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Original Application Form

PART - I

General Information

1. The following B.Tech programmes are offered by Vignan's University for the year 2015 - 2016:

- ▶ Agricultural Engineering
- ▶ Automobile Engineering
- ▶ Biotechnology
- ▶ Bioinformatics
- ▶ Biomedical Engineering
- ▶ Chemical Engineering
- ▶ Civil Engineering
- ▶ Computer Science & Engg. (CSE)
- ▶ Electronics & Communications Engg. (ECE)
- ▶ Electronics & Computer Engg. (ECM)
- ▶ Electrical & Electronics Engg. (EEE)
- ▶ Food Technology
- ▶ Information Technology (IT)
- ▶ Mechanical Engineering
- ▶ Mechatronics
- ▶ Petroleum Engineering
- ▶ Textile Technology

2. Eligibility criteria for admission:

- ▶ Candidates born on or after 1st July ,1994 and a pass in Intermediate or its equivalent with minimum 60% aggregate marks are eligible to appear for the admission test.
- ▶ Admission to B.Tech programmes will be through an on-line test V-SAT 2015. **(Vignan's Scholastic Aptitude Test. V-SAT is an on-line test conducted by Vignan's University on all India basis).**

Note: Candidates appearing for qualifying examination and awaiting results can also apply.

3. Streams for V-SAT 2015 :

Candidates who attempt Physics, Chemistry, Mathematics and English/Aptitude in the V-SAT 2015 are eligible for all the B.Tech programmes.

Candidates who attempt Physics, Chemistry, Biology and English/Aptitude in the V-SAT 2015 are eligible only for B.Tech. Biotechnology, Bioinformatics & Food Technology Programmes.

4. Scholarships offered by Vignan's University for admission into B.Tech. programmes for the year 2015-16:

Tuition Fee waiver	100%	50%	25%
V-SAT (Rank)*	1 - 100	101 - 300	301 - 500
EAMCET (Rank)**	below 5000	5001 - 10000	10001 - 20000
JEE (Adv) (Rank)**	below 20000	20001 - 35000	35001 - 50000
JEE Mains (Marks) **	> 180	150 - 179	Qualifying marks - 149

* for first year only

** for four years of study subject to maintaining a minimum of 70% of marks in the preceding year without any backlogs, and the ranks in JEE (Adv/Mains) should be All India Ranks / marks in open category.

5. Admission procedure :

- ▶ The admission will be on the basis of the performance in the V-SAT 2015 /EAMCET/JEE.
- ▶ The merit position of the candidate for admission will be based on the RANK obtained in V-SAT 2015/EAMCET/JEE, provided if he/she gets minimum 60% aggregate marks in the qualifying examination as per the eligibility criteria. Admissions will be purely on merit and by following the reservation policy applicable to Vignan's University.
- ▶ A common merit list will be prepared based on the performance in the entrance test and they will be called for the counseling to be held at the Vignan's University premises at Vadlamudi, Guntur District through common ranking.
- ▶ It is the responsibility of the candidates to ascertain whether they possess the requisite qualification for admission. Having been appeared for the competitive examination or called for counseling does not necessarily mean acceptance of the eligibility/admission.
- ▶ The admission offered to a candidate who has been provisionally admitted to a programme will stand cancelled if he/she does not submit the relevant documents in original pertaining to admission (such as marks statements, transfer certificate, conduct certificate etc.) to the Dean-Admissions before the date stipulated in the admission offer.
- ▶ Admissions to various programmes will, however, be subject to verification of facts from the original certificates/documents of the candidates. In case any discrepancy is noticed even at a later point of time after admission, the management reserves the right to cancel the admission and such a decision shall be final and binding on the candidate.

6. V-SAT 2015 On-line Test and Admission Schedule :

IMPORTANT DATES TO REMEMBER	
1. Sale of application forms :	20 th Nov 2014 onwards
2. Last date for receipt of filled in applications :	10 th April 2015
3. On-line Test Dates :	23 rd April 2015 to 27 th April 2015
4. Test Time :	Slot 1. 09.00 A.M. to 12.00 NOON. Slot 2. 02.00P.M to 05.00P.M
5. Announcement of V-SAT2015 result :	10 th May 2015
6. Counseling of merit listed candidates for admission:	20 th May to 30 th May 2015 Venue : Vignan's University, Vadlamudi, Guntur – 522 213 (A.P) Ph : +91 863 2344777 / 78

Note : The changes in the above schedule, if any, due to unavoidable circumstances will be informed to the candidates.

7. V-SAT 2015 Question Paper Pattern

- ▶ The question paper will be in English and consists of 4 sections (Maths or Biology, Physics, Chemistry and English/Aptitude)
- ▶ The questions are of multiple choice and objective type. Each question has 4 options. Choose the right option.
- ▶ Each correct answer carries one mark.
- ▶ There is no negative marking.

S.No	Details
1	Section I : Mathematics or Biology consists of 30 questions (30 Marks)
2	Section II : Physics consists of 30 questions (30 Marks)
3	Section III : Chemistry consists of 30 questions (30 Marks)
4	Section IV : English/Aptitude consists of 30 questions (30 Marks)
	Total 120 questions (120 Marks)

8. V-SAT 2015 Rules

- ▶ Candidates should report to the respective centre 30 minutes prior to the commencement of the test. Live demonstration of on-line test will be arranged for the candidates before the commencement of test.
- ▶ Candidates must bring their hall ticket with them.

Note : Use of calculators, log tables and slide ruler, watches with facilities of calculator, and cellular phones are strictly prohibited for the test. Candidates should not bring any material with them except the Hall Ticket, Pen, H.B. Pencil and Eraser.

General instructions

The test centre Co-ordinator is authorized to dismiss a candidate from the test for any of the following reasons:

- ▶ Creating disturbance.
- ▶ Attempting to take the test on behalf of someone else.
- ▶ Talking to other test taker(s).
- ▶ Use of calculators, slide rules, cell phones, concealed microphones, wireless devices or any other material that may aid in answering questions.

Timings & Breaks

- ▶ The test is of 180 minutes duration.
- ▶ No break is permitted during the test.

9. Application forms

Issue: Application forms will be issued from 20th Nov 2014 onwards. There are three modes of registration as under (for details visit our website www.vignanuniversity.org/admissions).

I. Direct

Candidates can obtain applications by post from the University Office on payment of Rs. 1000/- through DD drawn in favour of **Vignan University**, payable at Guntur or in person from any of Vignan Schools or Colleges at Guntur, Hyderabad, Eluru, Rajahmundry, Visakhapatnam and Vignan offices at Vijayawada, Guntur & Hyderabad.

ii. Post Offices

Applications can also be obtained from Head Post Offices throughout the States of Andhra Pradesh and Telangana. (For details refer to the inside of back cover page of this booklet).

iii. Download

Application form can be downloaded from the university website : www.vignanuniversity.org/appl. The filled application alongwith the DD for Rs. 1000/- drawn in favour of **Vignan University**, payable at Guntur should be sent to reach the address given below before the last date specified. Candidates should write their name and address on the reverse of DD.

The completed applications should be sent to the following address so as to reach before the last date specified :

Dean - Admissions

Vignan's University
Vadlamudi, Guntur - 522 213 (A.P)
Ph : +91 863 - 2344777 / 78

Receipt of application forms

- ▶ Last date for receipt of filled-in application at the University office is 10th April 2015.
- ▶ Applications received after the due date will not be accepted.
- ▶ Candidates are advised to retain a photo copy of the filled in application for future reference.
- ▶ The University will not be responsible for any postal delay, loss in postal transit or any irregularity beyond the control of the University.

10. Information at different stages

Candidates will be informed about the status of the application as under :

Receipt of Application	Through e-mail (admissions@vignanuniversity.org) using the application number about 10 days after dispatching the application.
Hall Ticket	Mentioning Application Number and the test centre after processing the application.

11. Test Centres for V-SAT 2015

V-SAT '15 will be held in various cities across the country. The list of test centres along with their corresponding codes is given under 'Instruction to fill up the Application Form'.

Important: The test centre, once allotted to the candidates, shall not be changed under any circumstances. While every effort will be made to allot test centre and time opted by the candidate, the University reserves the right to allot a centre and time other than that of the candidate's choice.

12. Hall Ticket

Important information

- ▶ The hall ticket will be issued only to those eligible candidates who have submitted their application forms complete in all respects, on or before the last date as specified.
- ▶ The hall ticket will contain name, photograph, signature, address of the test centre allotted and test date & time.
- ▶ Hall tickets will be dispatched through certificate of posting/speed post.
- ▶ The hall ticket once received should be carefully examined by the candidate. If any discrepancy is noticed, it should immediately be brought to the notice of the Dean-Admissions, Vignan's University. (admissions@vignanuniversity.org)
- ▶ The hall ticket can be downloaded from the website www.vignanuniversity.org one week prior to the test date.

- ▶ No candidate will be permitted to take the test without a valid hall ticket. The hall ticket should be presented to the invigilators for verification.
- ▶ Candidate must not tamper with the hall ticket or alter any entry made therein after it has been authenticated.
- ▶ The hall ticket is not transferable to any other person. Impersonation is a legally punishable offence.
- ▶ The hall ticket is an important document. It should be preserved and produced at the time of counseling and admission.

13. Hall Ticket not received due to application being incomplete

Vignan's University does not take any responsibility to inform candidates who have sent an incomplete application. Candidates are advised to check twice before submission that the application form is complete in all respects before posting.

14. Duplicate hall ticket

In case a candidate fails to get a hall ticket 7 days before the scheduled date for V-SAT 2015, he / she should report the same immediately to the Dean-Admissions and if he/she does not receive the hall ticket before the examination date, he/she would have to meet the University Representative one day before the examination at the test centre with a photocopy of the application form, DD and two attested passport size photographs, identical to the one affixed in the application form. Enquiries pertaining to the hall ticket without mentioning application number will not be entertained under any circumstances.

15. Counseling procedure for allocation of seats / branch

- ▶ The date / time for counseling will be intimated to the candidates either by post or through SMS or E-Mail and will also be published in the university website : www.vignanuniversity.org/admissions.
- ▶ Change of date / time of counseling is generally not permissible. If a candidate fails to appear personally for counseling on the date and time specified, he/she will forfeit his candidature for the allotment of seat on that day. However, he / she is eligible to appear for subsequent counseling depending on the availability of seats.
- ▶ The candidates should produce the documents listed below in original along with one set of photocopies while reporting for counseling. Candidates will not be allowed to participate in the counseling process without these documents.

16. Required documents in original during counseling

- ▶ Counseling call letter.
- ▶ V-SAT2015 hall ticket.
- ▶ V-SAT2015 rank card.
- ▶ 10th class marks memo as proof of date of birth.
- ▶ Marks sheet of qualifying examination.
- ▶ Caste certificate (if applicable)

Candidates will be allowed to participate in the counseling process only after verification of the documents. Authentic records pertaining to identification, age, marks sheet of qualifying examination, and other eligibility criteria, will be checked. If a candidate fails to produce any of these documents, he/she will not be considered for counseling.

- ▶ The candidate will be offered a seat based on his / her rank in the merit list and availability of seats.
- ▶ After allotment of a seat in a branch and acceptance of the same by the candidate he / she will remit the prescribed tuition fee and admission fee either by cash or DD drawn in favour of VFSTR-GF payable at Guntur.

17. Submission of documents on admission

The following documents in original are required to be submitted at the time of admission.

- ▶ V-SAT 2015 hall ticket.
- ▶ V-SAT 2015 rank card.
- ▶ Provisional letter of admission offer.
- ▶ Qualifying examination marks sheet.
- ▶ 10th Class marks memo.
- ▶ Transfer Certificate / Migration Certificate.
- ▶ Caste Certificate (if applicable).
- ▶ Conduct Certificate.

All the above referred documents shall be handed over to the Admission Office on or before the date prescribed by the University, failing which provisional admission accorded will stand cancelled.

18. Discontinuance / Withdrawal from the programme

1. Admission fee is non-refundable, once student is provisionally admitted.
2. Prior to closing of admissions and after commencement of class work, tuition fee is refundable with proportionate deduction of monthly fee.
3. Once admissions are closed, tuition fee is non-refundable.

19. General discipline

All candidates admitted to the university shall follow code of conduct, pay the requisite tuition and hostel fee and other charges by the due dates, attend their classes regularly and abide by the rules and regulations of the university. If at any point of time, the conduct of a candidate is not satisfactory or is of a suspicious nature, the management reserves the right, to make him / her vacate the hostel or expel him / her from the university without assigning any reason thereof.

RAGGING IN ANY FORM IS FORBIDDEN. IF ANYONE IS INVOLVED IN RAGGING HE/SHE CAN BE RUSTICATED FROM THE UNIVERSITY.

Note : Vignan's University reserves the right to alter any date or activity schedule announced or add, alter or delete information contained under various headings owing to administrative / operational reasons. The university also reserves the right to alter any of the terms of admission with due notice to the candidates.

20. Fee structure for the academic year 2015-16

For Category 'A' - through V-SAT / EAMCET / JEE (Adv/Mains)-2015.

For Category 'B' - open for candidates who have at least 60% aggregate in Intermediate or equivalent.

BRANCH	CATEGORY – A		CATEGORY - B	
	Admission Fee (Non refundable) (1st yr.)	Tuition Fee (Per year)	Admission Fee (Non refundable) (1st yr.)	Tuition Fee (Per year)
ECE	Rs.10,000/-	Rs. 1,35,000/-	Rs. 20,000/-	Rs. 2,25,000/-
EEE				
ECM				
CSE				
MECHANICAL ENGG.				
CIVIL ENGG.				
INFORMATION TECHNOLOGY				
MECHATRONICS	Rs. 10,000/-	Rs. 70,000/-	Rs. 20,000/-	Rs. 1,35,000/-
AUTOMOBILE ENGG.				
AGRICULTURAL ENGG.				
BIOTECHNOLOGY*				
BIOINFORMATICS*				
BIOMEDICAL ENGG.				
FOOD TECHNOLOGY*				
CHEMICAL ENGG.				
TEXTILE TECHNOLOGY				
PETROLEUM ENGG.				

CDA fee : Career Development Assistance fee of Rs. 5000/- per year for all branches along with 1st semester tuition fee every year.

* BiPC candidates are also eligible for admission into these programmes.

Hostel fee

Rs. 95,000/- + Rs. 5,000/- (Registration Fee) for Deluxe Rooms, Rs. 90,000/- + Rs. 5,000/- (Registration Fee) for A/C rooms & Rs. 65,000/- + Rs. 5,000/- (Registration Fee) for Non A/C rooms..

Study loans

The admitted candidates are eligible to apply for a study loan towards tuition fee, hostel fee, transport and purchase of books in all Nationalised Banks including UCO bank situated on campus at Vadlamudi, subject to terms and conditions of banks. For information contact UCO Bank, Vadlamudi, (Ph : 0863 - 2118495), Guntur Dist.

PART - II

Instructions to fill up the application form

General Instructions

- ▶ Read the following instructions carefully before filling in the application form. Requests for corrections will not be entertained later. Refer to the specimen copy enclosed in this brochure.
- ▶ The application form should be filled by the candidate in his/her own handwriting. Candidates should send only the original application form and may retain a xerox copy.
- ▶ The application form will be machine-processed. Hence take utmost care in writing with **black ballpoint pen** in the boxes wherever provided.
- ▶ Do not scribble, cut, tear or erase the application form. Do not put any stray marks anywhere on the application form.
- ▶ The photograph, signature and address of the applicant are to be machine-scanned. So paste a recent colour photograph of good quality with light colour background. Sign in the prescribed place using only a **black ballpoint pen**.
- ▶ Note that your name, your parent's / guardian's name and your date of birth should be exactly the same as given in your 10th Class marks memo / Higher Secondary School examination certificate.
- ▶ The application must be complete in all respects. An incomplete application or application filled in a language other than English will be rejected.
- ▶ Candidates are advised to retain with them a photocopy of the filled-in application for future reference and quote the application number in all correspondence.

Instructions for filling the application form (for downloaded applications)

- Carefully read the V-SAT 2015 Instruction Guide before you proceed to fill the form.
- Read and understand all the instructions and eligibility criteria for admission before proceeding to fill the form.
- You are advised to take a print out of these instructions so that you can refer to the same while filling the form.
- Once you confirm the data entered, you will not be allowed to change the same.
- After downloading the form, you should take two copies of the printout. Once you take the printout of the form, affix your photograph, fill the application form, sign and attach the Demand Draft for Rs. 1000/- drawn in favour of "Vignan University" payable at Guntur and send one copy of the same by registered post /speed post to the following address. You should keep the second copy with you for your reference.

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Vignan's University

Vadlamudi, Guntur - 522 213

Ph. No. : +91 863 2344777 / 78

Item wise instructions for filling the application form

- NAME OF THE APPLICANT** - Write your name in CAPITAL LETTERS as it appears in your 10th class marks memo. Leave one blank box between adjacent words. Do not use any prefixes like Mr., Mrs., Miss/Ms. etc. For example : Mr. CHENNAMA PRASADA RAO should be written as

C	H	E	N	N	A	M	A		P	R	A	S	A	D	A		R	A	O		
---	---	---	---	---	---	---	---	--	---	---	---	---	---	---	---	--	---	---	---	--	--

- DATE OF BIRTH** - Enter the date, month and year of your birth as recorded in 10th class marks memo in DD/MM/YY format only. When the number or date or month is a single digit, zero should be prefixed.

For example : 17th April 1994 will be entered as

1	7	0	4	9	4
DATE		MONTH		YEAR	

3. SEX - Tick Mark the appropriate box only.

MALE

FEMALE

4. COURSE CHOICE (B.TECH) CODE

Agricultural Engineering	31
Automobile Engineering	32
Biotechnology	33
Bioinformatics	34
Biomedical Engineering	35
Chemical Engineering	36
Civil Engineering	37
Computer Science & Engineering (CSE)	38
Electronics & Communications Engg. (ECE)	39

Electronics & Computer Engineering (ECM)	40
Electrical & Electronics Engineering (EEE)	41
Food Technology	42
Information Technology (IT)	43
Mechanical Engineering	44
Mechatronics	45
Petroleum Engineering	46
Textile Technology	47

For Example an applicant with ECE as the first choice, Civil Engineering as second choice and EEE as Third Choice should right as:

3	9	3	7	4	1
CHOICE 1		CHOICE 2		CHOICE 3	

5. TEST CENTRE - Refer to the table given below for test centre codes. You can give any two choices as per priority. You may be allotted any one of them.

For example, an applicant with Hyderabad as the first choice and Bengaluru as the second choice should write as :

2	2	1	5
CHOICE 1		CHOICE 2	

6. TEST DATE & TIME -Enter the date, month & year as per the convenience of the candidate. For example, if the candidate wishes to appear on 23rd April 2015. Please enter

2	3	0	4	1	5
Date		Month		Year	

TEST TIME : Every day two time slots are provided i.e., 9AM to 12NOON and 2PM to 5PM. Candidate can choose any one. For example, 2PM to 5PM, Please tick slot 2

Slot 1. 9AM to 12NOON

Slot 2. 2PM to 5PM

TEST CENTRE CODES

Test Centre	Code
ANANTAPUR	11
ASANSOL	12
BEGUSARAI	13
BELLARI	14
BENGALURU	15
BHOPAL	16
BHUBANESHWAR	17
CHENNAI	18
DISPUR	19

Test Centre	Code
ELURU	20
GUNTUR	21
HYDERABAD	22
ITANAGAR	23
JABALPUR	24
JAMSHEDPUR	25
KAKINADA	26
KHAMMAM	27
KOLKATA	28

Test Centre	Code
KURNOOL	29
MACHILIPATNAM	30
NELLORE	31
NIZAMABAD	32
ONGOLE	33
PATNA	34
RAIPUR	35
RAJAHMUNDRY	36
RANCHI	37

Test Centre	Code
SAMBALPUR	38
TANUKU	39
TIRUPATHI	40
VARANASI	41
VIGNAN'S UNIVERSITY Vadlamudi.	42
VIJAYAWADA	43
VISAKHAPATNAM	44
WARANGAL	45

7. **RELIGION** : Write the religion

H I N D U

8. **CATEGORY** : Tick Mark the appropriate box only.

BC SC ST PH Others

9. **NAME OF THE PARENT / GUARDIAN** : Write the name of your parent or guardian.

C H G O V I N D A R A O

For example : Mr. CH. GOVINDARAO

10. **ADDRESS FOR CORRESPONDENCE** - Write the complete postal address including PIN CODE to which communications are to be sent. Also write the telephone number with STD code and e-mail address if any.

For example the address is :

PLOT NO. 38, PHASE III
SECTOR 6
M V P COLONY
VISHAKHAPATNAM

ADDRESS FOR CORRESPONDENCE (DO NOT REPEAT NAME)

DOOR / HOUSE No.

P L O T N O 3 8 P H A S E I I I

STREET NAME

S E C T O R - 6

LOCALITY / MANDAL

M V P C O L O N Y

TOWN / CITY

V I S A K H A P A T N A M

DISTRICT

V I S A K H A P A T N A M

PINCODE

5 3 0 0 1 7

STATE

A N D H R A P R A D E S H

STD CODE

0 8 9 1

TELEPHONE NUMBER

2 5 3 4 5 4 7

MOBILE NUMBER

9 9 0 0 3 3 4 4 5 5

EMAIL ID

P A R S U . C H E N N A @ G M A I L . C O M

• **How do you come to know about Vignan's University?** Tick Mark in the appropriate box only

Newspaper Ads TV Friends

Relatives Present intermediate campus

• **Interested extra curricular activities** : Write in the appropriate box only. (for example)

1.

2.

11. **PHOTOGRAPH** - Paste your recent passport size colour photograph (not older than three months) at appropriate place. Do not staple or pin the photograph.
12. **DETAILS OF CLASS X** - Write the Year, Board and State from where you have passed class X.
13. **X CLASS EXAMINATION DETAILS** - Write maximum marks, marks obtained and percentage for all subjects put together.
14. **DETAILS OF INTERMEDIATE OR EQUIVALENT** - Tick mark the group and write the college and campus last attended, place, year of pass, Board and State from where you have passed or appeared for Intermediate or equivalent examination.
15. **SUBJECT WISE MARKS - INTERMEDIATE EXAMINATION OR EQUIVALENT** - Tick the group in the box provided and write the name of the subject, maximum marks, marks obtained and the percentage. Also write the maximum marks, total marks obtained and the percentage for all subjects put together. If the final result is not declared at the time of filling this application form, enter the Jr. Inter /11th class marks.
16. **APPLICATION FEE DETAILS:** Application can be obtained either by paying cash or submission of DD.
DEMAND DRAFT: DD amount Rs. 1000/- drawn in favour of Vignan University, payable at Guntur. Write your full name and address on the reverse of the DD.
17. **DECLARATION** - Candidate and the Parent / Guardian must sign with date the declaration to authenticate the information provided by them. Unsigned applications will not be accepted.

ENVELOPE ADDRESSED TO:

Dean - Admissions

Vignan's University

Vadlamudi, Guntur - 522 213 (A.P)

Ph : +91 863 2344777 / 78

Reservation Policy : VFSTR (Vignan's University) has evolved a reservation policy where by a percentage of seats are reserved for helping the socially and educationally backward sections of society and help them enjoy opportunities for development. In accordance with it 15% of the seats are reserved for scheduled castes (SC), and 7.5% of the seats are reserved for scheduled tribes (ST) and another 27% has been reserved for the other backward classes (OBC). In each of these categories horizontal reservation is given for special categories viz., Physically Handicapped – PH (3%), Children of Armed Forces Personnel –CAP (2%), National Cadet Corps – NCC (1%), Sports and Games (½%). In addition, a reservation of 33 1/3% of seats is in favour of women candidates in each category (OC/SC/ST/OBC). Reservation for women shall not be applicable if women candidates selected on merit in each category exceeds 33 1/3%.

If there is any vacancy available in the seats that are allocated to fill via special categories of a particular reserved category, the opportunity will be passed to the candidates of that reserved category and then to the general candidates.

There is no relaxation on any criteria specified, whether it is in passing of the exams or graduating a course. The candidates admitted through the reservation policy subjected to the same criteria as the general candidates in terms of fee structure and graduation policy.

Note: The candidates claiming reservation benefits under the above categories shall produce original documents in support of their claim at the time of seat allotment and originality of those documents will be confirmed from concerned authorities.

PART - III
Syllabus and Model Questions
for V-SAT 2015
Section-1 : Mathematics

Unit 1: Algebra

Sets, relations and functions

Sets and their representation, union, intersection of two sets and complement of a set and their algebraic properties, power set, Relation-types of relations, equivalence relation, Functions-types of functions, one-one and onto functions, composition of functions, inverse functions, algebra of real valued functions

Quadratic equations and expressions

Quadratic equations in real and complex number system and their solutions, relation between roots and coefficients, nature of roots, formation of quadratic equations with given roots, maximum and minimum values of quadratic expressions, quadratic inequations in one variable

Theory of Equations

Relation between roots and coefficients in an equation, solving an equation, Equation with real coefficients occurrence of complex roots in conjugate pairs, transformations of equations

Matrices, determinants and linear equations

Types of matrices, algebra of matrices; transpose of a matrix, determinants of matrices of order 2 and 3; properties of determinants, evaluation of determinants, adjoint and inverse of a square matrix, solution of simultaneous linear equations in two and three variables using determinants and matrices, consistency and inconsistency of simultaneous linear equations, Rank of a matrix

Permutations and combinations

Fundamental principle of counting, permutation as an arrangement and combination as a selection, linear and circular permutations, permutations when repetition of object is allowed, combinations

Binomial theorem and partial fractions

Binomial theorem for a positive integral index, general term, middle term (s), greatest term, properties of binomial coefficients, binomial theorem for rational index. Approximations using Binomial theorem, partial fractions

Sequences and series

Arithmetic, geometric and harmonic progressions, insertion of arithmetic, geometric and harmonic means between two numbers, arithmetico-geometric progression

Complex Numbers

complex number as an ordered pair of real numbers, representation of complex numbers in the form $a+ib$ and their representation in a plane, Argand diagram, algebra of complex numbers, modulus and argument (or amplitude) of a complex number, square root of a complex number, triangle inequality, De-moivres theorem and its applications

Unit 2: Trigonometry

Trigonometric Functions(1) Trigonometric ratios of compound angles, multiple and sub-multiple angles, transformations and identities, extreme values, periodicity (2) Trigonometric equations, (3) Inverse trigonometric functions (4) Hyperbolic and inverse hyperbolic functions (5) Properties of triangle

Unit 3: Vector Algebra

Vectors and scalars, addition of vectors, linear combination of vectors, linear dependence and independence, components of a vector in two and three dimensions, vector equations of a line and a plane, scalar and vector products of two vectors and their applications, scalar and vector triple products, scalar and vector products of four vectors

Unit 4: Measures of dispersion

Range, Mean deviation, variance and standard deviation, coefficient of variation and analysis of frequency distribution.

Probability

Random experiment, sample space, event, probability of an event, addition theorem of probability; conditional event, conditional probability, multiplication theorem of probability, Bayes theorem Probability distribution of a random variable, mean and variance of a random variable, Binomial and Poisson distributions

Unit 5: Coordinate Geometry

Coordinate system in two dimensions, locus and its equation, translation and rotation of axes

Straight Line

Various forms of equation of straight line, intersection of lines, angle between two lines, condition for concurrence of three lines, distance of a point from a line, centroid, circumcentre, in-centre and orthocenter of triangle, equation of family of lines passing through the point of intersection of two lines

Pair of straight lines

Combined equation of a pair of lines passing through the origin, angular bisectors, condition for general equation of second degree in x and y to represent a pair of lines, angle between a pair of lines

Three dimensional Geometry

Coordinates, Section formulae, direction cosines, direction ratios, plane equations.

Circle

Standard form of equation of a circle, general form of the equation of a circle and its parametric representation, equation of a circle when the end points of a diameter are given, points of intersection of a line and a circle, equation of tangent, normal, chord of contact, pole and polar, pair of tangents from an external point

System of circles

Angle between two circles, common tangents to two circles, orthogonality, radical axis, radical centre.

Conic sections

Sections of cones, equations of conic sections (parabola, ellipse and hyperbola) in standard forms, condition for $y=mx+c$ to be a tangent, normal

Unit 6: Calculus

Limits and continuity

Left limit, right limit and existence of limit of a function, continuity of a function

Differentiation and differentiability

Differentiability of a function, differentiation of the sum, product and quotient of two functions, Rolles and Lagranges mean value theorems

Applications of derivatives

Monotonic increasing and decreasing functions, maxima and minima of functions of one variable, tangents and normals, Errors and approximations, derivative as a rate of change

Integration

Integral as anti-derivative, integrals involving standard functions, methods of integration, integration by parts, reduction formulae

Definite integrals

Evaluation of definite integrals, properties of definite integrals

Areas

Areas of the regions formed by simple curves in standard form

Differential equations

Ordinary differential equations, their order and degree, formation of differential equations, solutions of differential equations by the method of variables separable, solution of homogeneous, non-homogeneous and linear differential equations of first degree

Section-II : Physics

Unit 1: Physical world

What is Physics? , Scope and excitement of physics, physics technology and society, fundamental forces in nature, Nature of physical laws

Units and Dimensions and Measurement

Units for fundamental and derived quantities, system of units, rules for writing units, multiple and submultiples units in S.I system, Accuracy and precision, errors, types of errors - random errors, gross errors, systematic errors, absolute errors, mean absolute error, relative error, percentage error, errors due to addition, subtraction, multiplication, division and powers of observed quantities, dimensions of physical quantities, dimensional formulae, applications and limitations of dimensional analysis, significant figures

Vectors

Scalars and vectors, types of vectors - equal, null and unit vectors, position vector, parallelogram law of vectors - applications, Triangle of law of vectors - applications, expression for resultant vector, polygon law of vectors, concept of relative velocity - application to relative motion of a boat in a river, multiplication of vector with scalar product with examples, vector product with examples

Rotatory Motion

Basic concepts - angular displacement, angular velocity, angular acceleration, centripetal and centrifugal force applications, motion of a body in a vertical circle, concept of Torque and couple, Angular momentum, moment of Inertia - parallel and perpendicular axes theorems, M. I. of a thin rod, uniform disc, rectangular lamina, solid sphere, hollow sphere, circular ring, solid cylinder, hollow cylinder, law of conservation of angular momentum with examples, rolling motion

Gravitation

Universal law of gravitation, nature of gravity, relation between g and G , Kepler's laws, variation of acceleration due to gravity with altitude, depth, latitude and shape of the earth - inertial and non - inertial frames inertial and gravitational masses - escape velocity - orbital velocity - geostationary satellites and their uses

Unit 2: Kinematics

Motion in a straight line, uniform motion, uniformly accelerated motion using position - time, velocity - time graphs, and relations for uniformly accelerated motion - concept of acceleration due to gravity equations of motion of freely falling body - vertically projected bodies from ground and tower. Motion in a plane with constant acceleration, projectiles oblique projection, horizontal projection from top of a tower - applications

Laws of motion (Dynamics)

Force and Inertia, Newton's first law of motion; momentum, Newton's second law of motion; Impulse, apparent weight, Newton's third law of motion; law of conservation of linear momentum and its applications, equilibrium of a particle, At woods machine, objects suspended by strings, blocks placed in contact with each other on frictionless horizontal surface

Work, Power and Energy

Definitions and units of work - power – energy, work done by variable force, expressions for P.E. & K.E., work - energy theorem, law of conservation of energy examples

Collisions

Collisions in one dimension - elastic and inelastic collision, coefficient of restitution, equation for height attained by freely falling body after a number of rebounds on the floor, collisions in two Dimensions.

Centre of mass

Definition of centre of mass - examples - centre of gravity - co-ordinates of centre of mass, characteristics, centre of mass of rigid body with homogeneous distributions of mass - thin rod, circular ring, disc, sphere.

Friction

Types of friction - static, kinetic and rolling - causes of friction - methods to reduce friction - motion of a body on the rough horizontal surface - pushing and pulling of lawn roller - acceleration, velocity of a body sliding on smooth and rough inclined planes

Unit 3: Mechanical properties of solids

Stress - strain Hook's law - moduli of elasticity (Y , n , K) poisson's ratio - behaviour of a wire under increasing load, elastic fatigue, strain energy, Searl's experiment, Determination of Young's modulus of material of a wire, Applications of elastic behavior of materials.

Mechanical properties of fluids

Surface Tension

Surface tension - definition - examples, molecular theory - force due to surface tension - applications, surface energy, work done in splitting the liquid drop - applications, angle of contact, capillarity - example, experimental determination of surface tension by capillary rise method, excess pressure inside a liquid drop and soap bubble applications

Fluid mechanics and viscosity

Principle of buoyancy - pressure energy in a fluid, Pascal's law, variation of pressure with depth, atmospheric pressure and gauge pressure, hydraulic machines, equation of continuity and Bernoulli's theorem - application to aerodynamic lift and motion of spinning ball, Torricelli's law, venturi meter, Blood flow and heart attack, stream line flow - turbulent flows - characteristics of stream line flow - turbulent flow - Poiseuille's equation - Stokes formula Terminal velocity-Reynold's number.

Unit 4: Oscillations

Definitions and examples - displacement, velocity, acceleration, time period, frequency - time period of simple pendulum, spring pendulum, force constant, K.E. and P.E. of a body in SHM, system's executing S.H.M., Damped S.H.M

Wave motion and Sound waves

Types of waves; longitudinal and transverse, progressive wave and its equation, stationary wave and its equation, principle of superposition of waves, reflection of waves, formation of stationary waves in stretched strings, laws of vibrating strings, sonometer, characteristics of sound, speed of sound in solids, liquids and gases, free and forced vibrations, resonance, standing waves in organ pipes - closed and open pipes (harmonics and overtones), Beats - definition and applications - Doppler effect - expressions for apparent frequency of sound in different cases - applications and limitation of Doppler effect - Echoes - absorption of sound waves - reverberation time.

Unit 5: Ray Optics

Reflection of light by spherical mirrors, Theories of light - Refraction of light at plane surface - prism - R.I. of - prism - critical angle - total internal reflection - application optical fibre - Lens makers formula - applications, lens theory, defects in images-spherical and chromatic aberrations and methods of their reduction - optical instruments simple and compound microscopes - astronomical and terrestrial telescopes - Ramsden's eyepiece - Huygens eye piece, kinds of spectra - emission, line, band and continuous spectra - absorption spectra - applications, Fraunhofer lines and their significance. Some natural phenomenon of sunlight

Physical Optics

Huygen's principle Interference of light - coherent sources - conditions for interference, Young's double slit experiment - fringe width - diffraction different classes of diffraction - Fresnel's and Fraunhofer's diffraction application - polarization - production of plane polarized light by reflection and refraction - double refraction Polaroids

Unit 6: Magnetism & Matter

Coulomb's inverse square law, magnetic field, magnetic lines of force, uniform and non - uniform magnetic fields couple acting on a bar magnet, magnetic moment - Bon axial and equatorial lines - Tangent law - deflection.

magnetometer - comparison of magnetic moments in Tan A and Tan B, position in equal distance and null methods- verification of inverse square law vibration magnetometer - experimental determination of M and BH - dia, para and ferromagnetic materials, properties and uses, Magnetism and Gauss's law, Earth's magnetism, Magnetisation and magnetic intensity, Hysteresisgraph.

Electrostatics

Electric charge - properties, coulombs inverse square law - principle of superposition with examples - concept of electric - field electric lines of force and their properties - electric intensity - Intensity due to isolated charge and due to multiple charges, Electric dipole, Dipole in uniform external field - electrostatic potential, definition-potential due to point charge and group of charges - relation between V and E, electrostatic potential energy, electric flux, Gauss law-Applications of Gauss law to find electric intensity and potential due to continuous charge distribution of infinite wire and infinite plane sheet and spherical shell, potential due to electric dipole, Electrostatics of conductors, dielectrics and polarization, capacitance - dielectric constant - condenser-definition and its uses - parallel plate condenser - effect of dielectric on capacitance of capacitors, capacitors in series and parallel, energy stored in a capacitor - types of capacitors - their uses, Vande- Graff generator

Current Electricity

Electric current, drift velocity, mobility, Ohms law and applications, resistance, conductance, specific resistance, specific conductance, variation of resistance and resistivity with temperature - thermostat - effective resistance in different cases, EMF of a cell electrical energy - electrical power and their units - Kirchoffs laws application to Wheatstone bridge - condition for balancing - metre bridge - potentiometer applications.

Unit 7: Moving charges and magnetism

Oersted's experiment, different laws to determine the direction of magnetic field - Biot-Savart's law - Amperes law, solenoid and Toroid, magnetic field near a long straight conductor, circular coil - tangent galvanometer, force on a moving charge and current carrying conductor in a magnetic field - force between two straight and parallel conductors, Torque on current loop, magnetic dipole, Fleming's left hand rule - working of moving coil galvanometer - conversion of MCG into ammeter and voltmeter

Electro magnetic induction

Electro magnetic induction, Experiments of Faraday & Henry, Faraday's law, - Fleming's right hand rule, Lenz's law, eddy currents, self inductance - mutual inductance - transformer - growth and decay of charge in C - R circuit connected to dc source - growth and decay of current in L - R circuit connected to dc source - time constant in C - R, L - R circuits significance, A.C generator.

Alternating currents

Instantaneous, peak mean and rms values of alternating current and alternating voltage applied to pure resistor, pure inductor, L - R, C - R and LCR circuits, power factor, LC oscillations.

Electro magnetic waves:-

Displacement current, Electro magnetic waves, Electro magnetic spectrum.

Unit 8: Dual nature of matter and radiation

Discovery of electron - specific charge of the electron by J.J. Thomson's method - Millikan's oil drop experiment, photoelectric effect - laws of photoelectric effect - Einstein's photo electric equation - Millikan's experimental verification of PEE, photo electric cells, de Broglie's hypothesis - matter waves, wave nature of matter, Davisson and Germer experiment

Atoms

Alpha particles scattering and Rutherford's nuclear model of Atom, Atomic spectra, Bohr's model of hydrogen atom, lines spectra of hydrogen atom, De Broglie's explanation of Bohr's second postulate of Quantization

Nuclei Nucleus and its composition, mass defect, binding energy, binding energy curve, natural radio activity α , β , γ rays-properties, radioactive decay law, half life and average life, nuclear forces and their properties discovery of Neutron, radio isotopes and uses, artificial transmutation, nuclear fission, chain reaction, nuclear reactor,

Nuclear fusion - energy of sun and stars (carbon - nitrogen cycle, proton - proton cycle).

Semiconductor Devices

Intrinsic & extrinsic semi conductors, p - type, n - type, P - N junction, junction diode, forward bias, reverse bias, current - voltage characteristics - rectifiers - Half wave and full wave rectifiers - zener diode as voltage regulator, transistor - PNP, NPN transistors and their working, V - I characteristics of transistor in CE configuration, Transistor as amplifier, digital electronics, logic (OR, AND, NOT, NAND, NOR) integrated circuits, special purpose PN junction diode.

Communication Systems

Elements of communication system (block diagrams), band width of signals (speech, TV and digital data) Band with of transmission medium, propagation of electromagnetic waves in the atmosphere, sky and space wave propagation modulation, Amplitude modulation, production of amplitude modulated wave detection of amplitude modulated wave.

Unit 9: Temperature and thermal expansion of Solids, Liquids and Gases

Thermal expansion of materials using potential energy curve (only qualitative treatment), coefficient of linear (a), area (b) and volume (r) expansions, the coefficients of real (rr) and apparent (ra) expansion of liquid, variation of density of solids and liquids with temperature, specific gravity bottle method for the determination of , anomalous expansion of water and its significance in nature, volume and pressure coefficients of gases-their relationship - Regnaults apparatus - Boyels law, Charles law - ideal gas equation - universal gas constant significance.

Thermodynamics

Heat - definition - calorie, thermal capacity, specific heat, latent heat - calorimetry - determination of specific heat and latent heat by method of mixtures - Joules law - first law and second law of thermodynamics, heat engine - refrigerator, phases of matter - triple point of water - specific heats of gases C_p , C_v and their relationship - Isothermal and adiabatic processes - relationships between P, V and T in adiabatic process - external work done by ideal gas in adiabatic, isothermal processes.

Transmission of heat

Conduction - coefficient of thermal conductivity - convection - free and forced convection - thermal radiation properties, provosts theory of heat exchange - emissive and absorptive power of bodies - black body radiation - kirchoffs law and its applications - Stefans law - Newtons law of cooling.

Kinetic Theory

Molecular nature of matter, Behaviour of gases, kinetic theory of an ideal gas, Law of equipartition of energy, specific heat capacity, Mean free path.

Section-III : Chemistry

Unit 1: Stoichiometry

Some basic concepts, Law of Chemical combinations, Gay Lussacs law of Gaseous Volumes, Dalton's atomic theory, Avogadro's law, Atomic and molecular masses – mole concept and molar mass concept of equivalent weight. Percentage composition of compounds and calculations of empirical and molecular formulae of compounds, stoichiometry and Stoichiometric calculations, Methods of expressing concentrations of Solutions, Redox reactions, Oxidation number concept, Types of redox reactions, Balancing of redox reactions - oxidation number of method-half reaction (ion-electron) method, Redox reactions in titrimetry.

Unit 2: States of matter: Gaseous and Liquids

Intermolecular forces, Thermal energy intermolecular forces vs Thermal interactions, The gaseous state, The gas laws, Ideal gas equation, Graham's law of diffusion – Dalton's law of partial pressures, Kinetic molecular theory of gases, Kinetic gas equation of an ideal gas (no derivation) – Deduction of gas laws from Kinetic gas equation Distribution of molecular Speeds – rms, average and most probable Speeds – Kinetic energy of gas molecules, Behaviour of real gases. Deviation from ideal gas behavior-compressibility factor vs pressure diagrams of real gases, Liquefaction of gases, Liquid state – properties of liquids in terms of inter molecular interactions – vapour pressure, Viscosity and surface tension (Qualitative idea only, no mathematical derivation).

Unit 3: Solid State

General characteristics of Solid state, Amorphous and Crystalline Solids, Classification of Crystalline Solids, probing the structure of Solids, X-ray Crystallography, Crystal Lattices and unit cells, Number of Atoms in a unit cell, closed packed structures, packing efficiency, calculations involving unit cell Dimensions, imperfections in Solids, Electrical properties, Magnetic properties.

Unit 4: Atomic Structures

Sub-atomic particles, Atomic models – Rutherford's nuclear model of atom Developments to the Bohr's model of atom, Bohr's model for hydrogen atom, Towards Quantum mechanical model of the Atom, Quantum mechanical model of an atom, Important features of Quantum mechanical model of atom-orbitals and Quantum numbers – Shapes of atomic orbitals – energies of orbitals – filling of orbitals in atoms, Aufbau principle, Pauli's exclusion principle and Hund's rule of maximum multiplicity – Electronic configurations of atoms – stability of half filled and completely filled orbitals.

Unit 5: Chemical Bonding and Molecular Structure

Kossel-Lewis approach to chemical bonding, 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 electro negativity, Fajans rule, dipole moment, dative bond, Bond parameters, The Valence Shell Electron Pair Repulsion (VSEPR) theory, Valence bond theory, Hybridisation, 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, concept of bond order, bond length and bond energy, Elementary idea of Hydrogen bond.

Unit 6: Thermodynamics

Thermodynamics terms, system and surrounding, Extensive and intensive properties, state functions, types of processes First law of Thermodynamic – concept of work, heat internal energy and enthalpy heat capacity, molar heat capacity, measurements of Δu and ΔH , calorimetry. Enthalpy change $\Delta_r H$ of a reaction – Reaction enthalpies for different types of reactions, spontaneity is decrease in enthalpy a Criterion for Spontaneity, entropy and spontaneity entropy, Spontaneity and second law of thermodynamics. Gibbs energy change and equilibrium absolute entropy and Third law of thermodynamics.

Unit 7: Solutions

Types of solutions, Expressing concentration of a solutions, Mass percentage W/W , Volume percentage (V/V) Mass by volume percentage(W/V), parts per million. Mole fraction, Molarity, Normality, Molality, Solubility of a solid in a liquid, Solubility of a gas in a liquid. Henry's law applications vapour pressure of liquid – liquid solutions. Raoult's laws as a special case of Henry's law, vapour pressure of solutions of solids in liquids. Ideal solutions, non ideal solutions, colligative properties and Determination of molar mass: relative lowering of vapour pressure Elevation of Boiling point, Depression of Freezing point, Osmosis and Osmotic pressure, Reverse Osmosis and water purification Abnormal molar masses.

Unit 8: Chemical equilibrium

Meaning of equilibrium, concept of dynamic equilibrium

Equilibrium involving physical process : Solid-liquid equilibrium, liquid-vapour equilibrium, Solid-vapour equilibrium. Equilibrium involving dissociation of solids or gases in liquids, General characteristics of equilibria involving physical processes

Equilibrium involving chemical processes: Dynamic equilibrium Law of chemical equilibrium and equilibrium constant, Homogeneous equilibria, Heterogeneous equilibria, Applications of equilibrium constants, Relationship between equilibrium constant(K), reaction quotient (Q) and Gibbs energy (G), Factors affecting equilibria, Application of Lechatelier's principle.

Unit 9: Acids & Bases

Ionic equilibrium in solution, Arrhenius concept of acids and bases, The Bronsted-Lowry Acids and bases, Lewis Acids and Bases Ionization of Acids and bases, Ionization constant of water and its Ionic Product, The PH scale, Ionization of Weak bases Relation between K_a and K_b , Di and poly basic acids and Di and poly acidic bases, Factors affecting acid strength, common ion effect in the ionization of acids and bases, Hydrolysis of salts and the PH of their solutions, Buffer solutions, Designing buffer solution, Solubility equilibria of sparingly soluble salts, solubility product constant common ion effect on solubility of salts.

Unit 10: Electrochemistry

Electrochemical cells, galvanic cells, Measurement of electrode potential, Nernst equation, Equilibrium Constant from Nernst equation, electro-chemical cell and Gibbs energy of the reaction, conductance of electrolytic solutions, Measurement of the conductivity of ionic solutions, variation of conductivity and Molar conductivity with concentration, Kohlrausch law and its application, Electrolytic cells and electrolysis, Faraday's laws of electrolysis, Products of electrolysis, Batteries, Primary secondary batteries fuel cells.

Unit 11: Chemical Kinetics

Rate of a chemical reaction, units of rate of a reaction, factors influencing Rate of a reaction, Dependence of Rate on concentration, Rate expression and Rate constant, Order of a reaction, units of rate constant, Molecularity of a reaction, Integrated rate equations, Zero Order reactions, First order reactions, Half-life of a reaction, Pseudo first order reaction, Temperature dependence of the rate of a reaction, Effect of Catalyst, Collision theory of Chemical reaction rates

Unit 12: Surface Chemistry

Adsorption - Adsorption in action, Distinction between Adsorption and Absorption, Mechanism of Adsorption , Types of Adsorption, Characteristics of Physisorption and chemisorptions, Adsorption isotherms, Adsorption from solution phase Applications of Adsorption.

Catalysis: Homogeneous and Heterogeneous Catalysis, Adsorption theory of Heterogeneous catalysis, Important features of solid Catalysts, Shape-selective Catalysis by Zeolites, Enzyme catalysis catalysts in industry Colloids: Classification of Colloids based on physical state, the nature of interaction, type of particles of Dispersed phase and dispersion medium, preparation of colloids, Purification and properties of colloidal solutions, coagulation of lyophilic sols, emulsions, Colloids Around us.

Unit 13: Classification of Elements and Periodicity in Properties

Need of classify elements, Genesis of periodic classification, Modern periodic law and present form of the periodic table, Nomenclature of elements with atomic number greater than 100 Electronic Configuration and types of elements s,p,d and f blocks. Trends in properties of elements atomic and ionic radii, Ionization enthalpy, electron gain enthalpy, Electro negativity, Valency, Oxidation states, Metallic and non-metallic Periodic Trends and chemical Reactivity.

Unit 14: General principles of Metallurgy

Occurrence of metals, concentration of ores, Levigation, Magnetic separation, forth floatation method, leaching. Extraction of crude metal from concentrated ore, conversion to oxide, reduction of oxide to metal, thermodynamic principles of metallurgy, Ellingham diagram, Applications, Extraction of iron from its oxides, Extraction of copper from cuprous oxide, Extraction of zinc from zinc oxide, Electro chemical principles of metallurgy oxidation-Reduction, Refining distillation, Liquation, poling electrolytic refining, zone refining, vapour phase refining, uses of Al, Cu, Zn and Fe.

Unit 15: Hydrogen and its Compounds

Hydrogen: Position of hydrogen in periodic table, isotopes, preparation, properties and uses of hydrogen, Hydrides ionic, covalent, Metallic Hydrides.

Water: Structure of H₂O, Physical and chemical properties of water, hard and soft water, Hardness of water **Hydrogen peroxide** preparation, Physical and chemical properties, storage, uses, Hydrogen as a fuel

Unit 16: S-Block elements (Alkali and alkaline earth metals)

Group 1 Elements

Alkali metals: Electronic configurations, atomic and ionic radii ionization enthalpy, hydration enthalpy, physical properties, chemical properties, uses. General characteristics of the compounds of the alkali metals, oxides, halides, salts of oxyacides, Anomalous properties of lithium, some important compounds of sodium, sodium carbonate, sodium chloride, sodium hydroxide, sodium hydrogen carbonate, Biological importance of sodium and potassium.

Group 2 elements

Alkaline earth elements; Electronic configuration ionization enthalpy, Hydration enthalpy, physical and chemical properties, uses General characteristics of compounds of the alkaline earth metals oxides, hydroxides, halides salts of oxyacids (carbonates, sulphates and nitrates) anomalous behavior of beryllium, its diagonal relationship with aluminum, some important compounds of calcium (CaO, Ca(OH)₂, CaCO₃, plaster of Paris, cement), Biological importance of Magnesium and calcium.

Unit 17: P- Blocks Elements

Group 13 to Group 18 Elements

Group 13

General Introduction- Electronic configuration atomic radii ionization enthalpy, electro negativity physical & chemical properties, important trends and anomalous properties of boron, some important compounds of boron-borax, orthoboric acid, diborane uses of boron, aluminium and their compounds

Group 14

General Introduction- Electronic configuration atomic radii ionization enthalpy, electro negativity, physical & chemical properties, important trends and anomalous properties of carbon, Allotropes of carbon, uses of carbon. Some important compounds of carbon and silicon- CO, CO₂, SiO₂, silicones, silicates and zeolites.

Group 15

Introduction, DiNitrogen, Ammonia, oxides of nitrogen, Nitric acid, phosphorus allotropic forms, phosphine, phosphorous halides and oxoacids of phosphorous.

Group 16

Introduction, Dioxygen, simple oxides, ozone, sulphur allotropic forms, sulphur dioxide oxoacids of sulphur, sulphuric acid

Group 17

Introduction chlorine preparation and properties and uses, hydrogen chloride oxoacids of halogens, inter halogen compounds

Group 18

Introduction-Occurrence, Electronic configuration ionization enthalpy, Atomic radii, Electron gain enthalpy physical and chemical properties. Compounds of XeF₂, XeF₄, XeF₆, XeO₃, XeOF₄ preparations and properties.

Unit 18: D- and F - Block Elements and Coordination Compounds

Transition Elements

Position in the periodic table, Electronic configuration General properties of the transition elements physical properties ionization enthalpy, oxidation states, atomic radii colour, catalytic behavior, magnetic properties, complex formation, Alloy formation, formation of interstitial compounds, trends in the M²⁺/M³⁺/M²⁺ standard electrode potentials, some important compounds of transition elements oxides and oxoanions of metals. Potassium dichromate, potassium permanganate

Inner Transition Elements

Lanthanoids & Actinoids Electronic configuration, Atomic and ionic sizes, oxidation states, general characteristics

Coordination Compounds

Werner's theory of coordination compounds, Definitions of some terms used in coordination compounds, Bonding in metal carbonyls stability of coordination compounds, importance and Applications of coordination compounds.

Unit 19: Environmental Chemistry

Definition of terms, Air, water and soil pollutions, Environmental pollution – Atmospheric pollution, Acid rain, particulate pollutants, Stratospheric pollution, water pollution, soil pollution, pesticides industrial wastes, strategies to control environmental pollution Green chemistry.

Unit 20: Purification and characterization of organic compounds

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

Qualitative analysis - Detection of nitrogen, sulphur, phosphorous 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 21: 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: - C = C -, - C - C - and those containing halogens, oxygen, nitrogen and sulphur, Homologous series, Isomerism - structural and stereoisomerism

Nomenclature (Trivial and IUPAC)

Covalent bond fission - Homolytic and heterolysis: free radicals, carbonations and carbanions, stability of carbonations and free radicals, electrophiles and nucleophiles

Electronic displacement in a covalent bond - Inductive effect, electromeric effect, resonance and hyper conjugation Common types of organic reactions - Substitution, addition, elimination and rearrangement

Unit 22: Hydrocarbons

Classification, isomerism, IUPAC nomenclature, general methods of preparation, properties and reactions
Alkanes - Conformations: Sawhorse and Newman projections (of ethane), Mechanism of halogenations of alkanes
Alkenes - Geometrical isomerism, Mechanism of electrophilic addition of hydrogen, halogens, water, hydrogen halides (Markownikoffs and peroxide effect), Ozonolysis, oxidation, 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 - Crafts alkylation and acylation, directive influence of functional group in mono-substituted benzene

Unit 23: Halo alkanes and halo arenes

Classification, nomenclature nature of C-X bond, methods of preparation, physical properties, chemical properties, substitution reactions SN^1 , SN^2 mechanism, stereo chemical aspects of nucleophilic substitution reactions, elimination reactions elimination versus substitution, reactions of halo arenes, nucleo-philic substitution, electro philic substitutions, reaction with metals poly halogen compounds, CH_2Cl_2 , $CHCl_3$, CCl_4 , Freons, DDT

Unit 24: Alcohols and phenols

Classification, nomenclature, structure of functional groups preparation of Alcohols and phenols, physical properties, chemical reactions, cleavage of O-H bond reactions, esterification cleavage of C-O reactions, Reactions of Phenols kolbe's reaction, reimer-Tiemann reaction, Commercially important alcohols, CH_3OH , C_2H_5OH

Unit 25: Ethers

Nomenclature, preparations of ethers,William son synthesis,physical properties chemical properties,cleavage of C-O bond in ethers, Electrophilic substitution.

Unit 26: Carbonyl Compounds

Aldehydes and Ketones, Nomenclature, Structure of carbonyl group preparation of aldehydes and ketones physical properties, chemical reactions, Nucleophilic addition reactions, reduction reactions, oxidation reactions, reactions due to α - Hydrogen, Cannizzaro reaction, electrophilic substitution reaction, uses of aldehydes and ketones.

Unit 27: Carboxylic Acids

Nomenclature, preparation of carboxylic acids physical properties, chemical reactions, Reactions involving cleavage of O-H bond, Reactions involving cleavage of C-OH bond, substitution Reactions in the Hydrocarbon part uses of carboxylic acids.

Unit 28: Organic Compounds containing nitrogen.

Amines: Structure of amines, classification, Nomenclature, preparation of amines, physical properties chemical reactions, Basic character of amines, Alkylation, Acylation, carbyl amine reaction, Reaction with HNO_2 , aryl sulphonyl chloride, Electrophilic substitution, bromination, Nitration, Sulphonation.

Diazonium Salts: Methods of preparation of diazonium salts physical properties chemical reactions, coupling reaction. Importance of diazonium salts on Synthesis of Aromatic Compounds.

Cyanides and isocyanides: Structures of cyanides and isocyanides preparations, physical properties chemical reactions, uses.

Unit 29: Polymers

General introduction and classification of polymers, general methods of polymerization- addition and condensation, copolymerization, Natural and synthetic rubber and vulcanisation, some important polymers with emphasis on their monomers and uses polythene, nylon, polyester and bakelite.

Unit 30: Bio-molecules

General introduction and importance of bio-molecules.

Carbohydrates - Classification, aldoses and ketoses, monosaccharides (glucose and fructose), constituent monosaccharides of oligosaccharides (sucrose, lactose, maltose) and polysaccharides (starch, cellulose, glycogen).

Proteins: Elementary Idea of - amino acids, peptide bond polypeptide, 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, Primary structure of DNA, Replication of DNA, Transcription and protein synthesis, Heredity (genetic code)

Hormones - Classification and structural features, General biological functions of animal hormones.

Lipids - Classification, Structure and function in bio-systems

Unit 31: Chemistry in everyday life

Chemical in medicines - Analgesics, tranquilizers, antiseptics, disinfectants, antimicrobials, antifertility drugs, antibiotics, antacids, antihistamines - their meaning and common examples.

Chemical in food - Preservatives, artificial sweetening agents - common examples

Cleansing agents - Soaps and detergents, cleansing action.

Section-IV : English/Aptitude

Unit 1: Grammar and Usage

- 1) Degrees of comparison (Comparison of adjectives and transformation of sentences)
- 2) Transformations (Transformations of sentences among Simple, Compound and Complex sentences)
- 3) Agreement / Concord (Agreement between subject and verb)
- 4) Time and Tense (Suitable verb forms based on the time of the action)
- 5) Voice (Transformation of sentences from the Active voice to Passive voice and vice-versa)
- 6) Modals and Adjectives (Usage of modal auxiliaries and adjectives)
- 7) Determiners (Usage of determiners / articles)
- 8) Prepositions (Simple, compound and following prepositions)
- 9) Question tags (Tag questions for confirmation)
- 10) Phrasal verbs (Prepositional phrases, noun phrases, adverb phrases and adjective phrases)
- 11) Correction of sentences (Concepts based on the usage of nouns, verb forms, prepositions, determiners and adjectives)

Unit 2: Vocabulary

- 1) Synonyms and Antonyms
- 2) Odd Words (Finding the odd word based on the concept)
- 3) One word substitution (One word substitutes for a long expression)
- 4) Spellings and Jumbled Letters (Correcting mis-spelt words and jumbled letters of a spelling)
- 5) Contextual meaning (Finding the meaning of the underlined words basing on the context)
- 6) Reasoning - Analogy and Linkers
- 7) Phonetics - Find the odd sound, Phonetic Transcription and Homophones

Section-1: Botany

UNIT-I: Diversity in the living world

The living world-What is living? Diversity in the living world; Taxonomic categories and taxonomical aids. Biological Classification-Five kingdom classification, Monera, Protista, Fungi, and Animalia, Three domains of life (six kingdom classification), Viruses, Viroids, Prions & Lichens.-Science of plants – Botany Origin, Development, Scope of Botany and Branches of Botany- Plant Kingdom - Salient features, classification and alternation of generations of the plants of the following groups Algae, Bryophytes, Pteridophytes, Gymnosperms and Angiosperms.

UNIT - II : Structural organisation in plants- Morphology

Morphology of flowering Plants Vegetative; Parts of a typical Angiospermic plant; Vegetative morphology and modifications- Root, Stem and Leaf, types; Venation, Phyllotaxy.

Reproductive : Inflorescence – Racemose, Cymose and special types (in brief). Flower : Parts of a flower and their detailed description; Aestivation, Placentation. Fruits : Types- True, False and parthenocarpic fruits.

UNIT-III: Reproduction in Plants

Modes of Reproduction - Asexual reproduction, binary fission, Sporulation, budding, fragmentation, vegetative propagation in plants, Sexual reproduction in brief, Overview of angiosperm life cycle. Sexual Reproduction in Flowering Plants .-Stamen, microsporangium, pollen grain. Pistil, megasporangium (ovule) and embryo sac; Development of male and female gametophytes.Pollination – Types, agents, Out breeding devices and Pollen, Pistil interaction. Double Fertilization; Post fertilisation events: Development of endosperm and embryo; development of seed, Structure of Dicotyledonous and Monocotyledonous seeds, Significance of fruit and seed. Special modes , Apomixis, parthenocarpy, polyembryony.

UNIT-IV: Plant systematics

Taxonomy of angiosperms Introduction. Types of Systems of classification (In brief).Semi- Technical description of a typical flowering plant Description of Families: Fabaceae, Solanaceae and Liliaceae.

UNIT-V: Cell Structure and Function

Cell – The Unit of Life-Cell- Cell theory and cell as the basic unit of life- overview of the cell.Prokaryotic cells, Ultra Structure of Plant cell (structure in detail and functions in brief), Cell membrane, Cell wall, Cell organelles: Endoplasmic reticulum, Mitochondria, Plastids, Ribosomes, Golgi bodies, Vacuoles, Lysosomes, Microbodies, Centrosome and Centriole, Cilia, Flagella, Cytoskeleton and Nucleus.Chromosomes: Number, structural organization; Nucleosome. – Biomolecules Structure and function of Proteins, Carbohydrates, Lipids and Nucleic acids.-Cell cycle and Cell Division. Cell cycle, Mitosis, Meiosis - significance.

UNIT-VI: Internal Organisation of Plants

Histology and Anatomy of Flowering Plants- Tissues - Types, structure and functions: Meristematic; Permanent tissues - Simple and Complex tissues.Tissue systems - Types, structure and function: Epidermal, Ground and Vascular tissue systems. Anatomy of Dicotyledonous and Monocotyledonous plants, Root, Stem and Leaf. Secondary growth in Dicot stem and Dicot root.

UNIT-VII: Plant Ecology

Ecological Adaptations, Succession and Ecological Services Introduction-Plant communities and Ecological adaptations: Hydrophytes, Mesophytes and Xerophytes- Plant succession. Ecological services – Carbon fixation, Oxygen release and-pollination (in brief).

UNIT-VIII: Plant Physiology

Transport in Plants-Means of Transport- Diffusion, Facilitated Diffusion, Passive symports and antiports, Active Transport, Comparison of Different Transport Processes, Plant-Water-Relations Water Potential, Osmosis, Plasmolysis, Imbibition, Long Distance Transport of Water- Water Movement up a Plant, Root Pressure, Transpiration pull, Opening and Closing of Stomata, Transpiration and Photosynthesis, Uptake and Transport of Mineral Nutrients- Uptake of Mineral Ions, Translocation of Mineral Ions, Phloem Transport: Flow from Source to Sink-The Pressure Flow or Mass Flow Hypothesis - Mineral Nutrition - Methods to Study the Mineral Requirements of Plants, Essential Mineral Elements-Criteria for Essentiality,

Macronutrients, Micronutrients, Role of Macro- and Micronutrients, Deficiency Symptoms of Essential Elements, Toxicity of Micronutrients, Mechanism of Absorption of Elements, Translocation of Solutes, Soil as Reservoir of Essential Elements, Metabolism of Nitrogen, Nitrogen Cycle, Biological Nitrogen Fixation, Symbiotic nitrogen fixation, Nodule Formation – Enzymes - Chemical Reactions, Enzymatic Conversions, Nature of Enzyme Action, Factors Affecting Enzyme Activity, Temperature and pH, Concentration of Substrate, Classification and Nomenclature of Enzymes, Co-factors Photosynthesis in Higher Plants - Early Experiments, Site of Photosynthesis, Pigments Involved in Photosynthesis, Light Reaction, The Electron Transport-Splitting of Water, Cyclic and Non-cyclic Photo-phosphorylation, Chemiosmotic Hypothesis, Biosynthetic phase- The Primary Acceptor of CO₂, The Calvin Cycle, The C₄ Pathway, Photorespiration, Factors affecting Photosynthesis - **Respiration of Plants** - Cellular respiration, Glycolysis, Fermentation, Aerobic Respiration - Tricarboxylic Acid Cycle, Electron Transport System (ETS) and Oxidative Phosphorylation, The Respiratory Balance Sheet, Amphibolic Pathway, Respiratory Quotient - **Plant Growth and Development** - Growth- Plant Growth, Phases of Growth, Growth Rates, Conditions for Growth, Differentiation, Dedifferentiation and Redifferentiation, Development, Plant Growth Regulators- Physiological Effects of Plant Growth Regulators, Auxins, Gibberellins, Cytokinins, Ethylene, Abscisic acid, Seed Dormancy, Photoperiodism, Vernalisation

UNIT IX : Microbiology

Bacteria - Morphology of Bacteria, Bacterial cell structure, Nutrition, Reproduction-Sexual Reproduction, Conjugation, Transformation, Transduction, The importance of Bacteria to Humans **Viruses** - Discovery, Classification of Viruses, structure of Viruses, Multiplication of Bacteriophages, The Lysogenic Cycle, Viral diseases in Plants, Viral diseases in Humans

UNIT X: Genetics

Principles of Inheritance and Variation - Mendel's Experiments, Inheritance of one gene (Monohybrid Cross)-Back cross and Test cross, Law of Dominance, Law of Segregation or Law of purity of gametes, Deviations from Mendelian concept of dominance, Incomplete Dominance, Co-dominance, Explanation of the concept of dominance, Inheritance of two genes- Law of Independent Assortment, Chromosomal Theory of Inheritance, Linkage and Recombination, Mutations, Significance of mutations.

UNIT XI: Molecular Biology

Molecular Basis of inheritance - The DNA - Structure of Polynucleotide Chain, Packaging of DNA Helix, The Search for Genetic Material, Transforming Principle, Biochemical Characterisation of Transforming Principle, The Genetic Material is DNA, Properties of Genetic Material (DNA versus RNA), RNA World, Replication-The Experimental Proof, The Machinery and the Enzymes, Transcription, Transcription Unit, Transcription Unit and the Gene, Types of RNA and the process of Transcription, Genetic Code Mutations and Genetic Code, tRNA—the Adapter Molecule, Translation, Regulation of Gene Expression-The Lac operon.

UNIT XII: Biotechnology

Principles and processes of Biotechnology - Principles of Biotechnology-Construction of the first artificial recombinant DNA molecule, Tools of Recombinant DNA Technology-Restriction Enzymes, Cloning Vectors, Competent Host (For Transformation with Recombinant DNA), Processes of Recombinant DNA Technology-Isolation of the Genetic Material (DNA), Cutting of DNA at Specific Locations, Separation and isolation of DNA fragments, Insertion of isolated gene into a suitable vector, Amplification of Gene of Interest using PCR, Insertion of Recombinant DNA into the Host, Cell/Organism, Selection of Transformed host cells, Obtaining the Foreign Gene Product, Downstream Processing - **Biotechnology and its applications** - Biotechnological Applications In Agriculture, Bt Cotton, Pest Resistant Plants, Other applications of Biotechnology Insulin, Gene therapy, Molecular Diagnosis, ELISA, DNA fingerprinting, Transgenic plants, Bio-safety and Ethical issues-Biopiracy

UNIT XIII: Plants, Microbes and Human welfare

Strategies for enhancement in food production Plant Breeding - What is Plant Breeding?, Wheat and Rice, Sugarcane, Millets, Plant Breeding for Disease Resistance, Methods of breeding for disease resistance, Mutation, Plant Breeding for Developing Resistance to Insect Pests, Plant Breeding for Improved Food Quality, Single Cell Protein (SCP), Tissue Culture - **Microbes in Human Welfare** - Microbes in Household Products, Microbes in Industrial Products-Fermented Beverages, Antibiotics, Chemicals, Enzymes and other Bioactive Molecules, Microbes in Sewage Treatment, Primary treatment, Secondary treatment or Biological treatment, Microbes in Production of Biogas, Microbes as Biocontrol Agents, Biological control of pests and diseases, Microbes as Biofertilisers, Challenges posed by Microbes

Section-1: Zoology

UNIT-I: Zoology – Diversity of living world

What is life? - Nature, Scope & meaning of zoology - Branches of Zoology - Need for classification- Zoos as tools for the study of taxonomy - Basic principles of Classification: Biological system of classification- (Phylogenetic classification only) - Levels or Hierarchy of classification - Nomenclature – Bi & Trinominal - Species concept - Kingdom Animalia - Biodiversity – Meaning and distribution (Genetic diversity, Species diversity, Ecosystem diversity(alpha,beta and gama), other attributes of biodiversity, role of biodiversity, threats to biodiversity, methods of conservation, IUCN Red data books, Conservation of wild life in India – Legislation, Preservation, Organisations, Threatened species..

UNIT-II: Structural Organization in Animals

Levels of organization, Multicellularity: Diploblastic & Triploblastic conditions - Asymmetry, Symmetry: Radial symmetry, and Bilateral symmetry (Brief account giving one example for each type from the representative phyla) - Acoelomates, Pseudocoelomates and Eucoelomates :- Schizo & Entero coelomates (Brief account of formation of coelom) - Tissues: Epithelial - Types, Connective - Types, Muscular-Types and Nervous tissues. Skeletal tissues – cartilage – Types; Bone- types; Blood- Plasma, Blood cells; Lymph

UNIT-III: Animal diversity - i: Invertebrate phyla

General Characters – Strictly restrict to 8 salient features only Classification up to Classes with two or three examples – Brief account only

Porifera- Cnidaria - Ctenophora - Platyhelminthes - Nematoda - Annelida (Include Earthworm as a type study strictly adhering to NCERT and Academy text books) - Arthropoda - Mollusca - Echinodermata - Hemichordata

UNIT-IV: Animal diversity - ii: Phylum : Chordata

General Characters – Strictly restrict to 8 points only Classification up to Classes - Brief account only with two or three examples

Phylum: Chordata - Sub phylum: Urochordata - Sub phylum: Cephalochordata - Sub phylum : Vertebrata - Super class: Agnatha - Class Cyclostomata - Super class: Gnathostomata - Super class pisces - Class: Chondrichthyes - Class : Osteichthyes - Tetrapoda - Class: Amphibia (Include Frog as a type study strictly adhering to NCERT and Academy text books) - Class: Reptilia - Class: Aves - Class: Mammalia

UNIT-V: Locomotion & Reproduction in Protozoa

Locomotion: Definition, types of locomotor structures pseudopodia (basic idea of pseudopodia without going into different types), flagella & cilia (Brief account giving two examples each) - Flagellar & Ciliary movement – Effective & Recovery strokes in Euglena, Synchronal & Metachronal movements in Paramecium.- Reproduction: Definition, types. Asexual Reproduction: Transverse binary fission in Paramecium & Longitudinal binary fission in Euglena. Multiple fission,- Sexual Reproduction. Syngamy, Conjugation.

UNIT-VI: Biology & Human Welfare

Wonderman of miracle drugs; Parasitism and parasitic adaptation - Health and disease: introduction (follow NCERT and Academy) Life cycle, Pathogenicity, Treatment & Prevention (Brief account only) 1 Entamoeba histolytica 2 Plasmodium vivax ; 3 Ascaris lumbricoides 4 Wuchereria bancrofti - Brief account of pathogenicity, treatment & prevention of Typhoid, Pneumonia, Common cold, & Ring worm.- Tobacco, Drugs and Alcohol abuse

UNIT-VII: Type study of Periplaneta americana

Habitat and habits - External features - Locomotion - Digestive system - Respiratory system - Circulatory system- Excretory system - Nervous system – sense organs, structure of ommatidium.- Reproductive system

UNIT-VIII: Ecology & Environment

Organisms and Environment: Ecology, population, communities, habitat, niche, biome and ecosphere (definitions only) - Ecosystem: Elementary aspects only Abiotic factors- Light, Temperature & Water (Biological effects only), Ecological adaptations - Population interactions - Ecosystems: Types, Components, Lake ecosystem - Food chains, Food web, Productivity and Energy flow in Ecosystem, Ecological pyramids ,Pyramids of numbers, biomass and energy. - Nutrient cycling – Carbon, Nitrogen, & Phosphorous cycles (Brief account) - Population attributes: Growth, Natality and Mortality, Age distribution, Population regulation. - Environmental issues- Pollution – Air pollution, Water pollution, Soil pollution

UNIT-IX : Human Anatomy and Physiology-I

Unit IXA: Digestion and absorption

Alimentary canal and digestive glands- Gastric glands, Liver, Pancreas ; Role of digestive enzymes and gastrointestinal hormones; Peristalsis, digestion, absorption and assimilation of proteins, carbohydrates and fats, egestion, Calorific value of proteins, carbohydrates and fats (for box item not to be evaluated); Nutritional disorders: Protein Energy Malnutrition (PEM), indigestion, constipation, vomiting, jaundice, diarrhea, Kwashiorkor.

Unit IX B: Breathing and Exchange of respiratory gases

Respiratory organs in animals; Respiratory system in humans; Mechanism of breathing and its regulation in humans – Exchange of gases, transport of gases and regulation of respiration; Respiratory volumes; Exchange of gases and transportation of respiratory gases; Regulation of respiratory movements, Respiratory disorders: Asthma, Emphysema, Occupational respiratory disorders – Asbestosis, Silicosis, Siderosis, Black Lung Disease in coal miners.

UNIT X : Human Anatomy and Physiology-II

Unit XA: Body Fluids and Circulation

Lymphatic system- Clotting of blood; Human circulatory system – structure of human heart and blood vessels; Cardiac cycle, cardiac output, double circulation; regulation of cardiac activity; Disorders of circulatory system: Hypertension, coronary artery disease, angina pectoris, heart failure.

Unit X B: Excretory products and their elimination

Modes of excretion – Ammonotelism, Ureotelism, Uricotelism; Excretory organs; Human excretory system – structure of kidney and nephron; Urine formation, Mechanism of concentration of the filtrate; osmoregulation; Regulation of kidney function –Renin-Angiotensin – Aldosterone system, Atrial Natriuretic Factor, ADH and diabetes insipidus; Role of other organs in excretion; Disorders: Uraemia, renal failure, renal calculi, nephritis, dialysis using artificial kidney.

UNIT XI: Human Anatomy and Physiology-III

Unit XIA: Muscular and Skeletal system

Skeletal muscle – ultra structure; Contractile proteins & muscle contraction; Skeletal system- Skull, Vertebral column, Sternum, Ribs, Girdles, Limb bones and its functions; Joints - Types. (to be dealt with relevance to practical syllabus); Disorders of the muscular and skeletal system: myasthenia gravis, tetany, muscular dystrophy, arthritis, osteoporosis, gout, rigormortis.

Unit XI B: Neural control and co-ordination

Nervous system in human beings – Central nervous system, Peripheral nervous system and Visceral nervous system; Generation and conduction of nerve impulse; Reflex action; Sensory perception; Sense organs; Brief description of other receptors; Elementary structure and functioning of eye and ear.

UNIT XII: Human Anatomy and Physiology-IV

Unit XIA: Endocrine system and chemical co-ordination

Endocrine glands and hormones; Human endocrine system , Hypothalamus, Pituitary, Pineal, Thyroid, Parathyroid, Adrenal, Pancreas, Gonads; Mechanism of hormone action (Elementary idea only); Role of hormones as messengers and regulators; Hypo and Hyper activity and related disorders: Common disorders – Dwarfism, acromegaly, cretinism, goiter, exophthalmic goiter, diabetes, Addison's disease, Cushing's syndrome. (Diseases & disorders to be dealt in brief).

Unit XIIB: Immune system

Basic concepts of Immunology - Types of Immunity - Innate Immunity, Acquired Immunity, Active and Passive Immunity, Cell mediated Immunity and Humoral Immunity, Interferon, HIV and AIDS.

UNIT XIII: Human Reproduction

Unit XIII A: Human Reproductive System

Male and female reproductive systems; Microscopic anatomy of testis & ovary; Gametogenesis “ Spermatogenesis & Oogenesis; Menstrual cycle; Fertilization, Embryo development up to blastocyst formation, Implantation; Gastrulation, organogenesis, placenta formation, Parturition, Lactation (elementary idea).

Unit XIII B: 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-ET, ZIFT, GIFT (elementary idea for general awareness). Surrogacy

UNIT XIV: Genetics

Heredity and variation: Mendel's laws of inheritance with reference to *Drosophila*. (*Drosophila melanogaster* Grey, Black body colour; Long, Vestigial wings), Pleiotropy; Multiple alleles: Inheritance of blood groups and Rh-factor; Co-dominance (Blood groups as example); Elementary idea of polygenic inheritance; Skin colour in humans (refer Sinnott, Dunn and Dobzhansky); Sex determination – in humans, birds, *Fumea* moth, genic balance theory of sex determination in *Drosophila melanogaster* and honey bees; Sex linked inheritance – Haemophilia, Colour blindness; 'Y' linked inheritance, Mendelian disorders in humans: Thalassaemia, Haemophilia, Sickle celled anaemia, cystic fibrosis PKU, Alkaptonuria; Chromosomal disorders – Down's syndrome, Turner's syndrome and Klinefelter syndrome; Genome, Human Genome Project and DNA Finger Printing,

UNIT XV: Organic Evolution

Origin of Life, Biological evolution and Evidences for biological evolution (palaeontological, comparative anatomical, embryological and molecular evidences); Theories of evolution: Lamarckism (in brief), Darwin's theory of Evolution – Natural Selection with example (Kettlewell's experiments on *Biston bitularia*), Mutation Theory of Hugo De Vries; Modern synthetic theory of Evolution - Hardy-Weinberg law ; Types of Natural Selection; Gene flow and genetic drift; Variations (mutations and genetic recombination); Adaptive radiation – viz., Darwin's finches and adaptive radiation in marsupials; Human evolution; Speciation – Allopatric, sympatric; Reproductive isolation.

UNIT XVI: Applied Biology

Apiculture; Animal Husbandry: Pisciculture, Poultry management, Dairy management; Animal breeding; Bio-medical Technology : Diagnostic Imaging (X-ray, CTscan, MRI), ECG, EEG; Application of Biotechnology in health: Human insulin and vaccine production ; Gene Therapy; Transgenic animals; ELISA; Vaccines, MABs, Cancer biology, stem cells.

SAMPLE APPLICATION FORM

APPLICATION NUMBER



VIGNAN'S
Foundation for Science, Technology & Research
UNIVERSITY
Building young India

PHOTOGRAPH

Paste your recent passport size colour photograph not older than 3 months. Do not pin or staple

READ DETAILED INSTRUCTIONS GIVEN SEPARATELY BEFORE FILLING THE APPLICATION FORM

ENGINEERING

V-SAT 2015

● NAME OF THE APPLICANT (AS IT APPEARS IN CLASS X OR EQUIVALENT MARKS CARD) SIGNATURE OF APPLICANT

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● NAME OF THE PARENT / GUARDIAN

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• How do you come to know about Vignan's University ?

Newspaper Ads TV Friends
 Relatives Present intermediate campus

• Interested extra curricular activities :

1.
2.

ACADEMIC DETAILS

1. X Class

Year of Pass : Board :

State :

Grade obtained

2. INTERMEDIATE or equivalent

College last attended :

Campus : Place :

Year of Pass : Board :

Inter/+2 Hall ticket no. :

SUBJECT WISE - INTERMEDIATE EXAMINATION *

SUBJECT	MAXIMUM MARKS	MARKS OBTAINED	% OF MARKS
English			
Sanskrit			
Maths-A/Botany			
Maths-B/Zoology			
Physics			
Chemistry			
Physics Practical			
Chemistry Practical			
Botany Practical			
Zoology Practical			
TOTAL			

Note : * If the final result is not declared at the time of filling this application form, enter Jr. Inter / 11th Class marks

DECLARATION : I hereby declare that all the particulars stated in this application are true to the best of my knowledge and belief. I have read and understood all provisions of the admission procedure and agree to abide by them. In the event of submission of fraudulent, incorrect or untrue information or suppression or distortion of any fact like educational qualification, marks etc., I understand that my admission is liable for cancellation. Further I understand that my admission is purely provisional subject to the fulfilment of the eligibility criteria.


 SIGNATURE OF PARENT/ GUARDIAN


 SIGNATURE OF APPLICANT