the latest community certificate based on the ordinance issued by the Government in A.P. Ordinance No.2 of 2025, dated 17.04.2025 as per the SC Sub-Classification (Group-I, Group-II and Group-III).

11. RESERVATION FOR ECONOMICALLY WEAKER SECTION CATEGORY:

Candidates who are local to AP State as per the definition given in Presidential Order, 2025 and belonging to Economically Weaker Section Category (as per the G.O.Ms.No.73, GA (Services-D) Department, dated 04.08.2021) whose gross annual family income is below Rs. 8.00 lakh are to

be identified as Economically Weaker Sections (EWS) for the benefit of reservation. The Income shall also include income from all sources i.e. salary, agriculture, business, profession, etc. for the financial year prior to the year of application. The applicants should submit the EWS certificate which was issued on or after 01.04.2026 by the Tahsildar concerned.

12. The requisite educational qualification, age and procedure to be followed for selection are given below. Candidates are advised to carefully read and understand the instructions contained in this Notification, as well as the “Instructions for Filling the application form in their own interest. SLPRB shall not be responsible for any claim subsequently made by a candidate arising out of failure to read or comply with the instructions contained in this Notification and the said instructions.

13. Eligibility Conditions:

a) Age Limit: A candidate must not have attained the age of 44 years as on 1st July, 2026, i.e., he/she must have been born on or after 2nd July, 1982.

b) Age Relaxation:

The upper age limit prescribed in para 13 (a) above will be relaxed as under:

- (i) Up to a maximum of five years if a candidate belongs to Economically Weaker Section Category.
- (ii) Up to a maximum of five years if a candidate belongs to a Backward Class (Non- Creamy layer) or a Scheduled Caste or a Scheduled Tribe.
- (iii) Length of regular service limited upto a maximum of five years if a candidate is an employee of AP State Government. Employees of APTRANSCO, DISCOMs, APGENCO, Corporations, Municipalities, Local bodies etc. are not entitled for age relaxation.
- (iv) Three years in addition to the length of service rendered in the Army, Navy or Air Force of the Union for the candidates who served in the Army, Navy or Air Force of the Union.
- (v) Three years in addition to the length of service rendered as a whole time Cadet Corps Instructor in NCC provided the candidate rendered a

minimum service of 6 months as a whole time Cadet Corps Instructor in NCC.

- (vi) Up to a maximum of three years if a candidate is a retrenched temporary employee in the State Census Department with a minimum service of 6 months during 1991.

The prescribed age limits shall not be relaxed under any circumstances, except as specifically provided above.

NOTE: (1) The date of birth accepted by the SLPRB, AP is that entered in the Secondary School Certificate or Matriculation or an equivalent examination certificate. The document relating to age like horoscopes, affidavits, birth extracts from Municipal Corporation, service records and will not be accepted.

(2) Due to various Age relaxations, Age validation is not being done in the Online Application Form. Therefore, it is the responsibility of the Candidates to satisfy themselves about their Age eligibility for the Post(s) applied for.

c) Minimum Educational Qualification:

The Applicants must possess the qualification from a recognized University, as detailed below, subject to various specifications, in the relevant service rules under as indented by the department as on the date of the notification:

Post Code No	Name of the Post	Educational Qualifications
61	Scientific Assistant (Physical)	Must have passed M.Sc. with I (or) II Division with Physics as the subject (or) Forensic Science with Physics as special subject from any University in India established (or) incorporated by or under a Central Act, (or) Provincial Act or State Act or an Institution recognized by the University Grants Commission (or) an equivalent qualification.

62	Scientific Assistant (Chemical)	Must have passed M.Sc. with I (or) II Division with Chemistry (or) Bio-Chemistry as the subject (or) Forensic Science with Chemistry or Toxicology as special subject from any University in India established (or) incorporated by or under a Central Act, or Provincial Act (or) State Act or an Institution recognized by the University Grants Commission (or) an equivalent qualification.
63	Scientific Assistant (Biology/Serology)	Must have passed M.Sc. with I (or) II Division with Biology (or) Zoology (or) Botany (or) Microbiology (or) Bio-Technology (or) Forensic Science with Biology as specialization from any University in India established (or) incorporated by or under a Central Act, (or) Provincial Act or State Act or an Institution recognized by the University Grants Commission (or) an equivalent qualification.

Note: The candidates who possess higher qualification than the prescribed one will also be considered for selection on par with the candidates who possess the prescribed qualification.

d) Medical Standards:

- a) Eye Sight: Visual Standards required for the above selection shall be as follows:

	Right Eye	Left Eye
Distant Vision	6/6	6/6
Near Vision	0/5	0/5
	(Snellen)	(Snellen)

- b) Each eye must have a full field of vision.
- c) Colour blindness, squint or any morbid condition of the eye or lids of either eye shall be deemed to be a disqualification.
- d) The candidate should possess sound health and be free from any bodily defect or infirmity which will render him unfit.
- e) Candidates who have the following ailments or defects will not be considered for recruitment to any post specified in this rule:
- Physically handicapped / Orthopedically handicapped.
 - Any other medical condition including hearing defect and abnormal psychological behaviour.

NOTE : In order to prevent disappointment, candidates are advised to have themselves examined by a **Civil Surgeon** before applying for the examination to ensure that they meet the prescribed Physical and Medical Standards.

14. Fee Structure:

- a) Candidates having local candidature of Andhra Pradesh belonging to the OCs (including EWS) and BC categories applying for the post of Scientific Assistant (Physical), Scientific Assistant (Chemical) & Scientific Assistant (Biology/Serology) in Forensic Science Laboratory Department shall pay a fee of Rs.600/- towards processing of the application, Written examinations, etc.
- b) Candidates having local candidature of Andhra Pradesh belonging to the SC & ST Categories shall pay a fee of Rs.300/-only.
- c) Candidates who are Non-Local to the State of Andhra Pradesh shall be treated under the Open Competition/(OC) category and shall pay a fee of Rs.600/-.

d) Mode of Payment of Fee:

I Step: Candidate has to visit SLPRB Website <https://slprb.ap.gov.in> to pay prescribed Registration Fee, through Credit Card, Debit Card, Net Banking or any other mode made available on the SLPRB Website by providing his/her details such as Name, Date of Birth, Mobile Number, Community and SSC Hall Ticket Number or its equivalent.

II Step: After making the Payment, Candidate has to visit the website <https://slprb.ap.gov.in> to submit the Online Application Form. After making payment of fee, if the candidate fails to press “submit” in the Online Application Form, such cases shall be rejected without giving any notice, and fee once paid shall not be refunded in any case.

III Step: As there is no Preliminary Written Test for the post of Scientific Assistant (Physical), Scientific Assistant (Chemical) & Scientific Assistant (Biology/Serology) in Forensic Science Laboratory. Candidates shall visit the website (<https://slprb.ap.gov.in>) at the appropriate time for further selection process.

15. CANDIDATES SHOULD ENSURE THEIR ELIGIBILITY FOR THE EXAMINATION: The candidates applying for the examination should ensure that they fulfil all eligibility conditions for admission to the examination. Their admission at all stages of the examination will be purely provisional and subject to satisfying the prescribed eligibility conditions.

Mere issue of Admit card / Hall ticket to the candidate will not imply that his / her candidature has been finally cleared by the Board. The board will take up verification of eligibility conditions with reference to the genuineness of original documents only after the candidate has finally qualified.

16. Selection Procedure/Scheme: The Selection Procedure/Scheme of the Exam will be as follows:

A) Written Examination:

Candidates will be required to appear for a written examination for 120 marks. The Questions will be objective in nature and it is for two hours duration. The Question Paper will be in English language only for the post code nos. 61, 62 and 63. The syllabus is given in **Annexure-I(A), I(B) & I(C).**

Post code	Subject	No. of questions	Max. Marks
61	Scientific Assistant (Physical)	120	120
62	Scientific Assistant (Chemical)	120	120
63	Scientific Assistant (Biology/Serology)	120	120

Note: Candidates will have to answer the questions on OMR answer sheet using Blue / Black Ball Point pen only. For this purpose, candidates should bring Blue / Black Ball Point pens along with them. Candidates must note that the time of examination, following articles are prohibited to be brought in to exam centers / hall:-

- (1) Mobile
- (2) Calculator
- (3) Watches
- (4) Rings / Jewellery
- (5) Electronic gadgets
- (6) Books / News Papers / Note books / Bags etc.
- (7) Any article / object which may be prescribed as prohibited by

examination Authority/SLPRB.

The minimum marks to be secured by the candidates in order to qualify in the Written examination is 40% for OC (including those claiming EWS reservation), 35% for BCs; and 30% for SCs/STs.

Note: (a) Mere securing of minimum qualifying marks does not confer any right to the candidate for being considered to the selection.

B) Certificate Verification: -

Candidates shall produce all original certificates/documents and other relevant particulars on the date of Certificate Verification or at such other time as may be specified by the SLPRB. Failure to produce the requisite original certificates/documents at the time of verification, or any discrepancy between the particulars furnished in the Application Form and those contained in the original certificates/documents produced by the candidate, shall result in rejection of the candidature/disqualification of the candidate without any further correspondence.

As the candidature of applicants for the recruitment is processed through computerized/electronic systems based on the particulars furnished in the Application Form, candidates are advised to exercise due care and caution while furnishing all relevant particulars and to ensure that the information furnished is complete, accurate and supported by valid original certificates/documents.

C) Selection: The final selection will be strictly on relative merit of the candidates in each category, obtained by them based on their total score in the written examination (120 marks), duly following the special representation as laid down in Rule 22 and sub rule 2 of Rule 22-A of Andhra Pradesh State and Subordinate Service Rules.

17. The provisions of “The Andhra Pradesh Public Employment (Organization of Local Cadres and Regulation of Direct Recruitment) Order, 2025” are not applicable.

18. (a) As per Rule 13 of A.P. State and Subordinate Services Rules, 1996, Every person appointed to a service, shall, within the period of probation, pass the Language test in Telugu, failing which his

probation shall be extended and increments in the time scale of pay shall be postponed without cumulative effect till he/she passes the test.

(b) As per G.O. Ms. No 38 Home (Pol.C) Dept. dated: 02-02-1994, the candidates shall pass Accounts Test for Executive Officers within the period of probation.

19. The quota earmarked for Physically handicapped/Orthopedically handicapped shall be filled with General Category.

20. DEFINITION OF LOCAL CANDIDATE:

Reservation to Local Candidates shall be applicable as per The Andhra Pradesh Public Employment (Organization of Local Cadres and Regulation of Direct Recruitment) Order, 2025, issued vide G.O.Ms.No.45, General Administration (SPF&MC) Department, dated 20.04.2026. Candidates claiming Local Candidate reservation shall submit the required Study Certificate(s) from Class I to Class VII, issued by the concerned Government/Government-recognized School Authorities (Annexure-II(A)). If the candidate has not studied in any Government/Government-recognized school during any part of the seven-year period, a Residence Certificate for that period, issued by the Tahsildar of the concerned Mandal, shall be submitted for determining Local Status (Annexure-II(B)).

NOTE: Single certificate, whether of study or residence would suffice for enabling the candidate to apply as a “Local Candidate”.

(i) If, however, a candidate has resided in more than one Mandal during the relevant four/seven years’ period but within the same District, separate certificates from the Mandal Revenue Officers exercising jurisdiction has to be obtained in respect of different areas.

NOTE: Residence certificate will not be accepted, if a candidate has studied in any educational institution up to 7th class or equivalent examination. Invariably, such candidates have to produce study certificates only. The candidates, who acquired Degree from Open Universities without studying SSC/Matriculation or equivalent in educational institutions, have to submit residence certificate only.

Reservation to local candidates is applicable as provided in the Rules and as amended from time to time as in force on the date of notification. The

candidates claiming reservation as local candidates should enclose the required Study certificates (from IV class to VII class (or) from I class to VII class. In case he/she has not studied from I class to VII class in one particular district Residence Certificate, in the given proforma only, should be enclosed for those candidates who have not studied in any Educational Institutions.

NOTE: As per G.S.R. 775 (E) read with GSR 591 (E): The candidates who migrated to any part of the State of Andhra Pradesh from the State of Telangana within a period of Ten years from the 2nd day of June, 2014 shall be regarded as the local candidate in the State of Andhra Pradesh at the place of his / her residence and be treated at par with the local candidates residing in that area, in accordance with such guidelines as may be issued by the Government of Andhra Pradesh for the purpose of employment.

21. Antecedents verification: As per Rule 12 (1) (a) of A.P. State and Subordinate Services Rules, 1996, No person shall be eligible for appointment to any service by direct recruitment unless he satisfies the selection authority as well as the appointing authority that his character and antecedents are such as to qualify him for such service.

22. DISQUALIFICATION FOR APPOINTMENT: The candidates falling under the following categories shall be disqualified for appointment, under these rules:

- i. If any document produced by the candidate is found fake or forged as established during antecedent verification.
- ii. If the candidate himself or through his relatives or friends or any other has canvassed or endeavoured to enlist extraneous support whether from official or non-official sources for his candidature.
- iii. A person (a) who has entered into or contracted a marriage with a person having a spouse living, or (b) who, having a spouse living, has entered into or contracted a marriage with any other person. Provided that the State Government may, if satisfied that such marriage is permissible under the personal law applicable to such person, exempt any person from the operation of this rule.

- iv. A person who has been dismissed from the services of a State or Central Government or from the service of any Central or State Government undertaking or local body or other authority.
- v. A person who has been convicted for any offence or facing trial in any court of law, except for offences of technical nature like Motor Vehicles Act Violations, J.J. Act (Juvenile Justice) Violations, shall stand disqualified.
- vi. A person who is involved in an offence involving moral turpitude is disqualification for appointment.

23. In the event of any information being found false or incorrect or ineligibility being detected at any time even after appointment, he/she will be discharged from service forthwith by the appointing authority without giving any notice.

24. Scale of Pay: Scientific Assistants (Physical, Chemical and Biology/Serology): Rs.44,570/- to 1,27,480/- (RPS.2022)

The employees who are appointed on or after 01-09-2004 are covered by the Contributory Pension Scheme. The existing Pension Scheme as per A.P. Revised Pension Rules, 1980 **will not be applicable to them.**

This office will not entertain any correspondence from any candidate.

25. Time limit for submission of attestation forms (or) other relevant documents (or) attend medical examination (or) join the training: The candidates who are selected will be asked to submit an attestation form, produce other relevant documents and attend medical examination on a specified date. The candidates who become eligible to be sent for training will be asked to join the training on a specified date. If any candidate fails to respond and fails to submit the necessary form or document or attend the medical examination or join the training on a specified date, his/her provisional selection may be cancelled without prior notice to the candidate.

26. General Instructions:

- i. Particulars furnished by the Candidates in the Application Form will be taken as final. Candidates should, therefore, be very careful in uploading / submitting the Application Form Online.

- ii. 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 SLPRB, AP under any circumstances. Candidates should be careful in filling up the Application Form before submission. If any lapse is detected at any stage of the recruitment process, the candidature will be instantly rejected.
- iii. Serving personnel of the Army, Navy, Air Force or Territorial Army of the Indian Union who are due to retire within one year from the last date prescribed for submission of Online Application Form shall produce a “No Objection Certificate (NOC)” issued by their respective Unit Commanding Officer, duly indicating the Personnel Number, Rank, Name, Unit and Date of Retirement, or the Retirement Order, as applicable, for claiming age relaxation and/or reservation under the Ex-Servicemen category.

Note: Candidates who claim Age relaxation as Ex.Servicemen should satisfy the conditions mentioned in Rule 2 (16) of A.P. State and Subordinate Service Rules and having the necessary certificate from the competent authority. Application received without the required permission from Concerned / Competent Authority will only be considered under General category.

- iv. Based on the information submitted by the candidate, in Online Application Form, (i.e. Community, Local & Non-Local, Ex-servicemen certificate, Non-Creamy Layer Certificate and EWS Certificate etc.), results will be issued. If any information is later found false, the candidature of such candidate shall be rejected, without giving notice and prior intimation.
- v. Candidates must submit all the relevant certificates during the process of physical verification of the certificates. No further submission of certificate will be entertained/received by SLPRB, AP at later stage.
- vi. The selection list shall be prepared based on the merit list. Candidature will not be considered against leftover/ unfilled vacancies.
- vii. Candidates are advised to carefully read and understand all the instructions before submitting the Online Application Form. By submitting the application form, the candidate has acknowledged acceptance of all the terms and conditions of the notification.

- viii. The persons already in Government Service/Autonomous bodies/Government aided institutions etc., whether in permanent or temporary capacity or as work charged employees are however required to inform in writing, their Head of office/Department that they have applied for this recruitment. These Applicants must enclose the required permission from the Concerned / Competent Authority. Application received without the required permission from Concerned / Competent Authority will only be considered under General category.
- ix. No waiting list shall be maintained for any recruitment conducted by SLPRB, AP. The selection list against the notified vacancies shall be final. Any vacancy arising due to cancellation, relinquishment, unwillingness, non-joining, medical unfitness, adverse antecedents or any other reason shall be deemed to have lapsed and shall not be filled.
- x. Mere admission to any test or inclusion of a Candidate's name in a Merit List shall not confer on him / her any right for selection / appointment to such service, class or category. The selection of the Candidates to the Posts mentioned in this Notification is subject to several other requirements described below.
- xi. The SLPRB, AP reserves the right to issue corrigendum/supplementary notifications time to time in case there is any modification in rules or in the recruitment process.

27. CERTIFICATES TO BE BROUGHT BY CANDIDATE AT THE TIME OF CERTIFICATE VERIFICATION:

- a) The candidates are requested to check their eligibility carefully and fill in all the relevant columns in the application form.
- b) Copies of the following documents must be enclosed in support of the information given in the application form where necessary. Failure to enclose the same will lead to rejection of the application form.
- c) Secondary School/Matriculation certificate or equivalent certificate in support of the date of birth.
- d) Educational Qualification.

- e) Study certificate issued by the school authorities or Residence certificate issued by M.R.O. (Annexure II(A) or Annexure – II (B))
- f) A candidate belonging to the Open Category (OC), who wish to claim concession in age and reservation specified for the EWS category, should submit the said Certificate issued by the competent authority as specified above.
- g) A candidate belonging to the Backward Class, who wish to claim concession in age and also reservation specified for the Backward Classes, must submit the Date of Birth Certificate, Latest Community Certificate and Non-Creamy Layer certificate (issued on or after 01-04-2026) by the competent revenue authority.
- h) A candidate belonging to SC or ST, who wish to claim concession in age and also reservation specified for the SCs (Group-I, Group –II and Group-III)/STs, must submit the Community & Date of Birth Certificate issued by the competent authority as specified.
- i) Certificate from the competent authority in respect of State Government employees/those who worked in the Army, Naval or Air Force of the Union/ NCC Instructors retrenched temporary employee in the State Census Department claiming age concession.

28. The SLPRB, AP reserves the right to take decision regarding conduct of examination and selecting candidates as per rules. The decision of the SLPRB, AP shall be final in all aspects. Further, SLPRB, AP may modify and reschedule the Examination / Test due to unforeseen circumstances. **Candidates are required to visit the website of SLPRB, AP regularly to keep himself / herself updated until completion of the recruitment process.** The SLPRB website information is final for all correspondence. No individual correspondence by any means will be entertained under any circumstances.

Sd/-
(RAJEEV KUMAR MEENA, IPS)
Chairman,
State Level Police Recruitment Board,
Andhra Pradesh, Mangalagiri.

ANNEXURE – I(A)

SYLLABUS FOR WRITTEN EXAMINATION

For Post Code No. 61 (Physical)

Mechanics Vector Analysis

Scalar and vector fields, gradient of a scalar field and its physical significance. Divergence and curl of a vector field with derivations and physical interpretation. Vector integration (line, surface and volume), statement and proof of Gauss and Stokes theorems.

Mechanics of Particles

Laws of motion, motion of variable mass system, equation of motion of a rocket. Conservation of energy and momentum, collisions in two and three dimensions, concept of impact parameter, scattering cross-section, Rutherford scattering.

Mechanics of Rigid Bodies

Definition of rigid body, rotational kinematic relations, equation of motion for a rotating body, angular momentum, Euler equations and their applications, precession of a top and gyroscope.

Central Forces

Central forces, definition and examples, conservative nature of central forces, conservative force as a negative gradient of potential energy, equation of motion under a central force. Derivation of Kepler's laws.

Special Theory of Relativity

Galilean relativity, absolute frames. Michelson-Morley experiment, postulates of special theory of relativity. Lorentz transformation, time dilation, length contraction, addition of velocities, mass-energy relation. Concept of four-vector formalism.

Waves & Oscillations

Simple Harmonic Oscillations

Simple harmonic oscillator and solution of the differential equation. Physical characteristics of SHM, torsion pendulum – measurements of rigidity modulus, compound pendulum – measurement of g, principle of superposition, combination of two mutually perpendicular simple harmonic vibrations of same frequency and different frequencies. Lissajous figures.

Damped and Forced Oscillations

Damped harmonic oscillator, solution of the differential equation of damped oscillator. Energy considerations, comparison with undamped harmonic oscillator, logarithmic decrement, relaxation time, quality factor, differential equation of forced oscillator and its solution, amplitude resonance and velocity resonance.

Vibrating Strings

Transverse wave propagation along a stretched string, general solution of wave equation and its significance, modes of vibration of stretched string clamped at ends, overtones and harmonics. Energy transport and transverse impedance.

Vibrations of Bars

Longitudinal vibrations in bars – wave equation and its general solution. Special cases: (i) bar fixed at both ends; (ii) bar fixed at the midpoint; (iii) bar fixed at one end. Tuning fork.

Wave Optics

Aberrations

Introduction – monochromatic aberrations, spherical aberration, methods of minimizing spherical aberration, coma, astigmatism and curvature of field, distortion. Chromatic aberration – the achromatic doublet. Achromatism for two lenses: (i) in contact and (ii) separated by a distance.

Interference

Principle of superposition – coherence, temporal coherence and spatial coherence – conditions for interference of light. Fresnel's biprism – determination of wavelength of light – change of phase on reflection. Oblique incidence of a plane wave on a thin film due to reflected and transmitted lights (cosine law) – colours of thin films – interference by a film with two non-parallel reflecting surfaces (wedge-shaped film). Determination of diameter of wire, Newton's rings in reflected light. Michelson interferometer. Determination of wavelength of monochromatic light using Newton's rings and Michelson interferometer.

Diffraction

Introduction, distinction between Fresnel and Fraunhofer diffraction. Fraunhofer diffraction – diffraction due to single slit, Fraunhofer diffraction due to double slit, Fraunhofer diffraction pattern with N slits (diffraction grating). Resolving power of grating, determination of wavelength of light in normal incidence position using diffraction grating, Fresnel's half-period zones, area of the half-period zones, zone plate, comparison of zone plate with convex lens, differences between interference and diffraction.

Polarization

Polarized light: methods of polarization, polarization by reflection, refraction, double refraction, scattering of light – Brewster's law – Malus's law – Nicol prism polarizer and analyzer – quarter-wave plate, half-wave plate – optical activity, determination of specific rotation by Laurent's half-shade polarimeter – Babinet's compensator – linear, elliptical and circular polarization.

Fiber Optics

Introduction – different types of fibers, rays and modes in an optical fiber, fiber material, principles of fiber communication (qualitative treatment only), advantages of fiber optic communication.

Thermodynamics

Kinetic Theory of Gases

Introduction – deduction of Maxwell's law of distribution of molecular speeds. Transport phenomena – viscosity of gases, thermal conductivity, diffusion of gases.

Thermodynamics

Introduction – Second Law of Thermodynamics, Kelvin's and Clausius statements – entropy, physical significance – change in entropy in reversible and irreversible processes – entropy and disorder – entropy of Universe – temperature-entropy (T-S) diagram – change of entropy of a perfect gas – change of entropy when ice changes into steam.

Thermodynamic Potentials and Maxwell's Equations

Thermodynamic potentials – derivation of Maxwell's thermodynamic relations – Clausius-Clapeyron equation – derivation for ratio of specific heats – derivation for difference of two specific heats for perfect gas. Joule-Kelvin effect – expression for Joule-Kelvin coefficient for perfect and van der Waals gases.

Low Temperature Physics

Joule-Kelvin effect – porous plug experiment – Joule expansion – distinction between adiabatic and Joule-Thomson expansion – expression for Joule-Thomson cooling – liquefaction of helium, Kapitza's method – adiabatic demagnetization, production of low temperatures.

Quantum Theory of Radiation

Blackbody – Fery's black body – distribution of energy in the spectrum of black body – Wien's displacement law, Wien's law, Rayleigh-Jeans law – quantum theory of radiation – Planck's law – measurement of radiation – types of pyrometers – disappearing filament optical pyrometer – experimental determination – Angstrom pyrheliometer – determination of solar constant, temperature of Sun.

Electromagnetism & Modern Physics

Electric Field Intensity and Potential

Gauss's law, statement and its proof – electric field intensity due to: (1) uniformly charged sphere and (2) an infinite conducting sheet of charge. Electrical potential – equipotential surfaces – potential due to: (i) a point charge, (ii) charged spherical shell and uniformly charged sphere.

Electric and Magnetic Fields

Biot-Savart's law, explanation and calculation of B due to long straight wire, a circular current loop and solenoid – Lorentz force.

Electromagnetic Induction and Electromagnetic Waves

Faraday's law – Lenz's law – self and mutual inductance, displacement current – Maxwell's equations – Maxwell's plane wave equation, transverse nature of electromagnetic waves.

Atomic Physics

Drawbacks/limitations of Bohr's atomic model – Sommerfeld's modification of Bohr's theory, Sommerfeld's elliptical orbits – relativistic correction. Wave-particle duality and concept of matter waves, de Broglie's hypothesis – wavelength of matter waves, Davisson and Germer experiment. Heisenberg's uncertainty principle – complementarity principle of Bohr, X-rays and lasers theory.

Nuclear Physics

Basic ideas of nucleus – size, mass, binding energy. Liquid drop model and shell model (qualitative aspects only) – magic numbers. Radioactive decay, alpha decay, beta decay, energy kinematics for beta decay, neutrino hypothesis.

ANNEXURE – I(B)

SYLLABUS FOR WRITTEN EXAMINATION

For Post Code No. 62 (Chemical)

ORGANIC CHEMISTRY

Acyclic Hydrocarbons

Alkanes

Preparation: Corey-House reaction, Wurtz reaction, Kolbe synthesis. Chemical reactivity – halogenation.

Alkenes

Preparation of alkenes: (a) by dehydration of alcohols; (b) dehydrohalogenation of alkyl halides; (c) by dehalogenation of 1,2-dihalides. Zaitsev's rule. Properties: addition of HX, Markovnikov's rule, addition of H₂O, HOX, H₂SO₄ with mechanism and addition of HBr in the presence of peroxide. Oxidation (cis-additions) – hydroxylation by KMnO₄, OsO₄, trans addition – peracids, ozonolysis – location of double bond.

Alkynes

Preparation by dehydrohalogenation of vicinal dihalides, dehalogenation of tetrahalides. Physical properties: acidity of terminal alkynes. Chemical reactivity – electrophilic addition of X₂, HX, H₂O. Oxidation and reduction.

Alicyclic Hydrocarbons

Nomenclature, preparation by Freund's method, Dieckmann reaction, heating dicarboxylic metal salts. Stability of cycloalkanes – Baeyer strain theory. Conformational structures of cyclohexane.

Aromatic Hydrocarbons

Aromaticity – definition, Hückel's rule – application. Reactions – general mechanism of electrophilic substitution, mechanism of nitration, sulphonation and halogenation, Friedel-Crafts alkylation (polyalkylation) and acylation. Orientation of aromatic substitution.

Arenes

Preparation of alkyl benzenes by Friedel-Crafts alkylation, Friedel-Crafts acylation followed by reduction, Wurtz-Fittig reaction. Chemical reactivity: ring substitution reactions, side-chain substitution reactions and oxidation.

Halogen Compounds

Nomenclature and classification. Chemical reactivity – reduction, formation of RMgX. Nucleophilic substitution reactions – classification into SN1 and SN2. Mechanism and energy profile diagrams of SN1 and SN2 reactions. Stereochemistry of SN2 (Walden inversion) – 2-bromobutane. SN1 (racemisation) – 1-bromo-1-phenylpropane, explanation of both by taking the example of optically active alkyl halide.

Alcohols

Preparation of alcohols using Grignard reagent, ester hydrolysis, reduction of carbonyl compounds, carboxylic acids and esters. Physical properties: H-bonding, boiling point and solubility. Reactions with sodium, HX/ZnCl₂ (Lucas reagent), esterification, oxidation with PCC, alkaline KMnO₄, acidic dichromates.

Phenols

Preparation: (i) from diazonium salts of anilines, (ii) from benzene sulphonic acids, and (iii) cumene hydroperoxide method. Properties: acidic nature, formation of phenoxide and reaction with R-X, electrophilic substitution – nitration, halogenation and sulphonation. Reimer-Tiemann reaction, Gattermann-Koch reaction, azo-coupling reaction, Schotten-Baumann reaction.

Ethers and Epoxides

Nomenclature, preparation by (a) Williamson's synthesis. Physical properties. Chemical properties – action of conc. H₂SO₄ and HI.

Carbonyl Compounds

Nomenclature and isomerism. Preparation of aldehydes and ketones from acid chlorides, nitriles, oxidation of arenes. Physical properties – absence of hydrogen bonding. Keto-enol tautomerism, polarisability of carbonyl groups, reactivity of the carbonyl groups in aldehydes and ketones. Chemical reactivity: addition of (a) NaHSO₃, (b) HCN, (c) RMgX, (d) NH₃, (e) RNH₂, (f) NH₂OH, (g) PhNHNH₂, (h) 2,4-DNP (Schiff bases). Addition of H₂O to form hydrate; addition of alcohols. Base-catalysed reactions – Aldol, Cannizzaro, Perkin, Benzoin condensation, haloform reaction, Knoevenagel condensation. Oxidation reactions – KMnO₄ oxidation; reduction – catalytic hydrogenation, Clemmensen's reduction, Wolff-Kishner reduction, reduction with LAH, NaBH₄. Analysis – 2,4-DNP test, Tollens' test, Fehling's test, Schiff's test, haloform test.

Carboxylic Acids

Nomenclature, classification. Preparation: (a) hydrolysis of nitriles, (b) carbonation of Grignard reagent. Oxidation of arenes. Kolbe reaction. Physical properties – hydrogen bonding, dimeric association, acidity – strength of acids. Chemical properties – reactions involving H, OH and COOH groups – salt formation, anhydride formation, acid halide formation, esterification and amide formation. Reduction of acid to the corresponding primary alcohol – via ester or acid chloride. Degradation of carboxylic acids by Hunsdiecker reaction, Schmidt reaction, Arndt-Eistert synthesis. Halogenation by Hell-Volhard-Zelinsky reaction. Carboxylic acid derivatives – reactions of acid halides, acid anhydrides, acid amides and esters.

Nitrogen Compounds

Nomenclature and classification of nitro hydrocarbons. Preparation, reactivity, Nef reaction, Mannich reaction, Michael addition, reduction reaction of nitrobenzenes in different media.

Amines

Nomenclature, classification. Preparation: Gabriel synthesis, Hofmann's bromamide reaction. Physical properties – basic character. Chemical properties: (a) alkylation, (b) acylation, (c) carbylamine reaction, (d) Hinsberg separation, reaction with nitrous acid. Aromatic amines – bromination, diazotisation. Synthetic utility of diazonium salts.

Cyanides and Isocyanides

Nomenclature and structure. Preparation of cyanides from: (a) alkyl halides, (b) amides, (c) aldoximes. Preparation of isocyanides from alkyl halides and amines. Properties of cyanides and isocyanides: (a) hydrolysis, (b) addition of Grignard reagent, (c) reduction.

Biomolecules

Carbohydrates: classification, monosaccharides, structures of pentoses and hexoses, anomeric carbon, mutarotation, simple chemical reactions of glucose, disaccharides: reducing and non-reducing sugars – sucrose, maltose and lactose, polysaccharides: elementary idea of structures of starch and cellulose.

Proteins: amino acids, peptide bond, polypeptides, proteins, structure of proteins – primary, secondary, tertiary and quaternary structures (qualitative idea only), denaturation of proteins; enzymes.

Hormones – elementary idea excluding structure. Vitamins – classification and functions.

Nucleic Acids: DNA and RNA.

Polymers:

classification of polymers, general methods of polymerization – addition and condensation, free-radical, cationic and anionic polymerization, copolymerization, natural rubber, vulcanization of rubber, synthetic rubbers.

Basics of Drugs and Formulation Analysis:

weights, balances, importance of analysis, quality control and quality assurance, analytical methods (classification, validation parameters), requirements – chemicals (types, purification, checking purity), glassware (types, calibration, cleaning), sampling techniques, sampling error minimization. Units of concentration. Error science, error minimization.

INORGANIC CHEMISTRY

Chemical Bonding

Molecular orbital theory: shapes and sign convention of atomic orbitals. Modes of overlapping. Concept of σ and π bonds. LCAO concept. Types of molecular orbitals – bonding, antibonding and non-bonding. MOED of homonuclear diatomics – H_2 , N_2 , O_2 , O_2^+ , O_2^- , F_2 (unhybridized diagrams only) and heteronuclear diatomics CO , CN^- , NO , NO^+ and HF . Bond order, stability and magnetic properties.

s-Block Elements

General characteristics of Groups I and II elements, diagonal relationship between Li and Mg, Be and Al.

p-Block Elements

Group 13: Synthesis and structure of diborane, boron-nitrogen compounds ($B_3N_3H_6$ and BN).

Group 14: Carbides – classification – ionic, covalent, interstitial – synthesis. Industrial application. Silicones – preparation: (a) direct silicon process, (b) use of Grignard reagent. Classification – straight-chain, cyclic and cross-linked.

Group 15: Synthesis of ammonia. Oxyacids of nitrogen and phosphorus.

Group 16: Manufacture of H_2SO_4 , oxyacids of sulphur.

Group 17: Interhalogens – classification, general preparation, structures of AB , AB_3 , AB_5 and AB_7 types and reactivity. Comparison of pseudohalogens with halogens. Chemistry of zero-group elements:

General preparation, structure, bonding and reactivity of xenon compounds – oxides, halides and oxy-halides.

Chemistry of d-Block Elements

Characteristics of d-block elements with special reference to electronic configuration, variable valence, ability to form complexes, magnetic properties and catalytic properties. Stability of various oxidation states and comparative treatment of second and third transition series with their 3d analogues.

Chemistry of Lanthanides

Electronic structure, oxidation state, ionic and atomic radii – lanthanide contraction – causes and consequences – complex formation. Magnetic properties, colour and spectra.

Chemistry of Actinides

Electronic configuration, oxidation state, actinide contraction, colour and complex formation. Comparison with lanthanides.

Theories of Bonding in Metals

Valence bond theory, explanation of metallic properties and its limitations, free electron theory, band theory, formation of bands, explanation of conductors, semiconductors – n-type and p-type, extrinsic and intrinsic semiconductors, and insulators.

Coordination Compounds

Coordination complexes. IUPAC nomenclature, Werner's theory, Sidgwick's EAN rule and limitations. Valence bond theory (VBT) – postulates and application to (a) tetrahedral complexes $[\text{Ni}(\text{NH}_3)_4]^{2+}$, $[\text{NiCl}_4]^{2-}$ and $[\text{Ni}(\text{CO})_4]$ (b) octahedral complexes $[\text{Fe}(\text{CN})_6]^{4-}$, $[\text{FeF}_6]^{4-}$, $[\text{Co}(\text{NH}_3)_6]^{3+}$, $[\text{CoF}_6]^{3-}$. Limitations of VBT. Isomerism in coordination compounds, stereoisomerism – (a) geometrical isomerism in (i) square planar metal complexes of the type $[\text{MA}_2\text{B}_2]$, $[\text{MA}_2\text{BC}]$, $[\text{M}(\text{AB})_2]$, $[\text{MABCD}]$.

(ii) octahedral metal complexes of the type $[\text{MA}_4\text{B}_2]$, $[\text{M}(\text{AA})_2\text{B}_2]$, $[\text{MA}_3\text{B}_3]$ using suitable examples, (b) optical isomerism in (i) tetrahedral complexes $[\text{MABCD}]$

(ii) Octahedral complexes $[\text{M}(\text{AA})_2\text{B}_2]$, $[\text{M}(\text{AA})_3]$ using suitable examples. Structural isomerism: ionisation, linkage and coordination ligand isomerism using suitable examples.

Cements:

Introduction, Classification of cement and properties, chemical composition of cement, Standards, Manufacturing of Portland cement, chemical constituents of Portland cement, Setting and hardening of cement, PCC & RCC.

PHYSICAL CHEMISTRY

Atomic Structure and Elementary Quantum Mechanics

Planck's radiation law, de Broglie's hypothesis. Heisenberg's uncertainty principle, Schrödinger's wave equation and its importance. Physical interpretation of the wave function, significance of ψ and ψ^2 . Schrödinger wave equation for H-atom (no derivation).

Gaseous State

Deviation of real gases from ideal behavior. van der Waals equation of state. The van der Waals equation and critical state. Relationship between critical constants and van der Waals constants. The law of corresponding states, reduced equation of states. Joule-Thomson effect and inversion temperature of a gas. Liquefaction of gases: (i) Linde's method based on Joule-Thomson effect; (ii) Claude's method based on adiabatic expansion of a gas.

Dilute Solutions & Colligative Properties

Dilute solutions, colligative properties, Raoult's law, relative lowering of vapour pressure, molecular weight determination. Osmosis – determination of molecular weight from osmotic pressure. Elevation of boiling point and depression of freezing point. Derivation of relation between molecular weight and elevation in boiling point and depression in freezing point. Experimental methods for determining various colligative properties. Abnormal molar mass, van't Hoff factor, degree of dissociation and association of solutes.

Solid State Chemistry

Symmetry elements in crystals, law of rationality of indices. Definition of space lattice, unit cell. Bravais lattices and seven crystal systems (a brief review). X-ray diffraction by crystals; Bragg's equation. Miller indices.

Symmetry of Molecules

Symmetry operations and symmetry elements in molecules. Definition of axis of symmetry, types of C_n , plane of symmetry (σ_h , σ_v , σ_d), centre of symmetry and improper rotational axis of symmetry (S_n).

Phase Rule

Meaning of the terms – phase, component and degrees of freedom. Gibbs phase rule, phase equilibria of one-component system – water system.

Colloids & Surface Chemistry

Definition of colloids. Classification of colloids. Solids in liquids (sols): preparations, protective action, Hardy-Schulze law, gold number. Liquids in liquids (emulsions): types of emulsions, preparation and emulsifier. Liquids in solids (gels): classification, preparations and properties, general applications of colloids. Adsorption: types of adsorption, factors influencing adsorption, Freundlich adsorption isotherm, Langmuir theory of unilayer adsorption isotherm, applications.

Chemical Equilibrium

Equilibrium in physical and chemical processes, dynamic nature of equilibrium, law of mass action, equilibrium constant, factors affecting equilibrium – Le Chatelier's principle, ionic equilibrium – ionisation of acids and bases, strong and weak electrolytes, degree of ionisation, ionisation of polybasic acids, acid strength, concept of pH, Henderson-Hasselbalch equation, hydrolysis of salts (elementary idea), buffer solution, solubility product, common ion effect (with illustrative examples).

Electrochemistry & EMF

Electrical transport – conduction in electrolyte solutions, specific conductance and equivalent conductance, measurement of equivalent conductance, variation of specific and equivalent conductance with dilution. Migration of ions and Kohlrausch's law, Arrhenius theory of electrolyte dissociation and its limitations,

weak and strong electrolytes, Ostwald's dilution law, Debye-Hückel-Onsager equation for strong electrolytes (elementary treatment only). Transport number, determination by Hittorf's method. Applications of conductivity measurements: determination of degree of dissociation, determination of K_a of acids, determination of solubility product of a sparingly soluble salt, conductometric titrations. Nernst equation, cell EMF and single electrode potential, standard hydrogen electrode – reference electrodes (calomel electrode) – standard electrode potential, sign conventions, electrochemical series and its significance. Applications of EMF measurements, determination of pH – quinhydrone electrode, solubility product of AgCl. Potentiometric titrations.

Chemical Kinetics

Introduction, rate of reaction, variation of concentration with time, rate laws and rate constant. Specific reaction rate. Factors influencing reaction rates: effect of concentration of reactants, effect of temperature, effect of pressure, effect of catalyst with simple examples, order of reaction. First-order reaction, derivation of equation for rate constant. Characteristics of first-order reaction. Units for rate constant. Half-life period, graph of first-order reaction, examples. Decomposition of H_2O_2 . Pseudo-first-order reaction, hydrolysis of methyl acetate. Second-order reaction, derivation of expression for second-order rate constant, examples – saponification of ester, $2O_3 \rightarrow 3O_2$, $C_2H_4 + H_2 \rightarrow C_2H_6$. Units for rate constants, half-life period and second-order plots.

Thermodynamics

A brief review of energy, work and heat units, definition of system, surroundings. First Law of Thermodynamics – statement, extensive properties and intensive properties, state function, path functions. Work of expansion and heat absorbed as path function. Expression for work of expansion, heat changes at constant pressure and heat changes at constant volume. Enthalpy. Heat capacities at constant pressure and constant volume. Derivation $C_p - C_v = R$. Isothermal and adiabatic processes. Reversible and irreversible processes. Reversible change and maximum work. Derivation of expression for maximum work for isothermal reversible process. Internal energy of an ideal gas. Joule's experiment and Joule-Thomson coefficient. Adiabatic changes in ideal gas, P-V curves for isothermal and adiabatic processes. Kirchhoff's equation and problems. Limitations of First Law and need for Second Law. Statement of Second Law of Thermodynamics. Cyclic process. Heat engine, Carnot's theorem, Carnot's cycle. Entropy: definition from Carnot's cycle. Entropy as a state function. Entropy as a measure of disorder. Sign of entropy change for spontaneous and non-spontaneous processes and equilibrium processes. Entropy changes in: (i) reversible isothermal process, (ii) reversible adiabatic process, (iii) phase change, (iv) reversible change of state of an ideal gas. Entropy of mixing, inert perfect gases. Free energy, Gibbs function (G) and Helmholtz function (A) as thermodynamic quantities. Concept of maximum work and net work. ΔG as criterion for spontaneity.

Analytical Chemistry

Analytical Techniques

Introduction, types of analysis – physical, chemical and instrumental. Physical analysis – specific gravity, melting point, boiling point, crystallization, purification of compounds, etc. Chemical analysis – quantitative and qualitative analysis of

organic and inorganic compounds. Instrumental analysis – spectroscopic, chromatographic, pH measurement, conductivity, turbidity, etc.

Volumetric Analysis (Titrimetric Analysis)

Acid-Base Titrations

Relative strength and its effect on titration, common ion effect, pH, Henderson-Hasselbalch equation, buffers, neutralization curve, acid-base indicators, theory of indicators, back titrations, biphasic titrations, pharmacopoeial applications, hydrolysis of salts, ionic products of water and law of mass action.

Redox Titrations

Theory of redox titrations, redox indicators, types of redox titrations, iodometry, cerimetry, mercurimetry, diazotization nitrite titrations, 2,6-dichlorophenol indophenol titrations, titration curve and calculations of potentials during the course of titrations.

Argentometric or Precipitation Titrations

Mohr's, Fajans' and Volhard methods.

Nonaqueous Titrations

Nonaqueous solvents, titrants and indicators. Differentiating and levelling solvents.

Complexometric Titrations

Theory of the titrations, titrant, indicators and pharmacopoeial applications.

Miscellaneous Titrations

Karl-Fischer titrations, Kjeldahl method.

Gravimetric Analysis

Stability, solubility products, types of precipitations, precipitation techniques, pharmacopoeial applications.

ANNEXURE – I(C)

SYLLABUS FOR WRITTEN EXAMINATION

For Post Code No. 63 (Biology/Serology)

Cell Biology

Ultrastructure of prokaryotic and eukaryotic cell, structure and functions of cell organelles. Cell division – mitosis and meiosis. Chromosomes – structure, karyotype.

Genetics

Mendelian principles, gene interaction, linkage and crossing over, multiple alleles (human blood groups), sex determination, sex-linked inheritance, mutations – genetic and chromosomal (structural and numerical); chromosomal aberrations in humans. Recombination in prokaryotes – transformation, conjugation, transduction, sexduction. Extra-genomic inheritance. DNA fingerprinting.

Molecular Biology and Genetic Engineering

Structure of eukaryotic gene, structure of DNA and RNA, DNA replication in prokaryotes and eukaryotes, transcription and translation in prokaryotes and eukaryotes, genetic code. Regulation of gene expression in prokaryotes, principles of recombinant DNA technology. DNA vectors, transgenesis. Applications of genetic engineering.

Biomolecules

Structure and functions of carbohydrates, proteins and amino acids, lipids, vitamins and porphyrins. Enzymes – classification and mode of action, enzyme assay, enzyme units, enzyme inhibition, enzyme kinetics, factors regulating enzyme action.

Techniques

Microscopy – light and electron, centrifugation, chromatography, electrophoresis, colorimetric and spectrophotometric techniques for the quantification of DNA, RNA and protein, blotting techniques, PCR.

Microbiology

Introduction to microbiology, sterilization techniques, different methods for isolation of microorganisms. Outlines of structure, nutrition and reproduction of eukaryotic microbes (algae, fungi, mycoplasma), prokaryotes (bacteria, cyanobacteria). Viruses: viral diseases – common cold, typhoid, cholera, ringworm, candidiasis.

Biotechnology

Plant and animal cell culture, cloning, fermentor types and process, biopesticides, biofertilizers, bioremediation, renewable and non-renewable energy resources, non-conventional fuels.

Nutrition

Biological values of carbohydrates, proteins and fats. Carbohydrate and protein malnutrition, disorders, chemistry and physiological role of vitamins and minerals in living systems.

Metabolism

Metabolism of carbohydrates, lipids, proteins, amino acids and nucleic acids. Biological oxidation and bioenergetics.

Immunology

Types of immunity, cells and organs of immune system, antigen-antibody reaction. Immunotechniques, hypersensitivity, Hepatitis B, AIDS. Vaccines.

Plant Science

Structure of root, stem and leaf of a flowering plant. Plant physiology – water relations, mineral nutrition, photosynthesis, phytohormones.

Animal Science

Biology of non-chordates and chordates, embryology of chordates, parasites of human importance – *Entamoeba histolytica*, *Plasmodium vivax*, *Taenia solium*, *Ascaris lumbricoides*, *Wuchereria bancrofti*.

Physiology

Structure and functions of liver, lungs (exchange and transport of respiratory gases), heart and kidney. Composition of blood, blood coagulation, biochemical tests for the identification of blood, digestion and absorption, endocrinology, muscle – structure and contraction, and nervous system.

Environment and Wildlife

Ecological pyramids, biogeochemical cycles – nitrogen, carbon and phosphorus. Ecological adaptations – pelagic, volant, fossorial, cursorial, desert, parasitic. Climatic and edaphic and biotic factors. Ecological succession – hydrosere and xerosere. Natural resources, biodiversity, current environmental issues, environmental pollution – air, water, soil, sound pollution, global warming, depletion of ozone and climate change. Importance of wildlife species in ecosystem, endangered and rare species, wildlife management, different methods of killing and poaching of wildlife animals.

Evolution

Theories and evidences of organic evolution, Hardy-Weinberg law. Sympatric and allopatric speciation. Evolution of man.

ANNEXURE II (A)

SCHOOL STUDY CERTIFICATE

Name of the student:

Father's Name:

Class	Name and Place of School	District	Duration of Study with Month & Year
I			
II			
III			
IV			
V			
VI			
VII			

Name of the School:

Village / Town:

Mandal:

District:

Station:

Date:

Signature of the Head of
the Educational Institute(s) with seal

Note: Should be obtained from the Educational Institution(s)

ANNEXURE II (B)
CERTIFICATE OF RESIDENCE

(To be produced by such candidates who have not studied in any educational Institution during the whole or part* of the relevant 4/7 years period but claim to be local candidates by virtue of residence for which there is reservation for local candidates.)

It is hereby certified that

(a) Sri/Smt./Kum_____son/daughter/wife of _____ has not studied in any Government Educational Institution/Government Recognized Educational Institution during the whole or part* of the 4/7 consecutive academic years ending with the academic year in which he/she completed his/her 7th class.

(b) In the 4/7 years immediately preceding his/her study of 7th class, he/she resided in the following place/places namely-

Sl.No.	Village	Mandal	District	Period
01				
02				
03				
04				
05				
06				
07				

Office Seal:

Station: Officer of Revenue Department not below the rank
Dated: of M.R.O. holding independent Charge of a Mandal

* Strike off whole/part as the case may be.