Abhilashi University
Pre-Veterinary Entrance Test (AUPVET)-2025

Date of Examination
12th July, 2025 (Saturday)

Information
cum
Counselling Booklet

Candidates are advised to carefully read the University Notification regarding AUPVET- 2025 Examination,

ABHILASHI UNIVERSITY

Chailchowk, Tehsil Chachyot, Distt. Mandi 175045 H.P.

Website: www.abhilashiuniversity.ac.in, **E-mail**admissioncell@abhilashiuniversiy.ac.in

Phone: 01907-250405

Abhilashi University
Pre-Veterinary Entrance Test (AUPVET)-2025

IMPORTANT DATES

Date of Examination- 12th July, 2025 (Saturday)

(Any change in date of examination or counselling due to any unavoidable circumstances will be notified on University website only)

DETAILED EXAMINATION AND COUNSELLING SCHEDULE	
Last date of application	30-06-2025
Issue of Admit Cards	12-07-2025 (9.30 AM onwards)
Date of AUPVET- 2025	12-07-2025 (11.00 AM)
Date of Declaration of Result of AUPVET-2025	14-07-2025
1st Round of Counselling	15-07-2025
Notification of vacant seats	20-07-2025
2nd Round of Counselling	25-07-2025
Notification of vacant seats	06-08-2025
Commencement of Classes	11-08-2025
MOP Up / spot admission Round (if required)	14-08-2025

GENERAL RULES FOR ADMISSION TO B.V.Sc. & A.H. DEGREE COURSE

The applications will be invited by Abhilashi University, Chailchowk, Mandi H.P. **FROM DESIROUS ADMISSION ELIGIBLE CANDIDATES** for appearing in Abhilashi University Pre- Veterinary Entrance Test-2025 for admission to **B.V.Sc. & A.H.** Degree Course (Session 2025-26) in its **School of Veterinary Sciences** as per prevailing Reguations and reservation policy notified by Govt. of Himachal Pradesh, as well as Regulations of **Veterinary Council of India**, New Delhi (MVSE-2016) and the **Abhilashi University** as applicable on these admissions. The University will issue Notification in two leading daily Newspapers and will also be available on the University website.

DURATION OF THE COURSE:

The duration of **BVSc & AH** degree course is **five and half years** which includes compulsory Internship of one-year period.

IMPORTANT INSTRUCTIONS

The candidates should note carefully that:

1) **ABHILASHI UNIVERSITY PRE-VETERINARY ENTRANCE TEST (AUPVT) 2025** will be conducted for eligible candidates' desirous of taking admission in B.V.Sc.& A.H. Course as per provisions laid down in "Minimum Standards of Veterinary Education- Degree course (B.V.Sc. & A.H.) Regulations, 2016" of Veterinary Council of India, New Delhi.
2) **AGE LIMIT:** The candidate must have attained the Minimum age of **17 years** on or before 31st December, 2025.
   Accordingly, the eligibility condition regarding minimum age is as under:

For candidates of General (UR)/General-EWS/SC/ST/STA/OBC-NCL/MBC-NCL category	**Candidate must be born on or before 31.12.2008**

Note: The date of birth as recorded in the secondary school examination marks sheet/ certificate will be taken as authentic for this purpose.

ELIGIBILITY CRITERIA TO APPEAR IN AUPVET-2025

1) ESSENTIAL EDUCATIONAL QUALIFICATIONS FOR APPEARING IN AUPVET-2025:

To be eligible for appearing in AUPVET-2025, the candidate must have passed the qualifying Senior Secondary/Indian School Certificate Examination/ Intermediate Examination of 10+2 scheme from a Statutory Indian Board/University (established under act by the State Governments or Central Government) with Physics, Chemistry, Biology/Bio-technology (which shall also include a practical examination in each of these subjects) and any other elective subjects along with English as one of the core compulsory subject. Provided further, the candidate must have passed the aforesaid subjects individually and also separately in Theory and Practical examinations in the subjects of Physics, Chemistry and Biology/Bio-technology.

Further, to be eligible for appearing in the AUPVET-2025 examination, the Unreserved & EWS category candidates must have obtained a minimum of 50% marks taken together in the subjects of Physics, Chemistry, Biology/Bio- technology and English at Senior Secondary (10+2) or equivalent recognized qualifying examination. For the candidates of SC, ST, OBC categories, this marks requirement will be 47.5% in the aforesaid subjects in the qualifying examination. Candidates appearing/appeared in the qualifying examination i.e. Senior Secondary or its equivalent recognized examination in the year 2025 and whose result has not been declared by the last date of submission of application form may also apply for and appear in AUPVET- 2025 but they shall not be eligible for admission to B.V.Sc. & A.H. course if they, at the time of counselling, do not produce documentary proof of passing qualifying examination with the required percentage of marks as applicable to them.

2) STATE QUOTA CRITERIA:

The Indian Nationals of HIMACHAL Domicile only will be eligible to apply and appear in the AUPVET-2025 and claim state quota subject to fulfilling the other laid down eligibility criteria also. All the candidates who are applying for AUPVET-2025 must compulsorily possess the valid BONAFIED HIMACHALI Certificate.

ADMIT CARD:

The admit cards of AUPVET-2025 will be provided on the day of the test at the University Campus by the o/o the COE, Abhilashi University

Examination Centres:

- The AUPVET-2025 shall be held at the Abhilashi University Campus only.
- **The examination centre shall not be changed in any case.**

REPORTING OF CANDIDATE AT EXAMINATION CENTRE AND SUBSEQUENT TIME SCHEDULE OF EXAMINATION:

The AUPVET-2025 examination shall be of 3 hours duration from 11.00 AM to 02.00 PM to be held on 12th July, 2025 The change of date, if any, will be intimated through notification on university website www.abhilashiuniversity.ac.in only. The candidates appearing in AUPVET- 2025 should reach and report at the allotted examination centre, as mentioned in the admit card, on the examination date as per following schedule: -

Date & Day of Examination	**12th July, 2025 (Saturday)**
Opening of Examination Centre	**9.00 AM**
Reporting Time at Centre	**9.30 AM to 10.30 AM**
Last Entry in the Examination Centre	**10.30 AM (No Entry thereafter)**
Distribution of Question Paper Booklet & cum answer sheet by the Invigilator	**10.45 AM**
Timing and Duration of Examination	**11:00 AM to 2:00 PM (3 hours)**
Test Commences	**11.00 AM**
Test Concludes	**02.00 PM (Candidates are not allowed to leave examination Hall/Room before 2.00 PM)**

All the candidates are advised to reach to examination centre well in time.

INFORMATION FOR PARENTS/GUARDIANS:

1) **It is expected from parents/guardians to guide their wards appropriately on the following issues before they leave home for appearing in the AUPVET- 2025 Examination:**
   (a) **He/She will not be allowed to enter in the examination centre after 10.30 AM. Therefore, he/she shall leave home well in advance considering all facts like traffic, location of the centre and weather conditions, etc.**
   (b) He/She will follow all the instructions and maintain the discipline during the whole examination process in the examination.
   (c) He/She will not breach any examination rule.
   (d) He/She will not use and promote any unfair means activity during the examination.
   (e) He/She will bring only the following at the examination centre:
      - Passport size coloured photograph for affixing on ADMIT CARD
      - Original Photo ID (Aadhar Card, Driving License and PAN Card etc. as ID of candidate)
   (f) He/She will not bring any barred item at the centre.
   (g) He/She will cooperate with the staff at examination centre in frisking process.
   (h) He/She will report at allotted examination centre well in advance to make him/herself available for frisking.
   (i) He/She will follow the dress code for appearing in AUPVET-2025 Examination.
2) **In case, your ward is found not obeying above instructions, he/she will not be permitted to enter in the examination centre and will not be allowed to appear in the examination.**
3) If your ward is found indulged in any unwanted activities, he/she shall be debarred from taking this examination as well as permanently in future examinations and shall also be liable for criminal action and/or any other action as deemed fit by the University.

GENERAL INSTRUCTIONS TO BE FOLLOWED IN THE EXAMINATION HALL

1) The Examination Centre will be opened 01 hour and 30 minutes before the commencement of the test. No candidate shall be allowed to enter in the examination centre after 09.30 AM. Therefore, the candidates are advised to ensure that they leave the home well in advance considering all facts like traffic, location of the centre and weather conditions, etc. After entry in

examination centre and completion of required formalities by the centre staff candidates are expected to take their allotted seats in the respective examination rooms.

2) A seat with a roll number will be allotted to each candidate. Candidates must find out and occupy their allotted seats. If a candidate is found appearing in the Test from a seat or room other than the allotted one to him/her, his/her candidature shall be cancelled.
3) The candidate must show, on demand, the Admit Card for admission in the Examination Hall. A candidate who does not possesses the valid Admit Card shall not be admitted to the Examination Hall under any circumstances by the Centre Superintendent.
4) The Candidate should collect the admit card from the COE office and affix coloured Photograph on it, before entering the Examination Centre.
5) During the examination time, the invigilator will check Admit Card of the candidates to satisfy himself/ herself about the identity of each candidate. He/she will sign at the given place in the admit card. The invigilators will also put their signatures in the place provided in the Question Booklet & Attendance sheet.
6) The candidate must ensure that both the invigilators present in the examination Hall have put their signatures in the space provided on the Question Booklet.

At the end of examination, the QUESTION BOOKLET must be handed over to the Invigilator before leaving the examination room.

7) Candidates are allowed to carry only original admit card and any one original photo ID (including Aadhar card, PAN Card, Driving License etc.) inside the Examination Hall. The name of candidate in the original photo ID should match with name in the application form.
8) No candidate will leave his/her seat or the Examination Room/Hall until the Test concludes as per schedule. Candidates should not leave the Room/Hall without handing over their OMR Answer Sheet to the invigilator on duty.
9) Smoking by any means in the examination centre is strictly prohibited.
10) The Test will start exactly at the time mentioned in the Admit Card and an announcement to this effect will be made by the invigilator.
11) Before the start of test, some important instructions will be communicated to the candidates by the invigilator for strict compliance by the candidates.
12) A signal will be given at the beginning of the examination and at half-time. A signal will also be given before the closing time when the candidate must stop marking the responses.
13) The candidate must sign on the Attendance Sheet at the appropriate place, after the commencement of examination. The candidates are also required

to put their Thumb Impressions in the space provided on the Attendance Sheet.

14) If required the candidate will have to give his/her thumb impression in the dongle (Electronic device) to link with Aadhaar to confirm the identity of the candidate.
15) The candidate will check and ensure that the Question paper booklet contains as many numbers of pages as written on the top of the cover page.
16) The candidate shall maintain silence and attend to their paper only. Any disturbance by the candidate at the Examination Centre/Hall will be deemed misbehaviour and the candidate(s) involved in such activity shall forfeit his/her right to continue in the examination. The decision of the Centre Superintendent in this regard shall be final and conclusive in the matter.

RULES REGARDING BREACH OF EXAMINATION:

BARRED ITEMS:

Candidates are not allowed to bring with them at the examination centre any barred item or any item which could be used in unfair means. The candidates will be subjected to extensive and compulsory frisking before entering the examination centre with the help of highly sensitive metal detectors. Possession of any such article with the candidates inside the centre premises will attract the penalties of unfair practices. Therefore, candidates are advised in their own interest not to bring any of the barred items to the venue of the examination as arrangement for safe keeping of articles/items belonging to the candidates will not be made at examination centre and candidates found in possession of these items will not be allowed entry inside the examination centre.

DRESS CODE:

The candidates are instructed to follow the following dress code while appearing for AUPVET-2025:

Male Dress code: Light clothes with half sleeves Shirt/T-Shirt, Slippers, Shoes or Sandals. The cap, long sleeves Shirt/T-Shirt are not allowed

Female Dress code: Light clothes with half sleeves Shirt/T-shirt, Salwar/Trouser, Slippers, Sandals and Shoes with low heels. The cap, long sleeves Shirt/T-Shirt are not allowed. All ornaments like Ring, Earrings, Nose-pin, Chain/Necklace, Pendants, Badge, Brooch and Mangal sutra etc are also not allowed.

IMPERSONATION:

If at any stage, it is found that any candidate has indulged in any type of impersonation activity i.e. impersonating any candidate or getting impersonated

by any person for taking the examination by any means; non-matching of the uploaded photograph/signature and videograph/ documents including any type

of certificate, marks sheet submitted by the candidate, submitting of coloured photocopies of the documents as original documents etc. In such cases, he/she will be handed over to the Police for further investigation and these cases will be dealt as per the Indian Penal Code. **Such candidates will be debarred permanently from taking B.V.Sc. & A.H. admission in Future.**

1) **Pattern of AUPVET-2025 Examination**: The AUPVET-2025 examination shall consist of one paper containing 200 objective type questions (four options with single correct answer) from Physics, Chemistry and Biology (Botany & Zoology) to be answered on the space provided on the test booklet itself at examination centre. The distribution of questions will be as under:

Subject	**No. of Questions**
Physics	50
Chemistry	50
Biology (Botany and Zoology)	100
Total	**200**

SYLLABUS FOR THE AUPVET-2025 EXAMINATION:

The general standard of the Abhilashi University Pre-Veterinary Entrance Test - 2025 will be that of 11th and 12th class under the 10+2 scheme/Pre-Medical/Intermediate Science or an equivalent recognized examination of an Indian University/State Board/CBSE. However, for convenience of the candidates, the model syllabus for AUPVET-2025 has been annexed in this Information booklet.

LANGUAGE OF THE QUESTION PAPER:

The candidates will be provided question paper booklet printed only in English. **The Question Paper Booklet:**

(a) Fifteen minutes before the commencement of the test every candidate will be given a Question paper booklet cum Answer sheet.

(b) Immediately on receipt of the Question paper booklet cum answer sheet, the candidates will fill in the required particulars on the cover page of the Question booklet with Black Ball Point Pen only. Candidates will not open the Question paper booklet until asked to do so by the invigilator.

(c) After completing the test and before handing over the test booklet cum answer sheet, the candidate should check again that all the particulars required in the booklet have been correctly written and marked.

(d) Before leaving the Examination Hall the candidates should ensure that they have handed over the Test Booklet cum answer sheet to the invigilators on duty.

(e) The candidate will not be allowed to take with him/her the Question Paper Booklet after completion of examination.

2) **Marking the Responses:**

(a) Use only Blue/Black Ball Point Pen to tick the appropriate circle.
(b) Mark should be dark and should completely visible.
(c) Tick only one circle for each entry as the Answer once marked cannot be changed.
(d) Mark the responses only in the space provided.
(e) Each question shall have four options to answer A, B, C, D. The candidate will indicate his/her response to the question by ticking the appropriate circle against A or B or C or D for each question completely with Blue/Black Ball Point Pen.

Changing an Answer is not allowed: The candidates must fully satisfy themselves about the accuracy of the answer before darkening the appropriate circle as no change in answer once marked is allowed. Use of eraser or white fluid on the Answer Sheet is not permissible as the Answer Sheets are machine gradable and it may lead to wrong evaluation.

3) **Scoring and Marking:**

(a) **Each question carries 2 marks. For each correct response the candidate will get 2 marks. For each incorrect response no mark will be deducted from the total score.** No deduction from the total score will, however, be made if no response is indicated for a question in the OMR answer sheet. **More than one answer indicated in a** question will be deemed as incorrect response and will be negatively marked.

4) **Rough Work**

All rough work is to be done in the Question paper booklet itself on specified page only.

POST EXAMINATION ACTIVITIES AND DECLARATION OF RESULT

1) **Declaration of result:**

The University will conduct the AUPVET-2025 Examination and the result will be displayed on its website.

Admission and Counselling Procedure for BVSc & AH Degree Course

Admission of candidates of all categories to B.V.Sc. & A.H. degree

course on State and All India quota seats in the School of Veterinary Sciences of the Abhilashi University, Chailchowk, Mandi will be filled on basis of merit of AUPVET-2025 qualified candidates, as well as prevailing Himachal State reservation policy as applicable on these admissions, fulfilment of the other laid down admission eligibility requirements and Veterinary Council of India, New Delhi, Regulations (MSVE-2016) and directives of State Govt./ Abhilashi University.

Management quota seats of School of Veterinary Sciences, Abhilashi University will be filled on basis of merit of AUPVET-2025 qualified candidates/merit of NEET(UG)- 2025 qualified candidates as per the Veterinary Council of India, New Delhi, Regulations (MSVE-2016) from time to time.

PROCESS OF FILLING THE SEATS IN SCHOOL OF VETERINARY SCIENCES, ABHILASHI UNIVERSITY

(i) **25% Regular State quota seats** – To be filled by the University through merit of the AUPVET-2025 qualified candidates.

(ii) **50% All India quota seats** – To be filled by the University through merit of the AUPVET-2025 qualified candidates.

(iii) **25% Management quota seats** – To be filled by the University through merit of the AUPVET-2025/ NEET (UG)-2025 qualified candidates

QUALIFYING CRITERIA FOR DECLARATION OF RESULT / MERIT OF AUPVET-2025

To be eligible for admission to B.V.Sc. & A.H. degree course, it shall be necessary for a candidate to obtain a minimum of marks at **50% marks** in the 'Abhilashi University Pre-Veterinary Entrance Test-2025: Provided that in respect of

(a) For candidates belonging to the **SC, ST and OBC** the minimum qualifying marks shall be at the 40% marks

(b) Candidates with benchmark disabilities specified as per MSVE-2016, the minimum marks shall be at **45% marks** in the case of **General category** and **40% marks** in the case of the **SC, ST, OBC.**

RESERVATION POLICY

The Abhilashi University has adopted the reservation policy of the H.P. State Govt. for educational Institutions issued by the Secretary (Education), H.P. vide notification dated 20-08-2020. The Policy specifies 22% seats for SC, 5% seats for ST and 15% seats for OBC categories apart from 10% seats for EWS Category (not available in BVSc & AH Course).

DISTRIBUTION OF SEATS UNDER DIFFERENT QUOTAS

The Abhilashi University the seats of B.V.Sc. & A.H course are divided into three categories as per the decision taken in the 59th Meeting its Academic Council held on 20-12-2024 and approved by the Board of Management/ Governing Bodies in their subsequent meetings held on 21-12-2024 and 30-12-2024 respectively. The seat wise reservation roaster for different categories is as under:

Reservation Roster for B.V.Sc. & A.H. Course based upon the Secretary, Education, H.P. Notification No. EDNA-F (7)-5/2013- Loose dated 20/08/2020 after excluding EWS seats (Total seats 80, 25% SQ i.e. 20 Seats,50 % AIQ i.e. 60 Seats & 25% MQ i.e. 20 Seats)

20 Point Roster for State Quota seats (SC- 22% i.e. 4 seats, ST 5% i.e. 1 seat and OBC 15% i.e. 3 seats)		40 Point Roster for AIQ seats (SC- 22% i.e.09 seats, ST 5% i.e. 2 seats and OBC 15% i.e. 6 seats)				20 Point Roster for Management Quota seats (SC- 22% i.e. 4 seats, ST 5% i.e. 1 seat and OBC 15% i.e. 3 seats)	
Sr. No. of seat	**Category of candidate**	**Sr. No. of seat**	**Category of candidate**	**Sr. No. of seat**	**Category of candidate**	**Sr. No. of seat**	**Category of candidate**
1	G-UR	1	G-UR	21	SC	1	G-UR
2	G-UR	2	G-UR	22	G-UR	2	G-UR
3	G-UR	3	G-UR	23	G-UR	3	G-UR
4	G-UR	4	G-UR	24	G-UR	4	G-UR
5	SC	5	SC	25	G-UR	5	SC
6	G-UR	6	G-UR	26	SC	6	G-UR
7	G-UR	7	G-UR	27	OBC	7	G-UR
8	OBC	8	OBC	28	G-UR	8	OBC
9	SC	9	SC	29	SC	9	SC
10	G-UR	10	G-UR	30	G-UR	10	G-UR
11	G-UR	11	G-UR	31	G-UR	11	G-UR
12	G-UR	12	G-UR	32	OBC	12	G-UR
13	SC	13	SC	33	G-UR	13	SC
14	G-UR	14	G-UR	34	SC	14	G-UR
15	G-UR	15	G-UR	35	G-UR	15	G-UR
16	OBC	16	OBC	36	ST	16	OBC
17	SC	17	SC	37	SC	17	SC
18	ST	18	ST	38	OBC	18	ST
19	G-UR	19	G-UR	39	G-UR	19	G-UR
20	OBC	20	OBC	40	G-UR	20	OBC

Please note if the seats of any category remain vacant after 2nd round of counselling they shall be converted to open category.

FEE STRUCTURE

The fee of B. V. Sc. & A.H. course is as per the decision taken in the Fee Structure Committee-I meeting chaired by the Secretary Health, Govt. of H.P. on dated 22-03-2025 and to be notified by the Secretary (Education), H.P.

ORIGINAL DOCUMENTS REQUIRED AT THE TIME OF COUNSELLING FOR VERIFICATION

The candidates must bring compulsorily the required original documents, for verification on the day of admission process for verification of is admission eligibility, failing which they will not be considered for admission.

The list of such documents is as under:

1) Original Photo ID along with its one self-attested photocopy.
2) Mark sheet & Certificate of Senior Secondary (10+2) or equivalent recognized Examination.
3) Mark sheet and Certificate of Secondary or equivalent recognized Examination.
4) Character Certificate (in the proforma of Institute mentioning all the admission related particulars) issued from the school/college last attended.
5) Valid I Caste Certificate as on the date of counselling, as per applicability, as applicable with respect to SC, ST, OBC issued by competent authority.
6) Bonafied Himachali Certificate issued by competent authority for state quota.
7) Transfer Certificate of last Institute, if at present no admission has been taken in any Institute.
8) Migration Certificate issued by last Board /University (If available at the time of counselling).
9) Four identical colour photographs with name and date of taking photograph.

The original documents submitted at the time of counselling, if found defective/forged, the eligibility for admission will be cancelled. Also, if for the reason(s), to be recorded in the writing, the Central UG Admission Board suspects that a particular candidate has obtained his/her documents including caste certificate and income certificates of parents by misrepresenting the facts, the matter will be referred to the concerned District Magistrate. Criminal action may also be initiated in such cases.

RULES FOR BREAKING TIE

In case of candidates securing equal marks (tie) in the AUPVET-2025 merit, the tie shall be broken to determine merit amongst themselves as per the procedure given below, in the same serial order:

a. Candidate obtaining higher marks/percentile score in Biology (Botany & Zoology) in the Test, followed by,

b. Candidate obtaining higher marks/percentile score in Chemistry in the Test, followed by,
c. Candidate obtaining higher marks/percentile score in Physics in the Test, followed by,
d. Candidate with less proportion of the number of attempted incorrect answers and correct answers in all the subjects in the Test,
e. Candidate with less proportion of a number of attempted incorrect answers and correct answers in Biology (Botany & Zoology) in the Test, followed by
f. Candidate with less proportion of a number of attempted incorrect answers and correct answers in Chemistry in the Test, followed by
g. Candidate with less proportion of a number of attempted incorrect answers and correct answers in Physics in the Test, followed by
h. In case, a-g criteria are exhausted and tie still persists, it will be resolved through a random process with the guidance of an independent expert committee.

MEDICAL EXAMINATION

All the candidates provisionally admitted to B.V.Sc. & A.H. course will have to submit Physical Fitness Certificate from Medical Jurist of Govt. Hospital / Medical College. The admission of candidate found unsuitable in Physical Fitness will be cancelled.

CLOSURE OF ADMISSIONS

The admissions for session 2025-26 will be closed on 30/09/2025 as per MSVE-2016 in the veterinary colleges or on the date as notified by the VCI, New Delhi.

Further, once all the seats at the School of Veterinary Sciences, Abhilashi University are filled before 30/09/2025, the admission for the academic session 2025-26 will be declared closed by the University.

LEGAL JURISDICTION

All disputes pertaining to the conduct of AUPVET-2025 & allotment of seats shall fall within the jurisdiction of Courts of Mandi only.

Modal Syllabus for AUPVET-2025

PHYSICS

UNIT 1: PHYSICS AND MEASUREMENT

Units of measurements, System of Units, S I Units, fundamental and derived units, least count, significant figures, Errors in measurements, Dimensions of Physics quantities, dimensional analysis, and its applications.

UNIT 2: KINEMATICS

The frame of reference, motion in a straight line, Position- time graph, speed and velocity; Uniform and non-uniform motion, average speed and instantaneous velocity, uniformly accelerated motion, velocity-time, position-time graph, relations for uniformly accelerated motion, Scalars and Vectors, Vector. Addition and subtraction, scalar and vector products, Unit Vector, Resolution of a Vector. Relative Velocity, Motion in a plane, Projectile Motion, Uniform Circular Motion.

UNIT 3: LAWS OF MOTION

Force and inertia, Newton's First law of motion; Momentum, Newton's Second Law of motion, Impulses; Newton's Third Law of motion. Law of conservation of linear momentum and its applications. Equilibrium of concurrent forces.

Static and Kinetic friction, laws of friction, rolling friction.

Dynamics of uniform circular motion: centripetal force and its applications: vehicle on a level circular road, vehicle on a banked road.

UNIT 4: WORK, ENERGY, AND POWER

Work done by a constant force and a variable force; kinetic and potential energies, work-energy theorem, power.

The potential energy of spring conservation of mechanical energy, conservative and nonconservative forces; motion in a vertical circle: Elastic and inelastic collisions in one and two dimensions.

UNIT5: ROTATIONAL MOTION

Centre of the mass of a two-particle system, Centre of the mass of a rigid body; Basic concepts of rotational motion; moment of a force; torque, angular momentum, conservation of angular momentum and its applications;

The moment of inertia, the radius of gyration, values of moments of inertia for simple geometrical objects, parallel and perpendicular axes theorems, and their applications. Equilibrium of rigid bodies, rigid body rotation and equations of rotational motion, comparison of linear and rotational motions.

UNIT 6: GRAVITATION

The universal law of gravitation. Acceleration due to gravity and its variation with altitude and depth. Kepler's law of planetary motion. Gravitational potential

energy; gravitational potential. Escape velocity, Motion of a satellite, orbital velocity, time period and energy of satellite.

UNIT 7: PROPERTIES OF SOLIDS AND LIQUIDS

Elastic behaviour, Stress-strain relationship, Hooke's Law. Young's modulus, bulk modulus, modulus of rigidity. Pressure due to a fluid column; Pascal's law and its applications. Effect of gravity on fluid pressure.

Viscosity. Stokes' law. terminal velocity, streamline, and turbulent flow. critical velocity. Bernoulli's principle and its applications.

Surface energy and surface tension, angle of contact, excess of pressure across a curved surface, application of surface tension - drops, bubbles, and capillary rise. Heat, temperature, thermal expansion; specific heat capacity, calorimetry; change of state, latent heat. Heat transfer conduction, convection, and radiation.

UNIT 8: THERMODYNAMICS

Thermal equilibrium, zeroth law of thermodynamics, the concept of temperature. Heat, work, and internal energy. The first law of thermodynamics, isothermal and adiabatic processes.

The second law of thermodynamics: reversible and irreversible processes.

UNIT 9: KINETIC THEORY OF GASES

Equation of state of a perfect gas, work done on compressing a gas, Kinetic theory of gases - assumptions, the concept of pressure. Kinetic interpretation of temperature: RMS speed of gas molecules: Degrees of freedom. Law of equipartition of energy and applications to specific heat capacities of gases; Mean free path. Avogadro's number.

UNIT 10: OSCILLATIONS AND WAVES

Oscillations and periodic motion – time period, frequency, displacement as a function of time. Periodic functions. Simple harmonic motion (S.H.M.) and its equation; phase: oscillations of a spring -restoring force and force constant: energy in S.H.M. - Kinetic and potential energies; Simple pendulum - derivation of expression for its time period:

Wave motion. Longitudinal and transverse waves, speed of travelling wave. Displacement relation for a progressive wave. Principle of superposition of waves, reflection of waves. Standing waves in strings and organ pipes, fundamental mode and harmonics. Beats.

UNIT 11: ELECTROSTATICS

Electric charges: Conservation of charge. Coulomb's law forces between two point charges, forces between multiple charges: superposition principle and continuous charge distribution.

Electric field: Electric field due to a point charge, Electric field lines. Electric dipole, Electric field due to a dipole. Torque on a dipole in a uniform electric field.

Electric flux. Gauss's law and its applications to find field due to infinitely long uniformly charged straight wire, uniformly charged infinite plane sheet, and uniformly charged thin spherical shell. Electric potential and its calculation for a point charge, electric dipole and system of charges; potential difference, Equipotential surfaces, Electrical potential energy of a system of two point charges and of electric dipole in an electrostatic field.

Conductors and insulators. Dielectrics and electric polarization, capacitors and capacitances, the combination of capacitors in series and parallel, capacitance of a parallel plate capacitor with and without dielectric medium between the plates. Energy stored in a capacitor.

UNIT 12: CURRENT ELECTRICITY

Electric current. Drift velocity, mobility and their relation with electric current. Ohm's law. Electrical resistance. V-I characteristics of Ohmic and non-ohmic conductors. Electrical energy and power. Electrical resistivity and conductivity. Series and parallel combinations of resistors; Temperature dependence of resistance.

Internal resistance, potential difference and emf of a cell, a combination of cells in series and parallel. Kirchhoff’s laws and their applications. Wheatstone bridge. Metre Bridge.

UNIT 13: MAGNETIC EFFECTS OF CURRENT AND MAGNETISM

Biot - Savart law and its application to current carrying circular loop. Ampere's law and its applications to infinitely long current carrying straight wire and solenoid. Force on a moving charge in uniform magnetic and electric fields.

Force on a current-carrying conductor in a uniform magnetic field. The force between two parallel currents carrying conductors-definition of ampere. Torque experienced by a current loop in a uniform magnetic field: Moving coil galvanometer, its sensitivity, and conversion to ammeter and voltmeter.

Current loop as a magnetic dipole and its magnetic dipole moment. Bar magnet as an equivalent solenoid, magnetic field lines; Magnetic field due to a magnetic dipole (bar magnet) along its axis and perpendicular to its axis. Torque on a

magnetic dipole in a uniform magnetic field. Para-, dia- and ferromagnetic substances with examples, effect of temperature on magnetic properties.

UNIT 14: ELECTROMAGNETIC INDUCTION AND ALTERNATING CURRENTS

Electromagnetic induction: Faraday's law. Induced emf and current: Lenz's Law, Eddy currents. Self and mutual inductance. Alternating currents, peak and RMS value of alternating current/ voltage: reactance and impedance: LCR series circuit, resonance: power in AC circuits, wattless current. AC generator and transformer.

UNIT 15: ELECTROMAGNETIC WAVES

Displacement current. Electromagnetic waves and their characteristics, Transverse nature of electromagnetic waves, Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet. X-rays. Gamma rays), Applications of e.m. waves.

UNIT 16: OPTICS

Reflection of light, spherical mirrors, morror formula. Refraction of light at plane and spherical surfaces, thin lens formula and lens maker formula. Total internal reflection and its applications.

Magnification. Power of a Lens. Combination of thin lenses in contact. Refraction of light through a prism. Microscope and Astronomical Telescope (reflecting and refracting) and their magnifying powers.

Wave optics: wavefront and Huygens' principle. Laws of reflection and refraction using Huygens principle. Interference, Young's double-slit experiment and expression for fringe width, coherent sources, and sustained interference of light. Diffraction due to a single slit, width of central maximum.. Polarization, plane-polarized light: Brewster's law, uses of plane-polarized light and Polaroid.

UNIT 17: DUAL NATURE OF MATTER AND RADIATION

Dual nature of radiation. Photoelectric effect. Hertz and Lenard's observations; Einstein's photoelectric equation: particle nature of light. Matter waves-wave nature of particle, de Broglie relation.

UNIT 18: ATOMS AND NUCLEI

Alpha-particle scattering experiment; Rutherford's model of atom; Bohr model, energy levels, hydrogen spectrum. Composition and size of nucleus, atomic masses, Mass-energy relation, mass defect; binding energy per nucleon and its variation with mass number, nuclear fission, and fusion.

UNIT 19: ELECTRONIC DEVICES

Semiconductors; semiconductor diode: I-V characteristics in forward and reverse bias; diode as a rectifier; I-V characteristics of LED. the photodiode, solar cell,

and Zener diode; Zener diode as a voltage regulator. Logic gates (OR. AND. NOT. NAND and NOR).

UNIT 20: EXPERIMENTAL SKILLS

Familiarity with the basic approach and observations of the experiments and activities:

1. Vernier calipers-its use to measure the internal and external diameter and depth of a vessel.
2. Screw gauge-its use to determine thickness/ diameter of thin sheet/wire.
3. Simple Pendulum-dissipation of energy by plotting a graph between the square of amplitude and time.
4. Metre Scale - the mass of a given object by the principle of moments.
5. Young's modulus of elasticity of the material of a metallic wire.
6. Surf ace tension of water by capillary rise and effect of detergents,
7. Co-efficient of Viscosity of a given viscous liquid by measuring terminal velocity of a given spherical **body,**
8. Speed of sound in air at room temperature using a resonance tube,
9. Specific heat capacity of a given (i) solid and (ii) liquid by method of mixtures.
10. The resistivity of the material of a given wire using a metre bridge.
11. The resistance of a given wire using Ohm's law.
12. Resistance and figure of merit of a galvanometer by half deflection method.
13. The focal length of;
    (i) Convex mirror
    (ii) Concave mirror, and
    (iii) Convex lens, using the parallax method.
14. The plot of the angle of deviation vs angle of incidence for a triangular prism.
15. Refractive index of a glass slab using a travelling microscope.
16. Characteristic curves of a p-n junction diode in forward and reverse bias.
17. Characteristic curves of a Zener diode and finding reverse break down voltage.
18. Identification of Diode. LED, Resistor. A capacitor from a mixed collection of such items.

CHEMISTRY
PHYSICAL CHEMISTRY

UNIT I: SOME BASIC CONCEPTS IN CHEMISTRY

Matter and its nature, Dalton's atomic theory: Concept of atom, molecule, element, and compound: Laws of chemical combination; Atomic and molecular masses, mole concept, molar mass, percentage composition, empirical and molecular formulae: Chemical equations and stoichiometry.

UNIT 2: ATOMIC STRUCTURE

Nature of electromagnetic radiation, photoelectric effect; Spectrum of the hydrogen atom. Bohr model of a hydrogen atom - its postulates, derivation of the relations for the energy of the electron and radii of the different orbits, limitations of Bohr's model; Dual nature of matter, de Broglie's relationship. Heisenberg uncertainty principle. Elementary ideas of quantum mechanics, quantum mechanics, the quantum mechanical model of the atom, its important features. Concept of atomic orbitals as one-electron wave functions: Variation of Ψ and $\Psi 2$ with r for 1s and 2s orbitals; various

quantum numbers (principal, angular momentum, and magnetic quantum numbers) and their significance; shapes of s, p, and d - orbitals, electron spin and spin quantum number: Rules for filling electrons in orbitals – Aufbau principle. Pauli's exclusion principle and Hund's rule, electronic configuration of elements, extra stability of half-filled and completely filled orbitals.

UNIT 3: CHEMICAL BONDING AND MOLECULAR STRUCTURE

Kossel - Lewis approach to chemical bond formation, the concept of ionic and covalent bonds.

Ionic Bonding: Formation of ionic bonds, factors affecting the formation of ionic bonds; calculation of lattice enthalpy.

Covalent Bonding: Concept of electronegativity. Fajan’s rule, dipole moment: Valence Shell Electron Pair Repulsion (VSEPR) theory and shapes of simple molecules.

Quantum mechanical approach to covalent bonding: Valence bond theory - its important features, the concept of hybridization involving s, p, and d orbitals; Resonance.

Molecular Orbital Theory - Its important features. LCAOs, types of molecular orbitals (bonding, antibonding), sigma and pi-bonds, molecular orbital electronic configurations of homonuclear diatomic molecules, the concept of bond order, bond length, and bond energy.

Elementary idea of metallic bonding. Hydrogen bonding and its applications.

UNIT 4: CHEMICAL THERMODYNAMICS

Fundamentals of thermodynamics: System and surroundings, extensive and intensive properties, state functions, types of processes.

The first law of thermodynamics - Concept of work, heat internal energy and enthalpy, heat capacity, molar heat capacity; Hess's law of constant heat summation; Enthalpies of bond dissociation, combustion, formation, atomization, sublimation, phase transition, hydration, ionization, and solution.

The second law of thermodynamics - Spontaneity of processes; ΔS of the universe and ΔG of the system as criteria for spontaneity. ΔG° (Standard Gibbs energy change) and equilibrium constant.

UNIT 5: SOLUTIONS

Different methods for expressing the concentration of solution - molality, molarity, mole fraction, percentage (by volume and mass both), the vapour pressure of solutions and Raoult's Law - Ideal and non-ideal solutions, vapour pressure - composition, plots for ideal and non-ideal solutions; Colligative properties of dilute solutions - a relative lowering of vapour pressure, depression of freezing point, the elevation of boiling point and osmotic pressure; Determination of molecular mass using colligative properties; Abnormal value of molar mass, van't Hoff factor and its significance.

UNIT 6: EQUILIBRIUM

Meaning of equilibrium, the concept of dynamic equilibrium.

Equilibria involving physical processes: Solid-liquid, liquid - gas and solid-gas equilibria, Henry's law. General characteristics of equilibrium involving physical processes.

Equilibrium involving chemical processes: Law of chemical equilibrium, equilibrium constants (K_p and K_c) and their significance, the significance of ΔG and ΔG° in chemical equilibrium, factors affecting equilibrium concentration, pressure, temperature, the effect of catalyst; Le Chatelier's principle.

Ionic equilibrium: Weak and strong electrolytes, ionization of electrolytes, various concepts of acids and bases (Arrhenius. Bronsted - Lowry and Lewis) and their ionization, acid-base equilibria (including multistage ionization) and ionization constants, ionization of water. pH scale, common ion effect, hydrolysis of salts and pH of their solutions, the solubility of sparingly soluble salts and solubility products, buffer solutions.

UNIT 7: REDOX REACTIONS AND ELECTROCHEMISTRY

Electronic concepts of oxidation and reduction, redox reactions, oxidation number, rules for assigning oxidation number, balancing of redox reactions.

Electrolytic and metallic conduction, conductance in electrolytic solutions, molar conductivities and their variation with concentration: Kohlrausch's law and its

applications.

Electrochemical cells - Electrolytic and Galvanic cells, different types of electrodes, electrode potentials including standard electrode potential, half - cell and cell reactions, emf of a Galvanic cell and its measurement: Nernst equation and its applications; Relationship between cell potential and Gibbs' energy change: Dry cell and lead accumulator; Fuel cells.

UNIT 8: CHEMICAL KINETICS

Rate of a chemical reaction, factors affecting the rate of reactions: concentration, temperature, pressure, and catalyst; elementary and complex reactions, order and molecularity of reactions, rate law, rate constant and its units, differential and integral forms of zero and first-order reactions, their characteristics and half-lives, the effect of temperature on the rate of reactions, Arrhenius theory, activation energy and its calculation, collision theory of bimolecular gaseous reactions (no derivation).

INORGANIC CHEMISTRY

UNIT 9: CLASSIFICATION OF ELEMENTS AND PERIODICITY IN PROPERTIES

Modem periodic law and present form of the periodic table, s, p. d and f block elements, periodic trends in properties of elements atomic and ionic radii, ionization enthalpy, electron gain enthalpy, valence, oxidation states, and chemical reactivity.

UNIT 10: P- BLOCK ELEMENTS

Group -13 to Group 18 Elements

General Introduction: Electronic configuration and general trends in physical and chemical properties of elements across the periods and down the groups; unique behaviour of the first element in each group.

UNIT 11: d - and f- BLOCK ELEMENTS

Transition Elements

General introduction, electronic configuration, occurrence and characteristics, general trends in properties of the first-row transition elements - physical properties, ionization enthalpy, oxidation states, atomic radii, colour, catalytic behaviour, magnetic properties, complex formation, interstitial compounds, alloy formation; Preparation, properties, and uses of $K_2Cr_2O_7$, and $KMnO_4$.

Inner Transition Elements

Lanthanoids - Electronic configuration, oxidation states, and lanthanoid contraction. **Actinoids** - Electronic configuration and oxidation states.

UNIT 12: CO-ORDINATION COMPOUNDS

Introduction to coordination compounds. Werner's theory; ligands, coordination number, denticity. chelation; IUPAC nomenclature of mononuclear co-ordination

compounds, isomerism; Bonding-Valence bond approach and basic ideas of Crystal field theory, colour and magnetic properties; Importance of co-ordination compounds (in qualitative analysis, extraction of metals and in biological systems).

ORGANIC CHEMISTRY

UNIT 13: PURIFICATION AND CHARACTERISATION OF ORGANIC COMPOUNDS

Purification - Crystallization, sublimation, distillation, differential extraction, and chromatography - principles and their applications.

Qualitative analysis - Detection of nitrogen, sulphur, phosphorus, and halogens.

Quantitative analysis (basic principles only) - Estimation of carbon, hydrogen, nitrogen, halogens, sulphur, phosphorus.

Calculations of empirical formulae and molecular formulae: Numerical problems in organic quantitative analysis,

UNIT 14: SOME BASIC PRINCIPLES OF ORGANIC CHEMISTRY

Tetravalency of carbon: Shapes of simple molecules - hybridization (s and p): Classification of organic compounds based on functional groups: and those containing halogens, oxygen, nitrogen, and sulphur; Homologous series: Isomerism - structural and stereoisomerism.

Nomenclature (Trivial and IUPAC)

Covalent bond fission - Homolytic and heterolytic: free radicals, carbocations, and carbanions; stability of carbocations and free radicals, electrophiles, and nucleophiles.

Electronic displacement in a covalent bond

- Inductive effect, electrometric effect, resonance, and hyperconjugation.

Common types of organic reactions- Substitution, addition, elimination, and rearrangement.

UNITS 15: HYDROCARBONS

Classification, isomerism, IUPAC nomenclature, general methods of preparation, properties, and reactions.

Alkanes - Conformations: Sawhorse and Newman projections (of ethane): Mechanism of halogenation of alkanes.

Alkenes - Geometrical isomerism: Mechanism of electrophilic addition: addition of hydrogen, halogens, water, hydrogen halides (Markownikoffs and peroxide effect): Ozonolysis and polymerization.

Alkynes - Acidic character: Addition of hydrogen, halogens, water, and hydrogen halides: Polymerization.

Aromatic hydrocarbons - Nomenclature, benzene - structure and aromaticity:

Mechanism of electrophilic substitution: halogenation, nitration.

Friedel - Craft's alkylation and acylation, directive influence of the functional group in monosubstituted benzene.

UNIT 16: ORGANIC COMPOUNDS CONTAINING HALOGENS

General methods of preparation, properties, and reactions; Nature of C-X bond; Mechanisms of substitution reactions.

Uses; Environmental effects of chloroform, iodoform freons, and DDT.

UNIT 17: ORGANIC COMPOUNDS CONTAINING OXYGEN

General methods of preparation, properties, reactions, and uses.

ALCOHOLS, PHENOLS, AND ETHERS

Alcohols: Identification of primary, secondary, and tertiary alcohols: mechanism of dehydration.

Phenols: Acidic nature, electrophilic substitution reactions: halogenation. nitration and sulphonation. Reimer - Tiemann reaction.

Ethers: Structure.

Aldehyde and Ketones: Nature of carbonyl group; Nucleophilic addition to >C=O group, relative reactivities of aldehydes and ketones; Important reactions such as - Nucleophilic addition reactions (addition of HCN. NH3, and its derivatives), Grignard reagent; oxidation: reduction (Wolf Kishner and Clemmensen); the acidity of α-hydrogen. aldol condensation, Cannizzaro reaction. Haloform reaction, Chemical tests to distinguish between aldehydes and Ketones.

Carboxylic Acids

Acidic strength and factors affecting it,

UNIT 18: ORGANIC COMPOUNDS CONTAINING NITROGEN

General methods of preparation. Properties, reactions, and uses.

Amines: Nomenclature, classification structure, basic character, and identification of primary, secondary, and tertiary amines and their basic character.

Diazonium Salts: Importance in synthetic organic chemistry.

UNIT 19: BIOMOLECULES

General introduction and importance of biomolecules.

CARBOHYDRATES - Classification; aldoses and ketoses: monosaccharides (glucose and fructose) and constituent monosaccharides of oligosaccharides (sucrose, lactose, and maltose).

PROTEINS - Elementary Idea of α-amino acids, peptide bond, polypeptides. Proteins: primary, secondary, tertiary, and quaternary structure (qualitative idea only), denaturation of proteins, enzymes.

VITAMINS – Classification and functions.

NUCLEIC ACIDS – Chemical constitution of DNA and RNA. Biological functions of nucleic acids.

Hormones (General introduction)

UNIT 20: PRINCIPLES RELATED TO PRACTICAL CHEMISTRY

Detection of extra elements (Nitrogen, Sulphur, halogens) in organic compounds; Detection of the following functional groups; hydroxyl (alcoholic and phenolic), carbonyl (aldehyde and ketones) carboxyl, and amino groups in organic compounds.

- The chemistry involved in the preparation of the following:

  Inorganic compounds; Mohr's salt, potash alum.

  Organic compounds: Acetanilide, p-nitro acetanilide, aniline yellow, iodoform.

- The chemistry involved in the titrimetric exercises – Acids, bases and the use of indicators, oxalic acid vs $KMnO_4$, Mohr's salt vs $KMnO_4$

- Chemical principles involved in the qualitative salt analysis:

  Cations – Pb^{2+}, Cu^{2+}, Al^{3+}, Fe^{3+}, Zn^{2+}, Ni^{2+}, Ca^{2+}, Ba^{2+}, Mg^{2+}, NH^{+}_4

  Anions- $CO^{2}_{3}{}^{-}$, S^{2-}, $SO^{2}_{4}{}^{-}$, $^{NO3-}$, NO^{2-}, Cl^{-}, Br^{-}, I^{-} (Insoluble salts excluded).

  Chemical principles involved in the following experiments:

  1. Enthalpy of solution of CuSO4

  2. Enthalpy of neutralization of strong acid and strong base.

  3. Preparation of lyophilic and lyophobic sols.

  4. Kinetic study of the reaction of iodide ions with hydrogen peroxide at room temperature.

BIOLOGY

UNIT 1: Diversity in Living World

- What is living?; Biodiversity; Need for classification; Taxonomy & Systematics; Concept of species and taxonomical hierarchy; Binomial nomenclature;
- Five kingdom classification; salient features and classification of Monera; Protista and Fungi into major groups; Lichens; Viruses and Viroids.
- Salient features and classification of plants into major groups-Algae, Bryophytes, Pteridophytes, Gymnosperms (three to five salient and distinguishing features and at least two examples of each category);
- Salient features and classification of animals-nonchordate up to phyla level and chordate up to classes level (three to five salient features and at least two examples).

UNIT 2: Structural Organisation in Animals and Plants

- Morphology and modifications; Tissues; Anatomy and functions of different parts of flowering plants: Root, stem, leaf, inflorescence- cymose and recemose, flower, fruit and seed (To be dealt along with the relevant practical of the Practical Syllabus) Family (malvaceae, Cruciferae, leguminoceae, compositae, graminae).
- Animal tissues; Morphology, anatomy and functions of different systems (digestive, circulatory, respiratory, nervous and reproductive) of an insect (Frog). (Brief account only)

UNIT 3: Cell Structure and Function

- Cell theory and cell as the basic unit of life; Structure of prokaryotic and eukaryotic cell; Plant cell and animal cell; Cell envelope, cell membrane, cell wall; Cell organelles structure and function; Endomembrane system-endoplasmic reticulum, Golgi bodies, lysosomes, vacuoles; mitochondria, ribosomes, plastids, micro bodies; Cytoskeleton, cilia, flagella, centrioles (ultra structure and function); Nucleus-nuclear membrane, chromatin, nucleolus.
- Chemical constituents of living cells: Biomolecules-structure and function of proteins, carbohydrates, lipids, nucleic acids; Enzymes-types, properties, enzyme action, classification and nomenclature of enzymes
- B Cell division: Cell cycle, mitosis, meiosis and their significance.

UNIT 4: Plant Physiology

- Photosynthesis: Photosynthesis as a means of Autotrophic nutrition; Site of photosynthesis take place; pigments involved in Photosynthesis (Elementary idea); Photochemical and biosynthetic phases of photosynthesis; Cyclic and non-cyclic and

photophosphorylation; Chemiosmotic hypothesis; Photorespiration C3 and C4 pathways; Factors affecting photosynthesis.

- Respiration: Exchange gases; Cellular respiration-glycolysis, fermentation (anaerobic), TCA cycle and electron transport system (aerobic); Energy relations-Number of ATP molecules generated; Amphibolic pathways; Respiratory quotient.
- Plant growth and development: Seed germination; Phases of Plant growth and plant growth rate; Conditions of growth; Differentiation, dedifferentiation and redifferentiation; Sequence of developmental process in a plant cell; Growth regulators auxin, gibberellin, cytokinin, ethylene, ABA;

UNIT 5: Human Physiology

- Breathing and Respiration: Respiratory organs in animals (recall only); Respiratory system in humans; Mechanism of breathing and its regulation in humans-Exchange of gases, transport of gases and regulation of respiration Respiratory volumes; Disorders related to respiration-Asthma, Emphysema, Occupational respiratory disorders.
- Body fluids and circulation: Composition of blood, blood groups, coagulation of blood;
- Composition of lymph and its function; Human circulatory system-Structure of human heart and blood vessels; Cardiac cycle, cardiac output, ECG, Double circulation; Regulation of cardiac activity; Disorders of circulatory system-Hypertension, Coronary artery disease, Angina pectoris, Heart failure.
- Excretory products and their elimination: Modes of excretion- Ammonotelism, ureotelism, uricotelism; Human excretory system-structure and function; Urine formation, Osmoregulation; Regulation of kidney function-Renin-angiotensin, Atrial Natriuretic Factor, ADH and Diabetes insipidus; Role of other organs in excretion; Disorders; Uraemia, Renal failure, Renal calculi, Nephritis; Dialysis and artificial kidney.
- Locomotion and Movement: Types of movement- ciliary, fiagellar, muscular; Skeletal muscle- contractile proteins and muscle contraction; Skeletal system and its functions (To be dealt with the relevant practical of Practical syllabus); Joints; Disorders of muscular and skeletal system-Myasthenia gravis, Tetany, Muscular dystrophy, Arthritis, Osteoporosis, Gout.
- Neural control and coordination: Neuron and nerves; Nervous system in humans central nervous system, peripheral nervous system and visceral nervous system; Generation and conduction of nerve impulse;
- Chemical coordination and regulation: Endocrine glands and hormones; Human endocrine system-Hypothalamus, Pituitary, Pineal, Thyroid, Parathyroid, Adrenal,

Pancreas, Gonads; Mechanism of hormone action (Elementary Idea); Role of hormones as messengers and regulators, Hypo-and hyperactivity and related disorders (Common

- disorders e.g. Dwarfism, Acromegaly, Cretinism, goiter, exophthalmic goiter, diabetes, Addison's disease).

(*Imp: Diseases and disorders mentioned above to be dealt in brief.*)

UNIT 6: Reproduction

- Sexual reproduction in flowering plants: Flower structure; Development of male and female gametophytes; Pollination-types, agencies and examples; Outbreeding devices; Pollen-Pistil interaction; Double fertilization; Post fertilization events-Development of endosperm and embryo, Development of seed and formation of fruit; Special modes apomixis, parthenocarpy, polyembryony; Significance of seed and fruit formation.
- Human Reproduction: Male and female reproductive systems; Microscopic anatomy of testis and ovary; Gametogenesis-spermatogenesis & oogenesis; Menstrual cycle; Fertilisation, embryo development upto blastocyst formation, implantation; Pregnancy and placenta formation (Elementary idea); Parturition (Elementary idea); Lactation (Elementary idea).
- Reproductive health: Need for reproductive health and prevention of sexually transmitted diseases (STD); Birth Control-Need and Methods, Contraception and Medical Termination of Pregnancy (MTP); Amniocentesis; Infertility and assisted reproductive technologies – IVF, ZIFT, GIFT (Elementary idea for general awareness).

UNIT 7: Genetics and Evolution

- Heredity and variation: Mendelian Inheritance; Deviations from Mendelism Incomplete dominance, Co-dominance, Multiple alleles and Inheritance of blood groups, Pleiotropy; Elementary idea of polygenic inheritance; Chromosome theory of inheritance; Chromosomes and genes; Sex determination-In humans, birds, honey bee; Linkage and crossing over; Sex linked inheritance-Haemophilia, Colour blindness; Mendelian disorders in humans-Thalassemia; Chromosomal disorders in humans; Down's syndrome, Turner's and Klinefelter's syndromes.
- Molecular basis of Inheritance: Search for genetic material and DNA as genetic
- material; Structure of DNA and RNA; DNA packaging; DNA replication; Central dogma; Transcription, genetic code, translation; Gene expression and regulation-Lac Operon; Genome and human genome project; DNA finger printing, protein biosynthesis.
- Evolution: Origin of life; Biological evolution and evidences for biological evolution from Paleontology, comparative anatomy, embryology and molecular evidence);

Darwin's contribution, Modern Synthetic theory of Evolution; Mechanism of evolution Variation (Mutation and Recombination) and Natural Selection with examples, types of natural selection; Gene flow and genetic drift; Hardy-Weinberg's principle; Adaptive Radiation; Human evolution.

UNIT 8: Biology and Human Welfare

- Health and Disease; Pathogens; parasites causing human diseases (Malaria, Filariasis, Ascariasis. Typhoid, Pneumonia, common cold, amoebiasis, ring worm, dengue, chikungunya); Basic concepts of immunology-vaccines; Cancer, HIV and AIDS; Adolescence, drug and alcohol abuse. Tobacco abuse
- Microbes in human welfare: In household food processing, industrial production, sewage treatment, energy generation and as biocontrol agents and biofertilizers.

UNIT 9: Biotechnology and Its Applications

- Principles and process of Biotechnology: Genetic engineering (Recombinant DNA technology).
- Application of Biotechnology in health and agriculture: Human insulin and vaccine production, gene therapy; Genetically modified organisms-Bt crops; Transgenic Animals; Biosafety issues-Biopiracy and patents.

UNIT 10: Ecology and Environment

- Organisms and environment Population interactions-mutualism, competition, predation, parasitism; Population attributes-growth, birth rate and death rate, age distribution.
- Ecosystem: Patterns, components; productivity and decomposition; Energy flow; Pyramids of number, biomass, energy
- Biodiversity and its conservation: Concept of Biodiversity; Patterns of Biodiversity; Importance of Biodiversity; Loss of Biodiversity; Biodiversity conservation; Hotspots, endangered organisms, extinction, Red Data Book, biosphere reserves, National parks and sanctuaries, Sacred Groves.