



**STATE MEDICAL AND TECHNICAL  
ENTRANCE EXAMINATION  
(SMATEE)**

*For Selection of Candidates for Higher Technical Courses under  
the department of Higher & Technical Education  
(Mizoram State Council for Technical Education)*

*Government of Mizoram*

*Mizoram : Aizawl*

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**Issued by:**

**Technical Wing,  
Directorate of Higher & Technical Education  
Government of Mizoram**

Website: [dhte.mizoram.gov.in](http://dhte.mizoram.gov.in); e-mail: [dhtemizoram@gmail.com](mailto:dhtemizoram@gmail.com)

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## **1. INTRODUCTION**

The Mizoram State does not have sufficient facilities for Higher Technical Studies within the State. The seats allotted to the State of Mizoram for various courses of Higher Technical Studies by the Central Government is insufficient to meet the demands of the students of the aspiring for Higher Technical Studies from the State. Therefore, the Government deems it expedient to have fair selection of promising candidates for those limited seats offered to Mizoram State on merit by means of Written Examination.

The Govt. of Mizoram has framed consolidated guidelines for conducting Selection Examination for selection of candidates for such higher technical studies in respect of degree/diploma courses in various discipline in Agriculture Sciences, Animal Husbandry and Veterinary Sciences, Medial Sciences etc.

The written Examination shall be conducted by a Selection Board duly constituted by the Government of Mizoram. The Selection Board shall also be responsible for preparation, declaration of results, counselling and allotment of seats.

## **2. MODE OF EXAMINATION**

- (a) Selection of Candidates shall be done through a Written Examination in Physics, Chemistry and Biology.
- (b) The Standard of Questions to be answered by the candidates in Written Examination shall be equivalent to the courses of Higher Secondary Leaving Certificate Examination in Science subjects of the Mizoram Board of School Education.

## **3. ELIGIBILITY OF CANDIDATES:**

An applicant must:

- (a) Be a citizen of India.
- (b) Have completed the age of 17 years at the time of admission or will complete the age of 17 years on or before 31<sup>st</sup> December of the year of admission and be below 23 years of age on the same date. Relaxation of upper age limit upto 5 years shall be permissible for scheduled caste, scheduled tribe and other backward class candidates only.
- (c) Have passed the Higher Secondary School Leaving Certificate Examination in Science conducted by the Mizoram Board of School Education or equivalent Examination recognized by the Government of Mizoram with Physics, mathematics, Chemistry, Biology and English or have appeared in the Higher Secondary School Leaving Certificate Examination in the above subjects but the results of such Examination in pending. Provided that such applicant who have not got their result sheets at the time of submission of their applications should submit their final results with mark sheet within fifteen days from the date of publication of their results by the concerned examination Board.
- (d) Have obtained not less than fifty percent (50%) of the maximum marks in aggregate in aforementioned subjects. Provided that the minimum percentage of marks for candidates belonging to Scheduled Caste, Scheduled Tribe and Other Backward Classes shall be forty percent (40%) in aggregate in the subjects concerned. This requirement may be raised if any particular institution insists a higher percentage.

## **4. METHOD OF SELECTION AND CATEGORIES:**

Method of Categorization and Selection to be applied notified by competent authority in due course of time.

## 5. ONLINE APPLICATION FORM:

### Important Dates and Fee Detail

- a. Online Submission of Application Form : 1<sup>st</sup> March 2025 to 31<sup>st</sup> March 2025  
(upto 5:00 pm)
- b. Last date of successful transaction  
of fee through online : 31st March 2025 (upto 5:00 pm)
- c. Fee Payable by Candidate : ₹ 950/- paid (with late fee ₹ 1250/- )  
by Credit/Debit Card/Net- Banking/UPI/Paytm  
Processing charges & Goods and Services  
Tax (GST) are to be paid by the candidate as  
applicable. Fee once paid is non-refundable  
and non-transferable.

### d. Place of Examination Centre:

1. Pachhunga University College, College Veng (PUC) (1200 Candidates)
2. Govt. T. Romana College, Republic Vengthlang (GTRC) (500 Candidates)
3. Institute of Advanced Study in Education (IASE), Republic Veng (320 Candidates)
4. Technical Wing, Higher & Technical Office, Chaltlang (160 Candidates)
5. Mizoram Polytechnic, Lunglei (not less than 50, not more than 120 candidates)

All candidates have to reach the examination centre at their own expense and have to make their own arrangements to appear for examination.

- e. Downloading of Admit Cards from website : 14th – 25th April 2025
- f. Date of Examination : 25th April 2025 (Friday)
- g. Duration of Examination : 180 Minutes (03 hours)
- h. Timing of Examination : 01;00 pm to 04:00 pm (IST)
- i. Website(s) : <https://dhte.mizoram.gov.in>
- j. Declaration of Result : To be announced later on the  
department website.

1. Candidates can apply for SMATEE-2025 through the “Online” mode only.
2. Submission of the Online Application Form may be done by accessing the SMATEE website <https://dhte.mizoram.gov.in>. The Application Form in any other mode will not be accepted.
3. Only one application is to be submitted by a candidate.
4. Candidates must follow the instructions given in the Information Brochure and on the department website strictly. Candidates nor complying with the instructions shall be summarily disqualified.
5. Candidates must ensure that the e-mail Address and Mobile Number provided in the Online Application Form are their own or Parents/Guardians only as all information/communication will be sent by Higher and Technical Education Department through e-mail on the registered e-mail address or SMS on registered Mobile Number only.
6. Instructions for filling Online Application Form: All candidates shall fill up each set of information of the Application Form at the respective time of availability. In the absence of filling up of any of the set information, his/her candidature will be cancelled. The ‘columns’ to be filled up in each set of information are available in the Information Brochure as Appendix-XVII for your reference.  
Downloading of Information Brochure and Application Form: Candidates should read these carefully to ensure their eligibility. In case a candidate is found to fill in more than one application, the Admit Card will be cancelled/withheld and his/her candidature will be forfeited for this/future examination.

- k. Candidates are advised to regularly visit the website [www.dhte.mizoram.gov.in](http://www.dhte.mizoram.gov.in) and also check their e-mails/SMS for the latest updates.
- l. Candidates shall appear at their own cost at the Examination Centre on the Date and Timing indicated on their Admit Card issued by the Higher and Technical Education Department.
- m. Any request to change the Examination Centre, Date and Time provided on the Admit Card shall not be considered under any circumstances.
- n. Candidates are advised to take Passport size colored photographs with white background. The photographs are to be used for uploading in the Online Application Form and also for Counselling/Admission. This is to ensure that the same photograph is used for all documents and for all purposes related to SMATEE-2025.

**Note:**

- 1. The final submission of the Online Application Form will remain incomplete if step-3 and step-4 under point 6 are not completed. Such forms will stand rejected and no correspondence on this account will be entertained.
- 2. No request for refund of fee once remitted by the candidate will be entertained by Higher and Technical Education Department under any circumstances.
- 3. The entire application process of SMATEE-2025 in online, including of scanned images and documents, payment of fees, and printing of confirmation page. Therefore, candidates are not required to send/submit any document(s) including confirmation page to Higher & Technical Education Department through Post/Fax/ By hand/ Email.
- 4. All candidates appearing in SMATEE- 2025 must regularly check updates on the website of Higher & Technical Education Department (<https://www.dhte.mizoram.gov.in/>); and other concerned Authorities of participating States/Universities/Institutions, till the conclusion of the final round of Counselling.

**6. DISCLAIMER**

- 1. Candidates are advised to read the Information Brochure carefully and go through the instructions regarding filling put the Online Application Form available on the Higher and Technical Education Department website (<https://dhte.mizoram.gov.in>), before starting online registration.
- 2. The candidate should ensure that all information entered during the online registration process is correct.
- 3. Online information provided by candidates like name of the candidate, contact/ address details, category, nationality, education qualification details, date of birth, etc. will be treated as correct/ final. Any request for changes in information after the closure of the correction period will not be considered by Higher and Technical Education Department under any circumstances. Any candidate found to mislead by providing inaccurate information will be debarred from taking the examination.
- 4. Higher and Technical Education Department does not have any liability that may arise due to incorrect information provided by the candidate(s) during the registration process.
- 5. Higher and Technical Education Department does not edit/ modify/alter any information entered by the candidates after completion of the application process under any circumstances. Higher and Technical Education Department does not guarantee that any request for change in information thereafter will be entertained. Therefore, candidates are advised to exercise utmost caution and care for filling up correct details in the Application Form.
  - (1) Please keep visiting the Website (<https://dhte.mizoram.gov.in/>) for the latest updates/ public notices/ notifications/ announcements to be issued from time to time regarding SMATEE-2025 (other than the information available in this Information Brochure)..

- (2) Usage of Data and Information: Higher and Technical Education Department can use the data provided by the End-User (Candidates/ Test-Takers in this Case) for making the Confirmation Page of the Application / Admit Card/ OMR Answer Sheet/ Counseling etc. available to them as well as for internal purpose (s) including training, research and development, analysis and another permissible purpose (s).

## 7. APPLICATION FOR EXAMINATION

1. All applications in prescribed form is obtained from the office of the Higher & Technical Education Office (Tech Wing), Chaltlang and Department Website (<https://dhte.mizoram.gov.in>) on payment of such fees as maybe prescribed, and duly filled in, should be submitted to the same for which a specified date shall be fixed. Applications received after the specified date shall not be accepted.
2. Every application form duly filled in shall be accompanied by attested copies of the following documents:
  - (a) Certificate of High School Leaving Certificate or equivalent examination.
  - (b) Marksheet of the Higher Secondary School Leaving Certificate or equivalent examination.
  - (c) Caste/Tribe Certificate.
  - (d) Residential certificate.
  - (e) Voters I.D of either parents or legal guardian.
  - (f) Family ration card in the absence of (e) above.
  - (g) Admit Card (Class –X and Class-XII/ Diploma).
  - (h) Recent passport – size photographs, printed from the same photo, one copy of which is to be firmly affixed to the application form submitted by the applicant, while the other loose copy (to be enclosed in an envelope) shall be meant for admission Card.
  - (i) Birth Certificate.
3. A candidate not in possession of the aforementioned Certificates and Mark sheets at the time of submission of his or her application form may submit authenticated Provisional Documents issued by the concerned Secondary or equivalent Board or by the Principal of the Educational Institute from where the candidate has studied or appeared at the Higher Secondary School leaving Certificate or equivalent Examination, showing the subjects taken and the date of birth recorded therein.

**Incomplete application shall be liable to be rejected without assigning any reason.**
4. No candidate should mutilate the Admit Card issued to him/her or change any entry made therein after it has been received by him or her. Candidates are advice to make photo copies of the admit card in case of loss or damage to the original admit card.
5. The Information Brochure can be downloaded from the office website.
6. Every candidate shall have to pay ₹ 900/- (Rupees Nine Hundred) only as fees for Examination, application form, etc. and ₹ 50/- (Rupees fifty) TOTAL= ₹ 950/- (Rupees Nine Hundred Fifty) only as counselling fees in the manner as may be prescribed, at the time of submitting the Application form. **Fee once paid will not be refunded.**

## 8. SYLLABUS etc. FOR THE EXAMINATION

1. All eligible candidates shall have to appear for a Written Examination in the following papers of Class – XI and Class-XII Courses and standard of Mizoram Board of School Education: provided marks weightage is 40% from class XI and 60% from class XII courses.

	<u>Subjects</u>	<u>No of Questions</u>	<u>Maximum marks</u>
(a)	Physics	25	100 marks
(b)	Chemistry	25	100 marks
(c)	Biology	50	200 marks
	<b>TOTAL</b>	<b>100</b>	<b>400 marks</b>

2. The marks secured by the candidates in the Written Examination only shall be taken into consideration for allotment of seats.
3. All candidates shall bring their Admit Card and shall produce the same before the Controller of Examination or any other Officer as may be authorized, on the day the examination is held on any subject and before such examination is commenced.

## 9. MODALITIES FOR CONDUCT OF THE SELECTION EXAMINATION

### 1. Date of Examination

Date of Examination is to be notified by Director, Higher & Technical Education or any other body as may be appointed by Government from time to time. The Selection Examination will be conducted every year on such date as may be notified by the Director of Higher & Technical Education from time to time.

### 2. Scheme of Examination

In the Selection Examination, the candidates must appear in the following papers:-

- (a) Physics, Chemistry and Biology (Zoology and Botany)
- (b) Duration of Examination is 180 minutes.
- (c) Physics and Chemistry shall carry 100 marks each, Biology carry 200 marks.
- (d) 100% Technical Entrance Questions should be of objective type.

### 3. Examination Centre

The Selection Examination will be held every year at the place/places as decided by the Selection Board Committee.

## 10. CONDUCT OF EXAMINATION

1. The Examination Hall will be opened 90 minutes before the commencement of the Examination. Candidates are expected to take their seats immediately after opening of the examination hall. If the candidates do not report in time, they are likely to miss some of the general instructions to be announced in the Examination Hall.
2. A candidate who does not possess a valid Admit Card shall not be admitted into the Examination Hall.
3. A candidate who comes 30 minutes after the commencement of Examination shall not be permitted to sit in the Examination Hall without a special permission of the Controller of Examination. A candidate who comes one hour after the commencement of the Examination under no circumstances shall be admitted.
4. A candidates shall not be allowed to carry any textual materials, printed or written, bits of papers or any other objectionable materials inside the Examination Room/ Hall.
5. Use of Electronics such as Calculator, Mobile handsets, etc. shall not be allowed.
6. No candidate, without the special permission of the Centre Superintendent or the Invigilator concerned, will leave his/her seat or Examination Room until the full duration of the paper is over. Candidates should not leave the room/hall without handing over their OMR to the Invigilator on duty.

7. Twenty minutes before the commencement of the paper, each candidate will be given an OMR. Candidates will fill in the required particulars on the OMR sheet with Ball Point Pen only. Candidates should take extreme care in filling the particulars as the **OMR sheets will not be replaced under any circumstance.**
8. Five minutes before the commencement of the examination, Question papers will be distributed to the candidates.
9. Candidates shall maintain complete silence and attend to their papers only. Any conversation or gesticulation or disturbance in the Examination Hall shall be taken into account as misbehaviour and if a candidate is found using unfair means or impersonating, his candidature shall be cancelled and he shall be liable to debarment of taking further examination either permanently or for a specified period according to the nature of offence.
10. During the examination time, the invigilator will check Admit Card of all the candidates to satisfy himself/ herself about the identity of each candidate. The invigilator will also put his/her signatures in the place provided in the OMR Sheet.
11. After completing the examination and before handing over the OMR Sheets, the candidate should check again that all the particulars required in the OMR Sheets have been correctly written.
12. Candidates are NOT allowed to carry any Instruments, Geometry or Pencil Box, Handbag, Purse, any kind of Paper/ Stationery/ Textual material (printed or written material), Eatables, Mobile Phone/Earphone/Microphone/Pager, Calculator, Docu Pen, Slide Rules, Log Tables, Camera, Tape Recorder, Electronic Watches with facilities of calculators, any metallic item or electronic gadgets/devices in the Examination Hall/ Room.
13. The candidates must sign on the Attendance Sheet at the appropriate place as proof of having attended the examination.
14. For those who are unable to appear on the scheduled date of examination for any reason, special examination shall not be held under any circumstances.

#### **11. RE-CHECKING OF OMR**

Re-checking of OMR papers/sheets may be allowed by the Selection Board according to the merit of the case and decision of the Selection Board shall be final. Candidates shall have to pay ₹ 500/- (Rupees Five Hundred) only as fee for re-evaluation. However, **re-checking will not be permitted if OMR is used for checking of answer papers/sheets.**

#### **12. SYSTEM OF MARKING**

1. Each objective question shall carry four marks. Questions without any response shall be awarded ZERO mark. More than one answer indicated against a question will be deemed as an incorrect response.
2. A negative mark shall be awarded against wrong answer. For each incorrect response, one fourth ( $1/4^{\text{th}}$ ) of the total marks allotted to the question will be deducted. **The candidates are advised not to attempt an item in the answer sheet if they are not sure of the correct response.**

#### **13. ISSUE OF PHOTOCOPY OF OMR SHEET:**

In order to ensure transparency and accountability in the SMATEE, provision for obtaining a photocopy of evaluated OMR sheet has been made as follows;

1. A photocopy of the answer sheet shall be given on request accompanied by a fee of ₹ 100/- (Rupees one hundred) only.
2. Photocopy of OMR sheet can be applied for and claimed only by the candidate himself/herself upon production of his/her original admit card issued by the Examining Board for the

examination under consideration. The Board **will not entertain** any application/claims made on behalf of the candidate(s).

3. A period of 10 (ten) days after the declaration of results shall be given to the candidates to apply for a photocopy of OMR sheet. Upon the expiry of this period, no application shall be entertained.
4. A candidate who desires to get a photocopy of the OMR sheet shall have to sign an undertaking with a pledge to maintain utmost confidentiality. Any violation of the undertaking will render the result of the candidate null and void and the Examination of the candidate shall be liable to be cancelled.
5. While giving the photocopy of the OMR sheet, names of the Examiner and Scrutinizer which appear on the sheet shall be concealed.

#### **14. MERIT LIST:**

1. The Examination Board shall prepare a list of the candidates in order of merit on the basis of the marks obtained in the Written Examination.
2. In case of two or more candidates obtaining equal marks in the merit, the inter-se-merit of such candidates shall be determined in order of preferences as under:
  - i) Candidates obtaining higher marks in Biology (Botany and Zoology) in the Selection Examination.
  - ii) Candidates obtaining higher marks in Chemistry in the Selection Examination.
  - iii) Candidates obtaining higher marks in Physics in the Selection Examination.
3. Candidate older in age shall be preferred in case of marks obtained being equal.
4. If the resolution is not possible after this criterion, candidates will be given the same rank.
5. No weightage will be given for higher qualifications.

#### **15. ALLOTMENT OF SEAT**

All the selected candidates will be required to appear in person before Officers of Higher & Technical Education (Tech Wing) for checking of all the documents listed below in original on the date, time and venue to be intimated to them:

- (a) Certificate, Mark sheet and Admit Card in the High School Leaving Certificate or equivalent examination.
- (b) Certificate, Mark sheet and Admit Card in the Higher Secondary School Leaving Certificate or equivalent examination.
- (c) Certificate showing the candidate's Caste, Tribe or Class in case he is a member of Scheduled Caste, Scheduled Tribe or other Backward Class issued by the Deputy Commissioner of the Administrative District or any other competent authority in the Administrative District in which the applicant resides.
- (d) Residential Certificate and Voter ID Card showing that the parent (s) of the applicant is residing permanently in Mizoram State.
- (e) Birth Certificate.
- (f) Security deposit of ₹ 5000/- for those who are allotted seats from counselling and can withdraw after submission of joining report to the office within stipulated time.

Those candidates who fail to produce the original documents at the time of personal appearance, shall be liable to have their allotted seats cancelled. If any candidate is found to have furnished false information or certificate (s) or to have withheld or concealed any material/ information to gain personal advantage, he shall be disqualified. If selection or even admission has already been done or effected, it shall be cancelled at any stage of his/her study and such other action as deemed necessary may be taken against him/her, under any law for the time being in force in the state of Mizoram.



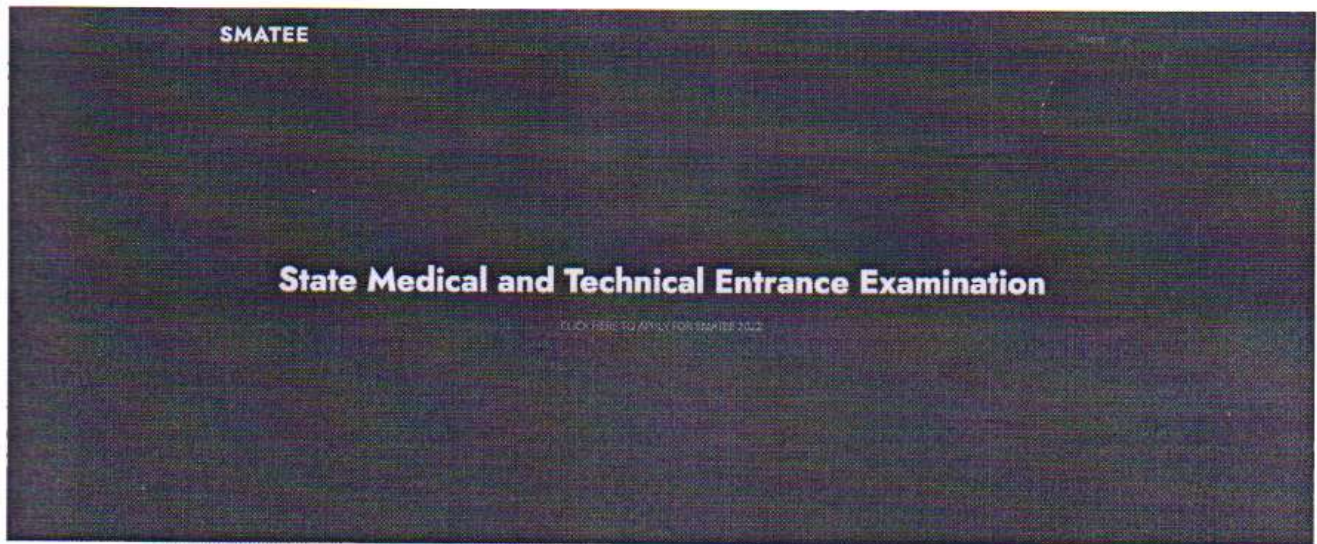
**Note:** The decision of the Selection Board on the authenticity of the documents shall be final and no representation on that score shall be entertained.

## 16. JOINING REPORT

All the allotted students should submit their joining report to the Jt. Director, Higher & Technical Education (Tech Wing) through the Principal of the respective Colleges/Institutions within one month from the date of joining. Their applications should be supported by attested copies of admission receipts, etc.

### INSTRUCTION FOR FILLING-UP OF APPLICATION FORM

**Step-1:** On your Browser visit [www.dhte.mizoram.gov.in](http://www.dhte.mizoram.gov.in) and you will be redirected to the website homepage



**Step-2;** Click on “CLICK HERE TO APPLY FOR SMATEE 2025” on the homepage. You will be redirected to the Application Form Page.

### Application Form

of the State Board of Technical Education

#### GENERAL

SMATEE Registration Number:

Registration Center:

#### DETAILS OF APPLICANT

Name*	Sex*	Date of Birth*	Place of Birth*
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Class*	Mode of Study (Full/Part-time)*	Place of Study (Institution)*	
<input type="text"/>	<input type="text"/>	<input type="text"/>	
Nationality*	Category*		
<input type="text"/>	<input type="text"/>		

Residential Details:

Locality*	House No.*	Pin Code*
<input type="text"/>	<input type="text"/>	<input type="text"/>
State*	Dist.*	Block/Region*
<input type="text"/>	<input type="text"/>	<input type="text"/>

Check if you are belonging to any category and/or reserved category.

College/Institution Address:

Locality*	House No.*	Pin Code*
<input type="text"/>	<input type="text"/>	<input type="text"/>
State*	Dist.*	Block/Region*
<input type="text"/>	<input type="text"/>	<input type="text"/>

#### DETAILS OF PARENTS/PARTICULARS

Father's Particulars:

Name*	Address*	Occupation*	SECTION*
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Name of State/Place of Birth	Name of Office and Address	Name of Employer	
<input type="text"/>	<input type="text"/>	<input type="text"/>	
Date of Birth and the Gender	Date of Transfer and Residence		
<input type="text"/>	<input type="text"/>		

Mother's Details:

Name*	Address*	Occupation*	SECTION*
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Name of State/Place of Birth	Name of Office and Address	Name of Employer	
<input type="text"/>	<input type="text"/>	<input type="text"/>	
Date of Birth and the Gender	Date of Transfer and Residence		
<input type="text"/>	<input type="text"/>		

#### DETAILS OF SCHOOL

Checked in school column in document submitted.

School Name*	School Address*	Year of Opening*	
<input type="text"/>	<input type="text"/>	<input type="text"/>	
Particulars of School in document submitted:			
School Name*	School Address*	Name of Examination*	Name of Exam Board*
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Year of Opening	Medium*	Full-time*	Top Rank Obtained*
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Medium	Year of Passing*		
<input type="text"/>	<input type="text"/>		
Particulars of School in document submitted:			
School Name*	Name of Examination*	Name of Exam Board*	Top Rank*
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Check if you are seeking for special status.

Details of Special Status:

Percentage*	Knowledge of IT*	Full-time*	Top Rank Obtained*
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Reason:	Year of passing*		
<input type="text"/>	<input type="text"/>		

Subjects	Full Marks*	Mark Obtained*
English	<input type="text"/>	<input type="text"/>
Physics	<input type="text"/>	<input type="text"/>
Chemistry	<input type="text"/>	<input type="text"/>
Biography	<input type="text"/>	<input type="text"/>
Math	<input type="text"/>	<input type="text"/>

List of Required Documents:

Passport size Photo (2x2 cm) (4)	10th/12th certificate (copy and original)	Residence Certificate (copy and original)
<input type="text"/>	<input type="text"/>	<input type="text"/>

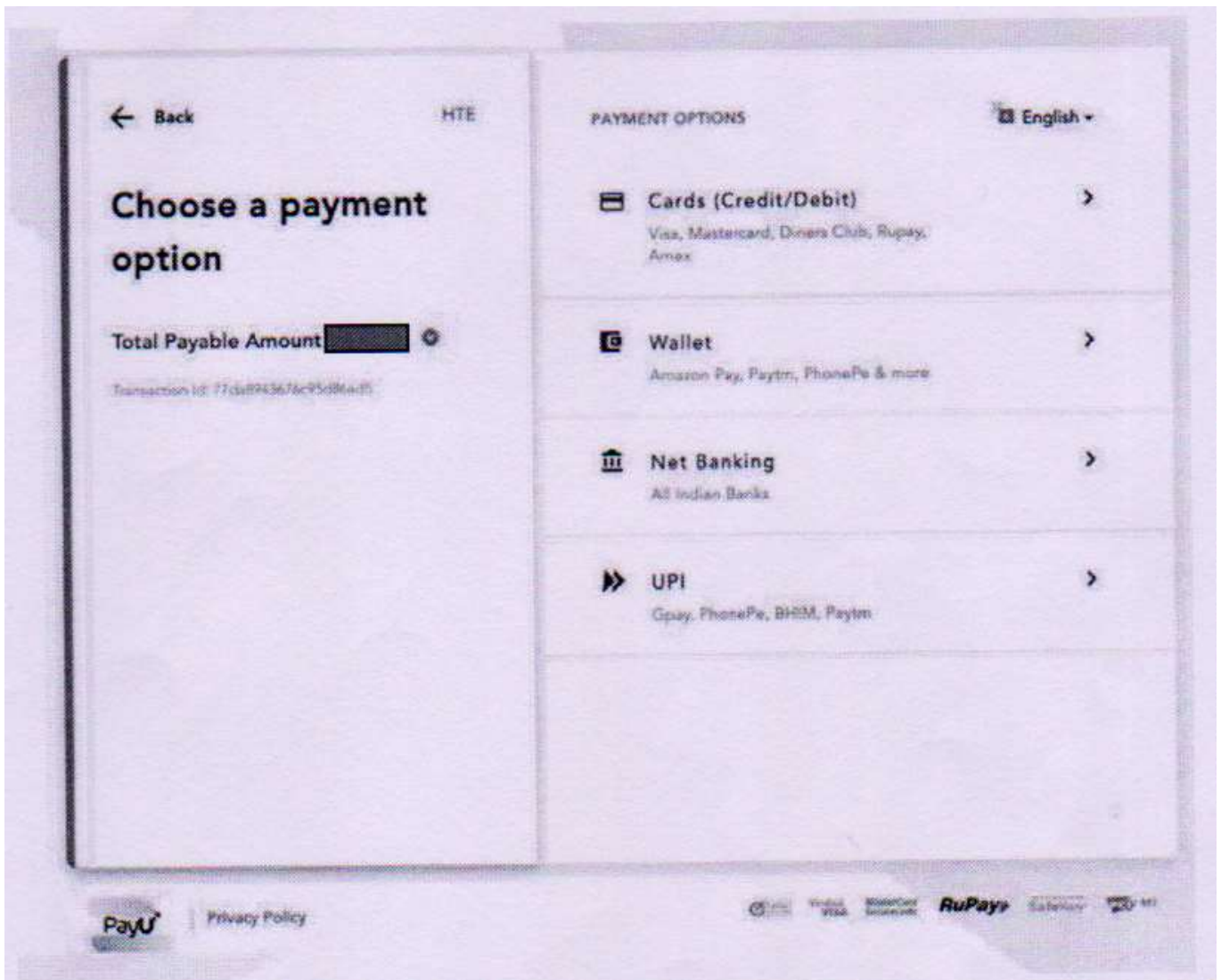
As per the rules issued from time to time by the board, the candidate should read the instructions carefully and should follow the same while applying for the exam. The candidate should also read the instructions of the board regarding the mode of examination and the mode of marking. The candidate should also read the instructions of the board regarding the mode of examination and the mode of marking.

Submit Application Form

**Step-3:** Fill in the Online Application Form.

**Step-4:** Upload scanned images of candidate's latest passport size Photograph (jpg file size:10 kb to 3mb): Category Certificate (SC/ST/OBC/EWS etc): (pdf file size: 10kb to 3 mb), Residential Certificate (pdf file size: 50kb to 3 mb). For photography, the focus needs to be on the face (80% face coverage, ears clearly visible, on white background).

**Step-5:** After filling up all the fields, click the 'Submit Application Form' button, and you will be redirected to the Payment Gateway Page.



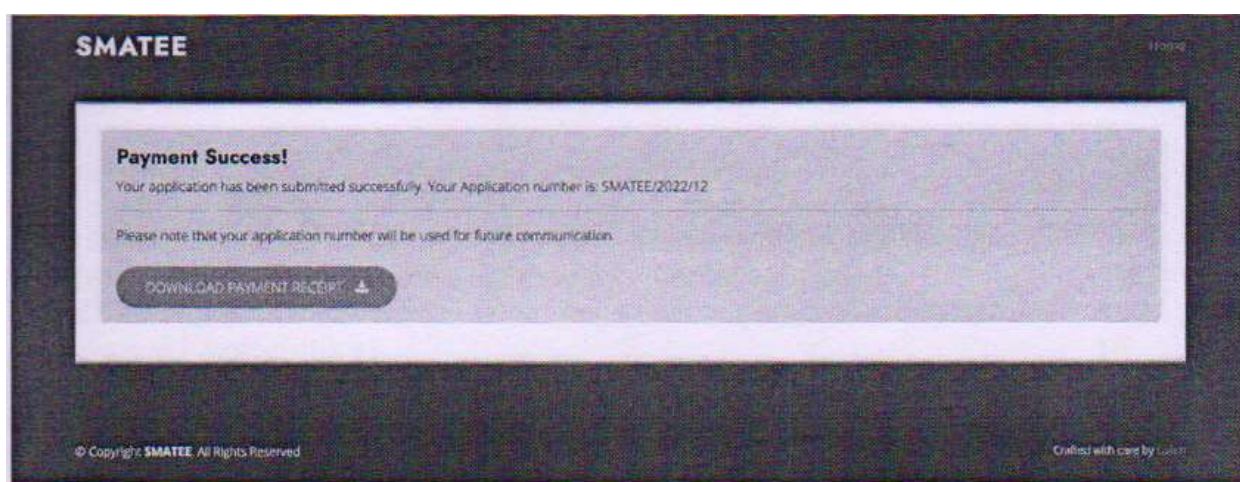
**Step-6:** Pay the fee using Payment Gateway through Debit Card/Credit Card/ Net-banking/UPI/Wallet. After making the payment you will be redirected to the following page. **Do not refresh or exit until and unless you are redirected to confirmation page.**



In case the Confirmation Page is not generated after payment of the prescribed Fee, then the candidate should approach the concerned Bank/ Payment Gateway integrator (the helpline number and email given in Appendix- XVI of the Information Brochure), for ensuring the successful payment. In spite of the above, if a successful transaction is not reflected on the Portal, the candidate may contact SMATEE Helpline 8258085520, 9862306387,961266098, 9862131194). If the payment issue is still not resolved, the candidate may pay a second time.

However, any duplicate payment received from the candidate by SMATEE in the course of said transactions will be refunded through the same payment mode through which the duplicate payment is received, after fee reconciliation by SMATEE.

**Step-7:** Download, save and print copy of the receipt after successful remittance of fee and keep copies safely for future reference.



**Calculate percentage of marks as given below;**

Percentage of Marks in PCB =  $\frac{\text{Total of Marks obtained in Physics, Chemistry \& Biology}}{\text{Total of Full Marks in Physics, Chemistry \& Biology}}$

**LIST OF COLLEGES/INSTITUTIONS WHERE SEAT ALLOTTED BY GOVERNMENT OF INDIA FOR  
MIZORAM STATE QUOTA UNDER SMATEE (As per 2023-2024)**

<b>Sl.No</b>	<b>Name of Branch &amp; Name of Institution</b>	<b>No. of Seats</b>
<b>1.</b>	<b>Bachelor of Science (Nursing)</b>	<b>58</b>
	a College of Nursing, SSKM Hospital Campus, Kolkata	1
	b Regional Institute of Para Medical and Nursing Science (RIPANS)	20
	c Regional Nursing College, Guwahati, Assam	2
	d Regional Institute of Medical Science, Imphal, Manipur	5
	e Mizoram College of Nursing (MCON), Falkawn	30
<b>2.</b>	<b>Bachelor of Pharmacy ( B.Pharm)</b>	<b>22</b>
	a Regional Institute of Para Medical and Nursing Science (RIPANS), Aizawl	16
	b Dibrugarh University, Dibrugarh, Assam	2
	c Regional Institute of Pharmaceutical Science and Technology(RIPSAT), Tripura	5
<b>3.</b>	<b>Bachelor of Science in MLT (B.Sc. MLT)</b>	<b>16</b>
	a Regional Institute of Para Medical and Nursing Science, Aizawl	16
<b>4.</b>	<b>Bachelor of Veterinary Science and Animal Husbandry (BVSc)</b>	<b>19</b>
	a College of Veterinary Sciences & Animal Husbandry, Selesih, Mizoram	12
	b Assam Agricultural University College of Veterinary Sciences, Jorhat, Guwahati	4
	c College of Veterinary Sciences & Animal Husbandry, Jalukie, Nagaland	3
<b>5.</b>	<b>Bachelor of Science (Agriculture)</b>	<b>18</b>
	a School of Agriculture Sc & Rural Dev. Medziphema, Nagaland	4
	b College of Agriculture, Iroisemba, Manipur	9
	c Assam Agriculture University, Jorhat	1
	d College of Horticulture & Forestry, Pasighat, Arunachal Pradesh	2
	e College of Post Graduate Studies, Barapani, Meghalaya	2
<b>6.</b>	<b>Bachelor of Science (Horticulture)</b>	<b>14</b>
	a College of Horticulture & Forestry, Pasighat, Arunachal Pradesh	6
	b College of Agriculture, Ranipool, Sikkim	1
	c Assam Agriculture University, Jorhat	1
	d College of Horticulture, Thenzawl, Mizoram	6
<b>7.</b>	<b>Bachelor Science (Fishery)</b>	<b>4</b>
	a College of Fishery, (CAU), Lembucherra, Agartala, Tripura	3
	b Assam Agriculture University, Jorhat	1
<b>8.</b>	<b>Bachelor of Science (Forestry)</b>	<b>5</b>
	a College of Horticulture & Forestry, Pasighat, Arunachal Pradesh	4
	b Dr. Y.S. Parmar University of Horticulture & Forestry, Nauni-Solan(HP)	1

<b>9. B.Sc. (Home Science)</b>	<b>4</b>
a Assam Agriculture University, Jorhat, Assam	2
b College of Home Science, Tura, Meghalaya	2
<b>10. Bachelor in Optometry &amp; Ophthalmic Technology (BOOT)</b>	<b>16</b>
a Regional Institute of Para Medical and Nursing Science, Aizawl	16
<b>11. Bachelor in Radiography &amp; Imaging Technology (BRIT)</b>	<b>16</b>
a Regional Institute of Para Medical and Nursing Science, Aizawl	16
<b>12. Bachelor of Sciene ( Sericulture)</b>	<b>1</b>
a Assam Agriculture University, Jorhat	1
<b>13. Bachelor of Science (Nutrition &amp; Dietetics)</b>	<b>1</b>
a College of Home Science, Dakopgre, Tura	1
<b>14. Diploma in Pharmacy (D.Pharm)</b>	<b>13</b>
a Dibrugarh University, Assam	5
b Regional Institute of Pharmaceutical Science and Technology(RIPSAT), Agartala Tripura	8
<b>15. Bachelor of Science in Community Science (B.Sc(C.Sc)(Female)</b>	<b>3</b>
a College of Home Science, Tura, Meghalaya	3
<b>16. Bachelor of Science ( Natural Firming)</b>	<b>5</b>
a College of Horticulture & Forestry, Pasighat, Arunachal Pradesh	1
b College of Agriculture, Ranipool, Sikkim	1
c College of Horticulture, Thenzawl, Mizoram	1
d College of Agriculture, Iroisemba, Manipur	1
e College of Post Graduate Studies, Barapani, Meghalaya	1
<b>17. Downtown University, Dispur, Guwahati, Assam(NEC)</b>	<b>31</b>
a Bachelor of Science in Physiotherapy(BPT)	4
b Bachelor of Science in Advance Imaging Technology	3
c Bachelor of Science in Trauma, Emergency & Disaster Management	3
d. Bachelor of Science in Medical Laboratory Technology	3
e. Bachelor of Science in Operation Theater Technology	3
f. Bachelor of Science in Dialysis	3
g. Bachelor of Science in Optometry	3
h. Bachelor of Science in Food, Nutrition & Dietetics	3
i. Bachelor of Science in Biotechnology	3
j. Bachelor of Science in Microbiology	3

# INSTRUCTIONS FOR USE OF ANSWER SHEET

## MIZORAM STATE COUNCIL FOR TECHNICAL EDUCATION OMR ANSWER SHEET

SEM-2

1. NAME OF THE CANDIDATE, USE ENGLISH CAPITAL LETTERS ONLY

2. FATHER'S NAME, USE ENGLISH CAPITAL LETTERS ONLY

3. ROLL NO.

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5. DATE OF EXAMINATION

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### ANSWERS

1	A	B	C	D	21	A	B	C	D	41	A	B	C	D	61	A	B	C	D	81	A	B	C	D
2	A	B	C	D	22	A	B	C	D	42	A	B	C	D	62	A	B	C	D	82	A	B	C	D
3	A	B	C	D	23	A	B	C	D	43	A	B	C	D	63	A	B	C	D	83	A	B	C	D
4	A	B	C	D	24	A	B	C	D	44	A	B	C	D	64	A	B	C	D	84	A	B	C	D
5	A	B	C	D	25	A	B	C	D	45	A	B	C	D	65	A	B	C	D	85	A	B	C	D
6	A	B	C	D	26	A	B	C	D	46	A	B	C	D	66	A	B	C	D	86	A	B	C	D
7	A	B	C	D	27	A	B	C	D	47	A	B	C	D	67	A	B	C	D	87	A	B	C	D
8	A	B	C	D	28	A	B	C	D	48	A	B	C	D	68	A	B	C	D	88	A	B	C	D
9	A	B	C	D	29	A	B	C	D	49	A	B	C	D	69	A	B	C	D	89	A	B	C	D
10	A	B	C	D	30	A	B	C	D	50	A	B	C	D	70	A	B	C	D	90	A	B	C	D
11	A	B	C	D	31	A	B	C	D	51	A	B	C	D	71	A	B	C	D	91	A	B	C	D
12	A	B	C	D	32	A	B	C	D	52	A	B	C	D	72	A	B	C	D	92	A	B	C	D
13	A	B	C	D	33	A	B	C	D	53	A	B	C	D	73	A	B	C	D	93	A	B	C	D
14	A	B	C	D	34	A	B	C	D	54	A	B	C	D	74	A	B	C	D	94	A	B	C	D
15	A	B	C	D	35	A	B	C	D	55	A	B	C	D	75	A	B	C	D	95	A	B	C	D
16	A	B	C	D	36	A	B	C	D	56	A	B	C	D	76	A	B	C	D	96	A	B	C	D
17	A	B	C	D	37	A	B	C	D	57	A	B	C	D	77	A	B	C	D	97	A	B	C	D
18	A	B	C	D	38	A	B	C	D	58	A	B	C	D	78	A	B	C	D	98	A	B	C	D
19	A	B	C	D	39	A	B	C	D	59	A	B	C	D	79	A	B	C	D	99	A	B	C	D
20	A	B	C	D	40	A	B	C	D	60	A	B	C	D	80	A	B	C	D	100	A	B	C	D

6. CANDIDATE'S SIGNATURE

7. INVIGILATOR'S SIGNATURE

### Counseling and Related Activities for SMATEE – 2025

Sl.No	Activity	When to start	When to complete	Place
1	Selling of Application Form SMATEE	1 <sup>st</sup> March 2025 (Saturday)	31 <sup>st</sup> March 2025 (Monday)	www.dhte.mizoram.gov.in
2	Last date of Submission of Application Form SMATEE	31 <sup>st</sup> March 2025 (Monday)	31 <sup>st</sup> March 2025 (Monday)	www.dhte.mizoram.gov.in
3	Date of Issue Admit Card SMATEE	14 <sup>th</sup> April 2025 (Monday)	25 <sup>th</sup> April 2025 (Friday)	www.dhte.mizoram.gov.in
4	Date of Examination SMATEE	25 <sup>th</sup> April 2025 (Friday)	25 <sup>th</sup> April 2025 (Friday)	Examination centre
5	Tentative Date of Publication of results SMATEE	To be notified later	To be notified later	<a href="https://dhte.mizoram.gov.in">https://dhte.mizoram.gov.in</a> and at Notice Board of Jt. Director Technical Wing Office, Chaltlang
6	Online Registration first round (Tentative)	To be notified later		<a href="https://dhte.mizoram.gov.in">https://dhte.mizoram.gov.in</a>
7	1 <sup>st</sup> round Results	To be notified later		<a href="https://dhte.mizoram.gov.in">https://dhte.mizoram.gov.in</a>
8	Reporting at the reporting centre against 1 <sup>st</sup> round of Allotment	To be notified later		Office of the Jt. Director Technical Wing Office, Chaltlang
9	Security Deposit for 1 <sup>st</sup> round	To be notified later		Office of the Jt. Director Technical Wing Office, Chaltlang
10	Last date for joining for 1 <sup>st</sup> round	To be notified later		Allotted Institutions
11	2 <sup>nd</sup> round/MOP-UP-round counseling (Tentative)	To be notified later		Office of the Jt. Director Technical Wing Office, Chaltlang/Dawrpui Multipurpose Hall
12	Conduct of Educational Fair with Private Institutions	To be notified later		Office of the Jt. Director Technical Wing Office, Chaltlang/Dawrpui Multipurpose Hall



## SYLLABUS FOR SMATEE 2025

### PHYSICS (Class XI)

#### Topic - I : Physical World and Measurement

**Need for measurement.** Units of measurement; systems of units; SI units, fundamental and derived units. Significant figures. Dimensions of physical quantities, dimensional analysis and its applications.

#### Topic - II : Kinematics

Frame of reference (Inertia and non-inertia frames), Motion in a straight line, Elementary concepts of differentiation and integration for describing motion, uniform and non-uniform motion, and instantaneous-velocity, uniformly accelerated motion, velocity-time and position-time graphs, relations for uniformly accelerated motion (graphical treatment).

**Scalar and vector quantities:** Position and displacement vectors, general vectors and notation, equality of vectors, multiplication of vectors by a real number; addition and subtraction of vectors. Unit vectors; resolution of a vector in a plane, rectangular components. Scalar and Vector products of Vectors.

Motion in a plane, cases of uniform velocity and uniform acceleration-projectile motion. Uniform circular motion.

#### Topic - III: Laws of Motion

Intuitive concept of force. Inertia, Newton's first law of motion; momentum and Newton's second law of motion; impulse; 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, lubrication. Dynamics of uniform circular motion: Centripetal force, examples of circular motion (vehicle on level circular road, vehicle on banked road).

#### Topic - IV: Work, Energy and Power

Work done by a constant force and a variable force; kinetic energy, work-energy theorem, power. Notion of potential energy, potential energy of a spring, conservative forces; non-conservative forces; motion in a vertical circle, elastic and inelastic collisions in one and two dimensions.

#### Topic - V: Motion of System of Particles and Rigid Body

Centre of mass of a two-particle system, momentum conservation and centre of mass motion. Centre of mass of a rigid body; centre of mass of uniform rod. Moment of a force, torque, angular momentum, law of conservation of angular momentum and its applications. Equilibrium of rigid bodies, rigid body rotation and equation of rotational motion, comparison of linear and rotational motions. moment of inertia, radius of gyration. Values of M.I. for simple geometrical objects (no derivation).

#### Topic - VI: Gravitation

Kepler's laws of planetary motion. The universal law of gravitation. Acceleration due to gravity and its variation with altitude and depth. Gravitational potential energy; gravitational potential, Escape velocity, orbital velocity of a satellite.

## **Topic - VII: Properties of Bulk Matter**

Elasticity, Stress-strain relationship, Hooke's law, Young's modulus, bulk modulus, shear, modulus of rigidity(qualitative idea only), poisson's ratio; elastic energy.

Pressure due to a fluid column; Pascal's law and its applications (hydraulic lift and hydraulic brakes), Effect of gravity on fluid pressure.

Viscosity, Stokes' law, terminal velocity, Reynolds's number, streamline and turbulent flow, Critical velocity, Bernoulli's theorem and its applications.

Surface energy and surface tension, angle of contact, excess of pressure across a curved surface, application of surface tension ideas to drops, bubbles and capillary rise.

Heat, temperature, thermal expansion; thermal expansion of solids, liquids and gases. Anomalous expansion of water, Specific heat capacity:  $C_p$ ,  $C_v$  - calorimetry; change of state - latent heat.

Heat transfer-conduction, convection and radiation, thermal conductivity. Qualitative ideas of Black Body Radiation, Wein's displacement law, Stefan's law.

## **Topic - VIII: Thermodynamics**

Thermal equilibrium and definition of temperature, Zeroth law of Thermodynamics, heat, work and internal energy. First law of thermodynamics.

Second law of thermodynamics: gaseous state of matter, change of condition of gaseous state – Isothermal, adiabatic, reversible, irreversible and cyclic processes.

## **Topic- IX: Behaviour of Perfect Gas and Kinetic Theory**

Equation of state of a perfect gas; work done on compressing a gas.

Kinetic theory of gases: Assumptions, concept of pressure. Kinetic energy and temperature; rms speed of gas molecules; degrees of freedom, law of equipartition of energy (statement only) and application to specific heat capacities of gases; concept of mean free path, Avogadro's number.

## **Topic - X: Oscillations and Waves**

Periodic motion – time period, frequency, displacement as a function of time. Periodic functions and their applications.

Simple harmonic motion(SHM) and its equation; phase; oscillations of a loaded spring -restoring force and force constant; energy in SHM. Kinetic and potential energies; simple pendulum derivation of expression for its time period (qualitative ideas only).

Wave motion: Longitudinal and transverse waves, speed of wave motion, 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.

## **PHYSICS ( Class XII )**

### **Topic - I: Electrostatics**

Electric charges, conservation of charges, Coulomb's law - force 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, statement of Gauss's theorem and its applications to find field due- to infinitely long straight wire, uniformly charged infinite plane sheet and uniformly charged thin spherical shell (field-inside and outside).

Electric potential, potential difference, electric potential due to a point charge, a dipole and system of charges; equipotential surfaces, electrical potential energy of a system of two point charges and of electric dipoles in an electrostatic field.

Conductors and insulators, free charges and bound charges inside a conductor. Dielectrics and electric polarisation, capacitors and capacitance, combination of capacitors in series and in parallel, capacitance of a parallel plate capacitor with and without dielectric medium between the plates, energy stored in a capacitor (no derivations, formulae only).

## **Topic - II: Current Electricity**

Electric current, flow of electric charges in a metallic conductor, drift velocity and mobility, and their relation with electric current; Ohm's law, electrical resistance, V- I characteristics (linear and non-linear), electrical energy and power, electrical resistivity and conductivity, temperature dependence of resistance, Internal resistance of a cell, potential difference and emf of a cell, combination of cells in series and in parallel, Kirchhoff 's laws and simple applications. Wheatstone bridge.

## **Topic - III: Magnetic Effects of Current and Magnetism**

Concept of magnetic field, Oersted's experiment. Biot - Savart law and its application to current carrying circular loop.

Ampere's law and its applications to infinitely long straight wire, straight solenoids (Only qualitative treatments). Force on a moving charge in uniform magnetic and electric fields.

Force on a current-carrying conductor in a uniform magnetic field, force between two parallel current-carrying conductors – definition of ampere, torque experienced by a current loop in a magnetic field; Current loop as a magnetic dipole and its magnetic dipole moment, moving coil galvanometer – its current sensitivity and conversion to ammeter and voltmeter.

Bar magnet, bar magnet as an equivalent solenoid (qualitative treatment only), magnetic field intensity due to a magnetic dipole (bar magnet) along its axis and perpendicular to its axis (qualitative treatment only), torque on a magnetic dipole (bar magnet) in a uniform magnetic field (qualitative treatment only), Magnetic field lines. Magnetic properties of materials - Para-, dia-, and ferro- magnetic substances with examples, Magnetization of materials, effects of temperature on magnetic properties.

## **Topic - IV: Electromagnetic Induction and Alternating Currents**

Electromagnetic induction; Faraday's law, induced emf and current; Lenz's Law, Self and mutual inductance.

Alternating currents, peak and rms value of alternating current/voltage; reactance and impedance; LCR series circuit (Phasor only), resonance (with sharpness of resonance); power in AC circuits, power factor, wattless current. AC generator and transformer.

## **Topic - V: Electromagnetic Waves**

Basic idea of displacement current, Electromagnetic waves: their characteristics, Transverse nature (qualitative ideas only).

Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet, x-rays, gamma rays) including elementary facts about their uses.

## **Topic - VI: Optics**

Reflection of light, spherical mirrors, mirror formula, refraction of light, total internal reflection and its applications, optical fibres, refraction at spherical surfaces, lenses, thin lens formula, lens-maker's formula, magnification, power of a lens, combination of thin lenses in contact, refraction and dispersion of light through prism.

*Optical instruments:* Microscope and astronomical telescope (reflecting and refracting) and their magnifying powers.

Wave optics: Wavefront and Huygens' principle, reflection and refraction of plane wave at a plane surface using wavefronts. Proof of laws of reflection and refraction using Huygens' principle.

Interference, Young's double slit experiment and expression for fringe width (No derivation, final expression only), coherent sources and sustained interference of light.

Diffraction due to a single slit, width of central maximum (qualitative treatment only). Polarisation, plane polarised light; uses of plane polarised light and Polaroids.

## **Topic - VII: Dual Nature of Matter and Radiation**

Photoelectric effect, Hertz and Lenard's observations; Einstein's photoelectric equation – particle nature of light. Experimental study of photoelectric effect.

Matter waves wave nature of particles, de Broglie relation (expression only).

## **Topic - VIII: Atoms and Nuclei**

Alpha - particle scattering experiment; Rutherford's model of atom; Bohr model of hydrogen atom, expression for radius, velocity and energy of possible  $n^{\text{th}}$  orbit (No derivation), energy levels, hydrogen spectrum (qualitative treatment only).

Composition and size of nucleus, atomic masses, isotopes, isobars; isotones, nuclear force.

Mass-energy relation, mass defect; binding energy per nucleon and its variation with mass number; nuclear fission (without nuclear reactor) and fusion.

## **Topic - IX: Electronic Devices**

Energy bands in conductors, insulators and semiconductors (qualitative ideas only), intrinsic and extrinsic semiconductors – p and n type, p-n junction.

Semiconductor diode - I-V characteristics in forward and reverse bias, diode as a rectifier.

## **CHEMISTRY (Class XI)**

### **Topic - I: Some Basic Concepts of Chemistry**

General Introduction: Importance and scope of Chemistry.

Nature of matter, laws of chemical combination, Dalton's atomic theory: concept of elements, atoms and molecules.

Atomic and molecular masses, mole concept and molar mass, percentage composition, empirical and molecular formula, chemical reactions, stoichiometry and calculations based on stoichiometry.

### **Topic - II: Structure of Atom**

Discovery of Electron, Proton and Neutron, atomic number, isotopes and isobars. Thomson's model and its limitations. Rutherford's model and its limitations, Bohr's model and its limitations, concept of shells and

subshells, dual nature of matter and light, de Broglie's relationship, Heisenberg uncertainty principle, concept of orbitals, quantum numbers, shapes of s, p and d orbitals, rules for filling electrons in orbitals - Aufbau principle, Pauli's exclusion principle and Hund's rule, electronic configuration of atoms, stability of half-filled and completely filled orbitals.

### **Topic - III: Classification of Elements and Periodicity in Properties**

Significance of classification, brief history of the development of periodic table, modern periodic law and the present form of periodic table, periodic trends in properties of elements - atomic radii, ionic radii, inert gas radii, Ionization enthalpy, electron gain enthalpy, electronegativity, valency. Nomenclature of elements with atomic number greater than 100.

### **Topic - IV: Chemical Bonding and Molecular Structure**

Valence electrons, ionic bond, covalent bond, bond parameters, Lewis structure, polar character of covalent bond, covalent character of ionic bond, valence bond theory, resonance, geometry of covalent molecules, VSEPR theory, concept of hybridization, involving s, p and d orbitals and shapes of some simple molecules, molecular orbital theory of homonuclear diatomic molecules (qualitative idea only), Hydrogen bond.

### **Topic - V: Chemical Thermodynamics**

Concepts of System and types of systems, surroundings, work, heat, energy, extensive and intensive properties, state functions.

First law of thermodynamics - internal energy and enthalpy, heat capacity and specific heat, measurement of U and H, Hess's law of constant heat summation, enthalpy of bond dissociation, combustion, formation, atomization, sublimation, phase transition, ionization, solution and dilution. Second law of Thermodynamics (brief introduction)

Introduction of entropy as a state function, Gibb's energy change for spontaneous and non- spontaneous processes, criteria for equilibrium.

Third law of thermodynamics (brief introduction).

### **Topic - VI: Equilibrium**

Equilibrium in physical and chemical processes, dynamic nature of equilibrium, law of mass action, equilibrium constant, factors affecting equilibrium LeChatelier's principle; ionic equilibrium ionization of acids and bases, strong and weak electrolytes, degree of ionization, ionization of polybasic acids, acid strength, concept of pH, Hydrolysis of salts (elementary idea), buffer solutions, Henderson equation, solubility product, common ion effect (with illustrative examples).

### **Topic- VII: Redox Reactions**

Concept of oxidation and reduction, redox reactions, oxidation number, balancing redox reactions, in terms of loss and gain of electrons and change in oxidation number, applications of redox reactions.

### **Topic - VIII: Organic Chemistry -Some Basic Principles and Techniques**

General introduction, methods of purification, qualitative and quantitative analysis, classification and IUPAC nomenclature of organic compounds. Electronic displacements in a covalent bond: inductive effect, electromeric effect, resonance and hyper conjugation. Homolytic and heterolytic fission of a covalent bond: free radicals, carbocations, carbanions, electrophiles and nucleophiles, types of organic reactions.

## Topic - IX: Hydrocarbons

### Classification of Hydrocarbons

*Aliphatic Hydrocarbons:* Alkanes - Nomenclature, isomerism, conformation (ethane only), physical properties, chemical reactions including free radical mechanism of halogenation, combustion and pyrolysis.

Alkenes - Nomenclature, structure of double bond (ethene), geometrical isomerism, physical properties, methods of preparation, chemical reactions: addition of hydrogen, halogen, water, hydrogen halides (Markovnikov's addition and peroxide effect), ozonolysis, oxidation, mechanism of electrophilic addition.

Alkynes - Nomenclature, structure of triple bond (ethyne), physical properties, methods of preparation, chemical reactions: acidic character of alkynes, addition reaction of - hydrogen, halogens, hydrogen halides and water.

*Aromatic Hydrocarbons:* Introduction, IUPAC nomenclature, benzene: resonance, aromaticity, chemical properties: mechanism of electrophilic substitution. Nitration, sulphonation, halogenation, Friedel Craft's alkylation and acylation, directive influence of functional group in monosubstituted benzene. Carcinogenicity and toxicity.

## CHEMISTRY (Class XII)

### Topic - I: Solutions

Types of solutions, expression of concentration of solutions of solids in liquids, solubility of gases in liquids, solid solutions, Raoult's law, colligative properties - relative lowering of vapour pressure, elevation of boiling point, depression of freezing point, osmotic pressure, determination of molecular masses using colligative properties, abnormal molecular mass, Van't Hoff factor.

### Topic - II: Electrochemistry

Redox reactions, EMF of a cell, standard electrode potential, Nernst equation and its application to chemical cells, Relation between Gibbs energy change and EMF of a cell, conductance in electrolytic solutions, specific and molar conductivity, variations of conductivity with concentration, Kohlrausch's Law, electrolysis and law of electrolysis (elementary idea), dry cell-electrolytic cells and Galvanic cells, lead accumulator, fuel cells, corrosion.

### Topic - III: Chemical Kinetics

Rate of a reaction (Average and instantaneous), factors affecting rate of reaction: concentration, temperature, catalyst; order and molecularity of a reaction, rate law and specific rate constant, integrated rate equations and half-life (only for zero and first order reactions), concept of collision theory (elementary idea, no mathematical treatment), activation energy, Arrhenius equation.

### Topic - IV: d and f Block Elements

General introduction, electronic configuration, occurrence and characteristics of transition metals, general trends in properties of the first row transition metals – metallic character, ionization enthalpy, oxidation states, ionic radii, colour, catalytic property, magnetic properties, interstitial compounds, alloy formation, preparation and properties of  $K_2Cr_2O_7$  and  $KMnO_4$ .

*Lanthanoids* - Electronic configuration, oxidation states, chemical reactivity and lanthanoid contraction and its consequences.

*Actinoids* - Electronic configuration, oxidation states and comparison with lanthanoids.

## **Topic - V: Coordination Compounds**

Coordination compounds - Introduction, ligands, coordination number, colour, magnetic properties and shapes, IUPAC nomenclature of mononuclear coordination compounds. Bonding, Werner's theory, VBT, and CFT; structure and stereoisomerism, importance of coordination compounds (in qualitative analysis, extraction of metals and biological system).

## **Topic - VI: Haloalkanes and Haloarenes**

Haloalkanes: Nomenclature, nature of C–X bond, physical and chemical properties, optical rotation mechanism of substitution reactions.

Haloarenes: Nature of C–X bond, substitution reactions (Directive influence of halogen in monosubstituted compounds only).

Uses and environmental effects of - dichloromethane, trichloromethane, tetrachloromethane, iodoform, freons, DDT.

## **Topic – VII: Alcohols, Phenols and Ethers**

Alcohols: Nomenclature, methods of preparation, physical and chemical properties (of primary alcohols only), identification of primary, secondary and tertiary alcohols, mechanism of dehydration, uses with special reference to methanol and ethanol.

Phenols: Nomenclature, methods of preparation, physical and chemical properties, acidic nature of phenol, electrophilic substitution reactions, uses of phenols.

Ethers: Nomenclature, methods of preparation, physical and chemical properties, uses.

## **Topic – VIII: Aldehydes, Ketones and Carboxylic Acids**

Aldehydes and Ketones: Nomenclature, nature of carbonyl group, methods of preparation, physical and chemical properties, mechanism of nucleophilic addition, reactivity of alpha hydrogen in aldehydes, uses.

Carboxylic Acids: Nomenclature, acidic nature, methods of preparation, physical and chemical properties; uses.

## **Topic-IX: Amines**

Amines: Nomenclature, classification, structure, methods of preparation, physical and chemical properties, uses, identification of primary, secondary and tertiary amines.

Diazonium salts: Preparation, chemical reactions and importance in synthetic organic chemistry.

## **Topic – X: Biomolecules**

Carbohydrates - Classification (aldoses and ketoses), monosaccharides (glucose and fructose), D-L configuration oligosaccharides (sucrose, lactose, maltose), polysaccharides (starch, cellulose, glycogen); Importance of carbohydrates.

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

Vitamins - Classification and functions.

Nucleic Acids: DNA and RNA.

## **BIOLOGY (Class XI)**

### **Topic - I: Diversity of Living Organisms**

Biodiversity; Need for classification; Three domain of life; 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, Gymnosperm (three-to five salient and distinguishing features and at least two examples of each category).

Salient features and classification of animals- non chordate up to phyla level and chordate up to classes level (three to five salient features and at least two examples).

### **Topic - II: Structural Organisation in Animals and Plants**

Morphology; Tissues; Anatomy and functions of different parts of flowering plants: Root, stem, leaf, inflorescence- cymose and racemose, flower, fruit and seed. Description of Solanaceae. (To be dealt along with the relevant practical of the Practical Syllabus).

Animal-tissues; Morphology, anatomy and functions of different systems (digestive, circulatory, respiratory, nervous and reproductive) of a frog.

### **Topic - III : 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; microbodies; 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, lipid, nucleic acids; Enzymes types, properties, enzyme action. Cell division: Cell cycle, mitosis, meiosis and their significance.

### **Topic - IV: Plant Physiology**

Photosynthesis: Photosynthesis as a means of Autotrophic nutrition; Where does photosynthesis take place; How many pigments are involved in Photosynthesis (Elementary idea) Photochemical and biosynthetic phases of photosynthesis; Cyclic and non cyclic photophosphorylation; Chemiosmotic hypothesis; Photorespiration; C<sub>3</sub> and C<sub>4</sub> pathways, Factors affecting photosynthesis.

Respiration: Exchange of 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; Seed dormancy.

### **Topic - V: 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, flagellar 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, goitre, exophthalmic goitre, diabetes, Addison's disease).

Imp: Diseases related to all the human physiology systems to be taught in brief.

## **BIOLOGY ( Class XII )**

### **Topic - I: Reproduction**

Sexual reproduction in flowering plants: Flower structure; Development of male-and female gametophytes; Pollination-types, agencies and examples; Outbreedings 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).

### **Topic - II: 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; Chromosome 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.

Evolution: Origin of life; Biological evolution and evidences for biological evolution (Paleontological, 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.

### **Topic - III: Biology and Human Welfare**

Health and Disease: Pathogens; parasites causing human diseases (Malaria, Filariasis, Ascariasis, Typhoid, Pneumonia, common cold, amoebiasis, ring worm); Basic concepts of immunology vaccines; Cancer; HIV and AIDS; Adolescence, drug and alcohol abuse.

Microbes in human welfare: In household food processing, industrial production, sewage treatment, energy generation and as biocontrol agents and biofertilizers.

### **Topic - IV: 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.

### **Topic – V: Ecology and environment**

Population interactions mutualism, competition, predation, parasitism; Population attributes —growth, birth rate and death rate, age distribution.

Ecosystems: 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 organism, extinction, Red Data Book, biosphere reserves, National parks and sanctuaries.

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