

**ENGINEERING ENTRANCE TEST
ANDHRA UNIVERSITY
AUEET-2023**



**AUEET - 2023
(SELF SUPPORT COURSES)
ADMISSION INFORMATION BROCHURE**



Prof.D.A.NAIDU

DIRECTOR

**DIRECTORATE OF ADMISSIONS, ANDHRA UNIVERSITY
VIJAYANAGAR PALACE, PEDA WALT AIR, VISAKHAPATNAM 530 017.**

Ph. No. 0891-2573441 e-mail: dirdoa.au@gmail.com

Website : www.audoa.in



Prof. P.V.G.D.PRASAD REDDY

**VICE-CHANCELLOR, ANDHRA UNIVERSITY,
CHAIRMAN, ADVISORY COMMITTEE, AUEET-2023**

SCHEDULE OF AUEET-2023

Registration and Processing Fee : Rs.1200/- (Rs.1000/- for SC / ST / PH)

Commencement of Submission of online Applications	27-03-2023
Last date for submission of online Applications	25-04-2023
Last Date for submission of online Applications with late fee of Rs.750/-	30-04-2023
Downloading Hall-Tickets from website	01-05-2023
Date of Entrance Test (Tentative)	03-05-2023
Date of Publication of Results (Tentative)	05-05-2023
Commencement of Admission process (Tentative)	Will be announced later

ADMISSION INFORMATION BROCHURE – 2023

B.Tech + M.Tech Dual Degree Programmes with an exit option at end of 4th Year

I. GENERAL:

1. Directorate of admissions, Andhra University, Visakhapatnam invites applications from eligible candidates for admission into various B.Tech.+M.Tech courses offered at University College of Engineering in self support mode for the academic year 2023-24.
2. Candidates are advised to carefully go through the **AUEET-2023 Information Brochure** available in Andhra University Website www.audoa.in
3. Courses offered, their eligibility criteria, details of seats available are given in Annexure - I.
4. The applicant should claim admission under the appropriate categories of reservation by clicking the relevant boxes in the online application form. Requests for inclusion or change of category once claimed will not be entertained under any circumstances. The applications will be processed as per the claims of the candidates only and the admissions will be subjected to the validity of their claims.
5. The reservation policy of the Government of A.P. that is in vogue in respect of SC, ST, BCs, EWS, CAP, PH, NCC and Sports categories will be followed in the process of admissions.
6. Mere appearance in the test does not automatically guarantee right of admission into the course. A candidate seeking admission into a particular course has to fulfill the eligibility criteria specified for that course.
7. In case of candidates belong to reserved categories 5% of relaxation in marks in the qualifying examination wherever applicable will be allowed.
8. Hostel accommodation is available for candidates admitted into Dual Degree Courses.
9. **The university reserves the right to fill or not to fill the seats earmarked for a particular course on administrative reasons. All admissions are purely provisional and the University reserves the right to cancel the admission at any stage. Further it also reserves the right to run or not to run a particular course depending on the number of candidates joined in it. A minimum of 10 candidates should join in any course under Self Support mode to run it.**
10. All disputes pertaining to the admissions shall fall within the court's Jurisdiction of Visakhapatnam only whether regular or consumer courts.

II. COURSE OFFERED:

B.Tech + M.Tech Dual Degree Programmes (with Entrance test Annexure -II for Syllabus)

- (i) Admissions into B.Tech.+M.Tech. Dual Degree Programmes will be processed as per rank obtained in the Entrance Test conducted by Directorate of Admissions, A.U.
- (ii) **The Candidates admitted in B.Tech + M.Tech Dual Degree Programmes can avail exit option after the completion of 4 Years course period, by paying Rs.10,000 as exit fee. Such candidates will be considered for B.Tech. alone, and not for Integrated PG.**

III. HOW TO APPLY :

- 1) **SUBMISSION OF FILLED IN APPLICATIONS THROUGH ONLINE:** Applications should be submitted through online only.

Online Submission

For online submission of application, visit the Website www.audoa.in. A candidate has to pay Rs.1,200/- (Rs.1000/- for SC/ST/PH) (Plus Bank charges applicable for the mode of payment selected) as Registration and Application Processing Fee (and late fee if applicable) by opting any of the following modes of payments: (a) Union Bank (b) Debit / Credit Card / Net Banking. After filling the online Application form with the required details, verify all the details carefully and press Submit button. Filled in Application Form will be generated that contains Application number along with filled details. Take print out of filled in Online Application Form. Use the Application number for future correspondence till the admission process is completed.

The following information must be kept ready for filling the details in online application form and submission

- a. Hall-Ticket Number of Qualifying Examination.
- b. Percentage of marks and year of Passing of Qualifying Examination, if Passed.
- c. Date of Birth as per SSC records.
- d. Caste in case of SC/ST/BC/EWS candidates.
- e. PH/NCC/SPORTS /CAP etc.
- f. Study or Residence (from M.R.O) or relevant certificate for proof of local status.

2) GENERAL INFORMATION / INSTRUCTIONS:

- a. The University reserves the right to reject the application of a candidate at any stage, if a) the application is incomplete. b) The candidate fails to satisfy the prescribed eligibility conditions. c) False or incorrect information is furnished.
- b. Any change whatsoever, including that of caste/community status or category, shall not be permitted to be made in the filled in application once it is received by the University. No correspondence will be entertained in this regard.
- c. The University is not responsible for non-submission of application within the notified date and time for any reason whatsoever.
- d. The candidate should PRESERVE THE HALL TICKET to produce it at the time of test and later at the time of admission into the course

3) The appearance at AUEET-2023 does not entitle any candidate to be considered for admission into the Course automatically.

4) For NCC/Sports categories, the certificates obtained during the period of qualifying examination alone are considered.

5) INCOMPLETE APPLICATIONS WILL BE SUMMARILY REJECTED.

IV. HALL-TICKETS:

Candidates should download the Hall-Tickets from the University website: **www.audoa.in** and attend the examination.

V. TEST CENTRES:

1. AUEET - 2023 will be conducted at the following Test Centres :

1. Visakhapatnam 2. Rajamahendravaram 3. Vijayawada 4. Guntur 5. Tirupathi 6. Kadapa.

2. Candidates should mention the Centre code and name of his / her choice in application form. Request for change of Test Centre opted by the candidate in the application form will not be considered under any circumstances.

3. Andhra University reserves the right to: (i) allot a Centre other than the candidate's choice, (ii) conduct or not to conduct the test and (iii) cancel a Test - Centre based on the number of candidates opted for the Test Centre.

4. **If less than 30 (Thirty) number of candidates are registered in any one examination center, then examination will not be conducted in such centre. The nearest centre will be allotted to the candidates registered for that centre.**

VI. TEST PROCEDURE:

1. Candidates are advised to come to the examination hall at least half-an hour before the commencement of the Test.
2. Candidates will not be allowed into the examination hall without hall-ticket and / or after the commencement of the Test. They will not be allowed to leave the examination hall before the stipulated time.
3. Calculators, pagers, cellular phones, books, papers, logarithm tables, slide-rule or any other calculating aids are NOT ALLOWED into the examination hall.
4. Candidates should answer on the candidate's specific (with candidate name, Hall Ticket Number and Photo) OMR ANSWER SHEET only.
5. The Chief Superintendent of the test centre can take disciplinary action on candidates involved in indiscipline, malpractice, impersonation, etc., and the answer scripts of such candidates will not be valued.

VII. RANK :

1. All candidates appeared for the Entrance Test will be awarded AUEET-2023 Rank as per marks secured in the test appeared.
2. In case of a tie between candidates securing the same marks, the order of merit will be decided on the basis of marks obtained in Part-A of the Test. In case of a further tie, the marks obtained by the candidate in Part-B shall be taken into account. In case of a further tie, the marks obtained by the candidate in Part-C shall be taken into account if the tie continues, the date of birth of the candidate shall be taken into account, with priority to older candidate.
3. Rank card shall be downloaded from the website: www.audoa.in
4. There is no provision for revaluation or personal verification of the OMR answer sheet.

VIII. ADMISSION INFORMATION:

1. Admission shall be based on the **AUEET-2023** Rank, subject to the fulfillment of eligibility criteria as given in Annexure - I.
2. The admission schedule will be made available in the website.
3. The university shall not be responsible for either non-receipt or delayed receipt of communications in this regard.
4. Information regarding course-wise and reservation category-wise seat distribution will be made available after declaration of **AUEET-2023** results on the website www.audoa.in
5. Candidates should upload the following certificates in support of the qualification and reservations claimed in the application for verification.
 - (i) AUEET-2023 Rank card & Hall Ticket.
 - (ii) Intermediate original certificate.
 - (iii) Consolidated Marks statement of the Qualifying Examination.
 - (iv) Transfer and Conduct Certificate from the institution where the candidate last studied.
 - (v) Date of Birth Certificate (SSC/Matriculation or equivalent Certificate)
 - (vi) Migration Certificate, (if applicable)
 - (vii) Study Certificates for the last seven years or Residence Certificate for preceding seven years of the qualifying examination.
 - (viii) Integrated Community Certificate issued by the competent authority in case of SC/ST/BC/EWS/ Minority candidates.
 - (ix) Candidates opting for admission under NCC/Sports/CAP/PH category, shall produce relevant certificate, in addition to the above.
 - (x) Discharge certificate and service certificate of the parent in case of a child of armed personnel.
 - (xi) Physical fitness certificate from an Asst. Civil Surgeon.

6. Candidates seeking admission under Special Categories like NSS/NCC/PH/Sports/CAP should attend for physical verification by the concerned officers/ Doctors as per the schedule.
7. The applications of those candidates waiting for revaluation results will not be considered for admission.
8. (a) The university reserves the right to deny entry into AUEET-2023 if the University finds the antecedents of the candidate are bad. If the University finds the antecedents of the candidates are bad subsequent to the appearance of AUEET-2023, his/her rank can be cancelled and the candidate can be denied admission into any program under AUEET-2023 or admission can be cancelled even if admission is given.
- (b) All the admissions are purely provisional and the university reserves the right to cancel the admission at any stage.
9. Candidates should produce original certificates for verification after the provisional allotment, at the office of the principal, AU College of Engineering (A).
8. **Cancellation of seats: Cancellation of seats will be made with 90% refund of total fee prescribed before completion of first phase and 80% refund before completion of second phase counseling and with no fee refund after second phase of counseling.**

9. RESERVATION OF SEATS:

Admission into various courses of study shall be made on the basis of AUEET-2023 Rank and eligibility criteria subject to the rule of reservation as detailed below:

A. LOCAL CANDIDATES:

In every course of study 85% of the available seats in each course and category are reserved in favour of the Local Candidates from the districts of Srikakulam, Vizianagaram, Visakhapatnam, East Godavari, West Godavari, Krishna, Guntur and Prakasam belonging to Andhra University area.

1. A candidate shall be regarded as a local candidate in relation to a local area (AU/OU/SVU);
 - 1.1 If he/she has studied in an educational institution or educational institutions in such local area for a period of not less than four consecutive academic years ending with the academic year in which he/she appeared or first appeared in the relevant qualifying examination as the case may be; OR
 - 1.2 Where, during the whole or any part of the four consecutive academic years in which he/she appeared, or first appeared in the relevant qualifying examination, he/she has not studied in any educational institutions, if he/she resided in that local area for a period of not less than four years immediately preceding the date of commencement of the relevant qualifying examination in which he/she appeared, or first appeared, as the case may be.
2. A candidate who is not regarded as local candidate under clause (1.1) above in relation to any local area shall be regarded as a local candidate of AU/OU/SVU.
 - 2.1 If he/she has studied in the educational institutions in the state for a period of not less than seven consecutive academic years ending with the academic year in which he/she appeared or first appeared for the relevant qualifying examination as the case may be, be regarded as a local candidate in relation to (i) Such local area where he/she has studied for the maximum period out of the period of seven years; or (ii) Where the period of his/her study in two or more local areas is equal, such local area where he/she studied last in such equal periods;

OR

 - 2.2 If during the whole or any part of the seven consecutive academic years ending with the academic year in which he/she appeared or first appeared for the relevant qualifying examinations, he/she not studied in the educational institutions, in any local area, but has resided in the State during the whole of the said period of seven years, be regarded as a local Candidate in relation to (i) Such local area where he/she has resided for the maximum period out of the said period of seven years; or (ii) Where the period of his/her residence in two or more local areas is equal, such local area where he/she has resided last in such equal periods.

3. The remaining 15% of seats can be completed by the categories mentioned below:

- a) All candidates defined as “Locals” of Andhra University area, and
- b) The following categories of candidates who are defined as “Non-locals” for the present purpose: (i) All candidates, who are locals for Osmania and Sri Venkateswara University areas. (ii) Candidates who have resided in the State of Andhra Pradesh for a total period of ten years, excluding periods of study outside the State; or either of whose parents have resided in the State for a period of ten years excluding periods of employment outside the State. (iii) Candidates who are spouses/children of those in the employment of the State or Central Government, Public Sector Corporations, Local Bodies, Universities, Educational Institutions recognized by the Government and similar State or quasi Government Institutions within the State. A Certificate to that effect from the Head of the Institution or Department should be enclosed. (G.O.No.646 dated : 10.07.1979)

B. OTHER CATEGORIES OF RESERVATION:

The allocation of percentage of seats as detailed below is as per G.O.M.S.No.184, Education (EC-2) Department, dt. 20-8-1993, and G.O.M.S.No.116 SW (CV-1) dt. 10-12-1999 as amended up to date:

- (a) Scheduled Castes (SC):15%; Scheduled Tribes (ST): 6%; Listed Backward Classes : 29% (A-7%, B-10%, C-1%, D-7%, E-4%) and EWS 10% Supernumerary.
- (b) NCC: 1%; Sports: 0.5%; Children of Armed Forces Personnel (CAP): 2% of seats be filled by horizontal method of reservation. This reservation is applicable for local candidates only.
- (c) PH: 3% of seats be filled by following horizontal method of reservation. In the absence of suitable PH candidates in the respective categories, those seats will be filled-in with other candidates of the same category. This reservation is applicable for local candidates only.
- (d) 33.33% of the seats in each course shall be **reserved in favour of women** candidates in each category. This rule of reservation shall not be applicable if women candidates selected on merit in each category form 33.33% or more of the seats therein. In the absence of eligible women candidates in categories of SC, ST, BC Groups A, B, C, D, E, those seats will be filled in with men candidates of the same category. (G.O.M.S.no.184, dt. 20-8-1993);
- (e) The number of seats reserved under various categories shall be calculated on the total seats available in the respective units given below as per the existing rules of the respective universities: If there is any fraction in the calculation of seats under reservation for various categories, it should be rounded off to the nearest number without affecting the sanctioned strength. B.Tech.+M.Tech. Dual Degree Programmes offered in AU College of Engineering are taken as one unit each.
- (f) 5% supernumerary seats in each course are available to candidates belonging to Other States. To consider a candidate under **Other States** category, the candidate should have studied in any state other than A.P. and be a native of a place outside A.P and Telangana.
- (g) 15% supernumerary seats are available to **foreign students** in each course as per the D.O.No.F.1-30/94 (CPP-11) of UGC subject to their eligibility. Such candidates need not appear for the Entrance Test. Their applications will be considered through the Dean, International Affairs, Andhra University under separate fee structure applicable to foreign students.

C. PROCEDURE FOR ADMISSION TO RESERVED SEATS:

- (i) SC, ST ,BC's (A, B, C, D, E) & EWS seats will be filled as per the order of merit (Rank) in each category.
- (ii) In case of special categories, University will constitute expert committees with competent authorities and they will fix the priority.

10. GENERAL REGULATIONS DURING STUDY OF THE COURSE :

1. As per the UGC guidelines all Candidates admitted into the various courses of study are required to put in a minimum of 75% of class room attendance. Candidates not securing a minimum of 75% attendance should repeat the course. The name of a student who continuously remains absent for a period of 10 days from the date of admission without valid reason and intimation to the concerned Head of the department shall be removed from the rolls.

2. Candidates admitted into full-time (day) courses should not undertake any assignment / employment or study any other course simultaneously (except evening diploma course where he/she has to get no objection certificate) and any violation leads to cancellation of admission.
3. Payment of residential scholarships in respect of eligible students of all categories is conditional on their putting a minimum attendance of 75% in the college in each quarter. If the candidate puts in less than 75% of attendance for valid reasons, he/she shall be paid scholarship in proportion to the attendance. Those who are absent themselves without valid reasons will not be paid any scholarship.
4. Examinations shall be conducted at the end of each Semester. No supplementary examination will be conducted.
5. **RAGGING** in any form by any student will make him/her liable for expulsion/punishment as per A.P. Ragging Act 26 of 1997 and subsequent Supreme Court verdict.
6. Only **limited Hostel accommodation** is available. Hostel admission is subject to the rules in force from time to time. Candidates under self-support mode will be considered for hostel accommodation subject to availability of seats only after accommodating students under regular category.
7. Continuous absence from classes for more than 10 consecutive working days without permission entails automatic cancellation of admission.
8. The admission is liable for cancellation in case of proven misconduct either in the department or in the hostel or on the campus.

ANNEXURE-I

<i>B.TECH + M.TECH DUAL DEGREE PROGRAMMES</i>					
Test Code	Test Name	Course Code	Name of the Course	Eligibility	No. of Seats
					A.U. College of Engineering Self-Support Mode
611	B.Tech+M.Tech DUAL DEGREE PROGRAMMES	61101	B.Tech CSE + M.Tech.	10 + 2 with Mathematics, Physics & Chemistry with minimum 45% Marks (40% in case of candidates belonging to reserved category).	360
		61102	B.Tech+M.Tech. (Electronics & Communications Engg)	- do -	60
		61103	B.Tech+M.Tech. (Mechanical Engineering)	- do -	30
		61104	B.Tech+M.Tech. (Civil Engineering)	- do -	30
		61105	B.Tech+M.Tech. (Electrical & Electronics Engineering)	- do -	30

FEE PARTICULARS

B.Tech.+ M.Tech Dual Degree Programme is a SELF SUPPORT PROGRAMME, “and the students enrolled in this program are not entitled for any fee reimbursement/scholarship”.

Test No	Course	Self-Support mode
		Total Fee Per Year
611	B.Tech CSE + M.Tech.	2,00,000/-
	B.Tech+M.Tech. (Electronics & Communications Engg)	1,50,000/-
	B.Tech+M.Tech. (Mechanical Engineering)	1,50,000/-
	B.Tech+M.Tech. (Civil Engineering)	1,00,000/-
	B.Tech+M.Tech. (Electrical & Electronics Engineering)	1,00,000/-

- Note-1 Candidates have to pay study or tour / field work fee in the respective Departments where they are part of the curriculum.
- Note-2 Special Fee Rs.1760/- which includes : Games & Athletics Fee Rs.200/-, Reading Room Fee Rs.100/-, Library Fee Rs.200/-, Medicine Fee Rs.100/-, Medical Inspection Fee Rs.50/-, Stationery Fees Rs.150/-, Audio Visual Education Fee Rs.50/-, Poor Student Aid Fund Rs.100/-, Inter-University Sports Rs.80/-, Dramatic Association Fee Rs.50/-, University Union Fee Rs.80/-, College Magazine Fee Rs.60/-, Departmental Association Fee Rs.100/-, Student Social Service League Rs.40/-, Fresher's Day Celebrations Rs.150/-, College Day Celebrations Rs.150/-, NCC Rs.50/-, NSS Rs.50/-.
- Note-3 In addition to the above the candidate has to pay Rs. 3000/- (one time) as accreditation fee in AU College of Engineering.

ANNEXURE - II

SYLLABI FOR ENTRANCE TESTS IN ENGINEERING COURSES 611 - B. Tech + M. Tech Dual Degree Programmes (As per the APEAPCET-2023)

MATHEMATICS

ALGEBRA

- Functions:** Types of functions – Definitions - Real valued functions (Domain and Range).
- Matrices:** Types of matrices - Scalar multiple of a matrix and multiplication of matrices- Transpose of a matrix – Determinants (excluding properties of determinants) - Adjoint and Inverse of a matrix - Rank of a matrix - solution of simultaneous linear equations (Excluding Gauss Jordan Method).
- Complex Numbers:** Complex number as an ordered pair of real numbers fundamental operations - Representation of complex numbers in the form $a+ib$ (excluding Square root of Complex numbers and related problems) - Modulus and amplitude of complex numbers –Illustrations - Geometrical and Polar Representation of complex numbers in Argand plane-Argand diagram.

- d) **De Moivre's Theorem:** De Moivre's theorem- Integral and Rational indices - n^{th} roots of unity Geometrical Interpretations –Illustrations.
- e) **Quadratic Expressions:** Quadratic expressions, equations in one variable - Sign of quadratic\ expressions – Change in signs – Maximum and minimum values.
- f) **Theory of Equations:** The relation between the roots and coefficients in an equation - Solving the equations when two or more roots of it are connected by certain relation - Equation with real coefficients, occurrence of complex roots in conjugate pairs and its consequences.
- g) **Permutations and Combinations:** Fundamental Principle of counting – linear and circular permutations- Permutations of 'n' dissimilar things taken 'r' at a time - Permutations when repetitions allowed - Circular permutations - Permutations with constraint repetitions Combinations-definitions, certain theorems. (Excluding derivation of **Formula n_{pr} and n_{cr}**).
- h) **Partial fractions:** Partial fractions of $f(x)/g(x)$ when $g(x)$ contains non –repeated linear factors Partial fractions of $f(x)/g(x)$ where both $f(x)$ and $g(x)$ are polynomials and when $g(x)$ contains repeated and/or non-repeated linear factors - Partial fractions of $f(x)/g(x)$ when $g(x)$ contains irreducible factors (excluding conversion of $f(x)/g(x)$ in power series of x).

TRIGONOMETRY

- a) **Trigonometric Ratios upto Transformations:** Graphs and Periodicity of Trigonometric functions - Trigonometric ratios and Compound angles - Trigonometric ratios of multiple and sub- multiple angles - Transformations - Sum and Product rules.
- b) **Hyperbolic Functions:** Definition of Hyperbolic Function – Graphs - Definition of Inverse Hyperbolic Functions – Graphs - Addition formulae of Hyperbolic Functions.
- c) **Properties of Triangles:** Relation between sides and angles of a Triangle - Sine, Cosine, Tangent and Projection rules- Half angle formulae and areas of a triangle–In-circle and Ex-circle of a Triangle (excluding problems related to heights and distances).

VECTOR ALGEBRA

- a) **Addition of Vectors:** Vectors as a triad of real numbers - Classification of vectors - Addition of vectors - Scalar multiplication - Angle between two non-zero vectors – Linear combination of vectors - Component of a vector in three dimensions - Vector equations of line and plane including their Cartesian equivalent forms.
- b) **Product of Vectors:** Scalar Product - Geometrical Interpretations - orthogonal projections Properties of dot product - Expression of dot product in i, j, k system - Angle between two vectors - Geometrical Vector methods – Vector equations of plane in normal form-Angle between two planes- Vector product of two vectors and properties- Vector product in i, j, k system - Vector Areas.

MEASURES OF DISPERSION AND PROBABILITY

- a) **Measures of Dispersion** - Range - Mean deviation - Variance and standard deviation of ungrouped/grouped data.
- b) **Probability:** Random experiments and events - Classical definition of probability, Axiomatic approach and addition theorem of probability - Independent and dependent events - conditional probability- multiplication theorem and Baye's theorem.
- c) **Random Variables and Probability Distributions:** Random Variables - Theoretical discrete distributions – Binomial and Poisson Distributions.

COORDINATE GEOMETRY

- a) **Locus:** Definition of locus –Illustrations-To find equations of locus-Problems connected to it.
- b) **The Straight Line:** Revision of fundamental results - Straight line - Normal form – Illustrations - Straight line - Symmetric form - Straight line - Reduction into various forms - Intersection of two Straight Lines - Family of straight lines - Concurrent lines - Condition for Concurrent lines - Angle between two lines - Length of perpendicular from a point to a Line - Distance between two parallel lines - Concurrent lines - properties related to a triangle.
- c) **Pair of Straight lines:** Equations of pair of lines passing through origin - angle between a pair of lines - Condition for perpendicular and coincident lines, bisectors of angles - Pair of bisectors of angles (excluding proofs of all the theorems only) - Pair of lines - second degree general equation - Conditions for parallel lines - distance between them, Point of intersection of pair of lines - Homogenizing a second degree equation with a first degree equation in x and y.
- d) **Circle :** Equation of circle -standard form-centre and radius equation of a circle with a given line segment as diameter & equation of circle through three non collinear points - parametric equations of a circle - Position of a point in the plane of a circle – power of a point-definition of tangent-length of tangent - Position of a straight line in the plane of a circle-conditions for a line to be tangent – chord joining two points on a circle – equation of the tangent at a point on the circle- point of contact-equation of normal - Chord of contact - pole and polar-conjugate points and conjugate lines - equation of chord with given middle point.
- e) **System of circles:** Angle between two intersecting circles - Radical axis of two circles-properties- Common chord and common tangent of two circles – radical centre - Intersection of a line and a Circle.
- f) **Parabola:** Conic sections –Parabola- equation of parabola in standard form-different forms of parabola- parametric equations.
- g) **Ellipse:** Equation of ellipse in standard form- Parametric equations.
- h) **Hyperbola:** Equation of hyperbola in standard form- Parametric equations - Equations of tangent and normal at a point on the hyperbola (Cartesian and parametric) - conditions for a straight line to be a tangent-Asymptotes.
- i) **Three Dimensional Coordinates:** Coordinates - Section formulae - Centroid of a triangle and tetrahedron.
- j) **Direction Cosines and Direction Ratios:** Direction Cosines – Direction Ratios (Excluding angle between two lines and problems related to it).
- k) **Plane:** Cartesian equation of Plane – Simple Illustrations (Excluding angle between two planes and problems related to it).

CALCULUS

- a) **Limits and Continuity:** Intervals and neighborhoods – Limits - Standard Limits –Continuity.
- b) **Differentiation:** Derivative of a function - Elementary Properties - Trigonometric, Inverse Trigonometric, Hyperbolic, Inverse Hyperbolic Function – Derivatives - Methods of Differentiation - Second Order Derivatives.
- c) **Applications of Derivatives:** Geometrical Interpretation of a derivative - Equations of tangents and normals - Angles between two curves and condition for orthogonality of curves - Increasing and decreasing functions - Maxima and Minima.

- d) **Integration:** Integration as the inverse process of differentiation- Standard forms - properties of integrals - Method of substitution- integration of Algebraic, exponential, logarithmic, trigonometric and inverse trigonometric functions (excluding the integrals of the form

$\int \sqrt{ax^2 + bx + c} dx$, $\int (px + q) \sqrt{ax^2 + bx + c} dx$ - Integration by parts – Integration by partial fractions method – Reduction formulae.

- e) **Definite Integrals:** Fundamental theorem of Integral Calculus– Properties - Reduction formulae.
 f) **Differential equations:** Degree and order of an ordinary differential equation - Solving differential equation by i) Variables separable method, ii) Homogeneous differential equation, iii) Linear differential equations (excluding Solution of linear differential Equations of the type $\frac{dx}{dy} + Px = Q$, Where P and Q are constants or functions of y only. dy

PHYSICS

1. **PHYSICAL WORLD:** What is physics? Scope and excitement of physics. Physics, technology and society Fundamental forces in nature. Nature of physical laws
2. **UNITS AND MEASUREMENTS: Introduction,** The international system of units, Measurement of Length, Measurement of Large Distances, Estimation of Very Small Distances, Size of a Molecule, Range of Lengths, Measurement of Mass, Range of Masses, Measurement of time, Accuracy, precision of instruments and errors in measurement, Systematic errors, random errors, least count error, Absolute Error, Relative Error and Percentage Error, Combination of Errors, Significant figures, Rules for Arithmetic Operations with Significant Figures, Rounding off the Uncertain Digits, Rules for Determining the Uncertainty in the Results of Arithmetic Calculations, Dimensions of Physical Quantities, Dimensional Formulae and dimensional equations, Dimensional Analysis and its Applications, Checking the Dimensional Consistency of Equations, Deducing Relation among the Physical Quantities.
3. **MOTION IN A STRAIGHT LINE: Introduction,** Position, path length and displacement, average velocity and average speed, instantaneous velocity and speed, acceleration, kinematic equations for uniformly accelerated motion, relative velocity.
4. **MOTION IN A PLANE: Introduction,** Scalars and vectors, position and displacement vectors, equality of vectors, multiplication of vectors by real numbers, addition and subtraction of vectors - graphical method, resolution of vectors, vector addition - analytical method, motion in a plane, position vector and displacement, velocity, acceleration, motion in a plane with constant acceleration, relative velocity in two dimensions, projectile motion, equation of path of a projectile, time of maximum height, maximum height of a projectile, horizontal range of projectile, uniform circular motion.
5. **LAWS OF MOTION: Introduction,** Aristotle's fallacy, Equilibrium of a particle, Common forces in mechanics, friction, types of friction, static, kinetic and rolling frictions, Circular motion, Motion of a car on a level road, Motion of a car on a banked road, solving problems in mechanics.
6. **WORK, ENERGY AND POWER: Introduction,** The Scalar Product, Notions of work and kinetic energy, The work-energy theorem, Work, Kinetic energy, Work done by a variable force, The work-energy theorem for a variable force, The concept of Potential Energy, The conservation of Mechanical Energy, The Potential Energy of a spring, Various forms of energy, Heat, Chemical Energy, Electrical Energy, The Equivalence of Mass and Energy, Nuclear Energy, The Principle of Conservation of Energy, Power, Collisions, Elastic and Inelastic Collisions, Collisions in one dimension, Coefficient of Restitution and its determination, Collisions in Two Dimensions.

7. **SYSTEM OF PARTICLES AND ROTATIONAL MOTION: Introduction**, Rigid body motion, Centre of mass, Centre of Gravity, Motion of centre of mass, Linear momentum of a system of particles, Vector product of two vectors, Angular velocity and its relation with linear velocity, Angular acceleration, Kinematics of rotational motion about a fixed axis, Moment of force (Torque), Angular momentum of particle, Torque and angular momentum for a system of particles, conservation of angular momentum, Equilibrium of a rigid body, Principle of moments, Moment of inertia, Dynamics of rotational motion about a fixed axis, Angular momentum in case of rotation about a fixed axis, Rolling motion, Kinetic Energy of Rolling Motion.
8. **OSCILLATIONS: Introduction**, Periodic and oscillatory motions, Period and frequency, Displacement, Simple harmonic motion (S.H.M.), Simple harmonic motion and uniform circular motion, Velocity and acceleration in simple harmonic motion, Force law for Simple harmonic Motion, Energy in simple harmonic motion, some systems executing Simple Harmonic Motion, Oscillations due to a spring, The Simple Pendulum, damped simple harmonic motion, Forced oscillations and resonance.
9. **GRAVITATION: Introduction**, Universal law of gravitation, central forces, the gravitational constant, Acceleration due to gravity of the earth, Acceleration due to gravity below and above the surface of earth, Gravitational potential energy, Escape speed, Orbital Speed, Earth satellites, Energy of an orbiting satellite, Geostationary and polar satellites, Weightlessness.
10. **MECHANICAL PROPERTIES OF SOLIDS: Introduction**, Elastic behavior of solids, Stress and strain, Hooke's law, Stress-strain curve, Elastic moduli, Young's Modulus, Determination of Young's Modulus of the Material of a Wire, Shear Modulus, Bulk Modulus, Applications of elastic behavior of materials.
11. **MECHANICAL PROPERTIES OF FLUIDS: Introduction**, Pressure, Pascal's Law, Variation of Pressure with Depth, Atmospheric Pressure and Gauge Pressure, Hydraulic Machines, Archimedes' Principle, Streamline flow, Bernoulli's principle, Speed of Efflux, Torricelli's Law, Venturi-meter, Blood Flow and Heart Attack, Dynamic Lift, Viscosity, Variation of Viscosity of fluids with temperature, Stokes' Law, Reynolds number, Critical Velocity, Surface tension and Surface Energy, Angle of Contact, Drops and Bubbles, Capillary Rise, Detergents and Surface Tension.
12. **THERMAL PROPERTIES OF MATTER: Introduction**, Temperature and heat, Measurement of temperature, Ideal-gas equation and absolute temperature, Thermal expansion, Specific heat capacity, Calorimetry, Change of state, Triple Point, Regelation, Latent Heat, Newton's law of cooling and its experimental verification.
13. **THERMODYNAMICS: Introduction**, Thermal equilibrium, Zeroth law of thermodynamics, Heat, Internal Energy and work, First law of thermodynamics, Specific heat capacity, Specific heat capacity of water, Thermodynamic state variables and equation of State, Thermodynamic processes, Quasi-static process, Isothermal Process, Adiabatic Process, Isochoric Process, Isobaric process, Cyclic process, Second law of thermodynamics, Reversible and irreversible processes, Carnot engine, Carnot's theorem.
14. **KINETIC THEORY: Introduction**, Molecular nature of matter, Behaviour of gases, Boyle's Law, Charles' Law, Kinetic theory of an ideal gas, Pressure of an Ideal Gas, Kinetic interpretation of temperature, Law of equipartition of energy, Specific heat capacity, Monatomic Gases, Diatomic Gases, Polyatomic Gases, Specific Heat Capacity of Solids, Specific Heat Capacity of Water, Mean free path.

15. **WAVES: Introduction**, Transverse and longitudinal waves, displacement relation in a progressive wave, amplitude and phase, wavelength and angular wave number, period, angular frequency and frequency, the speed of a travelling wave, speed of a transverse wave on stretched string, speed of a longitudinal wave (speed of sound), the principle of superposition of waves, reflection of waves, standing waves and normal modes, beats.
16. **RAY OPTICS AND OPTICAL INSTRUMENTS: Introduction**, Sign convention, refraction, total internal reflection, total internal reflection in nature and its technological applications, refraction at spherical surfaces and by lenses, power of a lens, combination of thin lenses in contact, refraction through a prism, dispersion by a prism, optical instruments, the eye, the simple and compound microscopes, refracting telescope and Cassegrain reflecting telescope.
17. **WAVE OPTICS: Introduction**, Huygens principle, refraction and reflection of plane waves using Huygens principle, refraction in a rarer medium (at the denser medium boundary), reflection of a plane wave by a plane surface, the Doppler effect, coherent and incoherent addition of waves, interference of light waves and Young's experiment.
18. **ELECTRIC CHARGES AND FIELDS: Introduction**, Electric charge, conductors and insulators, charging by induction, basic properties of electric charges, additivity of charges, conservation of charge, quantization of charge, Coulomb's law, forces between multiple charges, electric field, electric field due to a system of charges, physical significance of electric field, electric field lines, electric flux, electric dipole, the field of an electric dipole for points on the axial line and on the equatorial plane, physical significance of dipoles, dipole in a uniform external field, continuous charge distribution, Gauss's law.
19. **ELECTROSTATIC POTENTIAL AND CAPACITANCE: Introduction**, Electrostatic potential, potential due to a point charge, potential due to an electric dipole, potential due to a system of charges, equipotential surfaces, relation between field and potential, potential energy of a system of charges, potential energy in an external field, potential energy of a single charge, potential energy of a system of two charges in an external field, potential energy of a dipole in an external field, electrostatics of conductors, electrostatic shielding, dielectrics and polarisation, electric displacement, capacitors and capacitance, the parallel plate capacitor, effect of dielectric on capacitance, combination of capacitors, capacitors in series, capacitors in parallel, energy stored in a capacitor, Van de Graaff generator.
20. **CURRENT ELECTRICITY: Introduction**, Electric current, electric current in conductors, Ohm's law, drift of electrons and the origin of resistivity, mobility, limitations of Ohm's law, Temperature dependence of resistivity, electrical energy, power, Cells, EMF, internal resistance, cells in series and in parallel, Kirchhoff's rules, Wheatstone Bridge, Meter Bridge, Potentiometer.
21. **MOVING CHARGES AND MAGNETISM: Introduction**, Magnetic force, sources and fields, magnetic field, Lorentz force, magnetic force on a current carrying conductor, motion in a magnetic field, helical motion of charged particles, magnetic field due to a current element, Biot – Savart's law, Magnetic field on the axis of a circular current loop, Ampere's circuital law, the solenoid and the toroid, force between two parallel current carrying conductors, the ampere (UNIT), torque on current loop, magnetic dipole, torque on a rectangular current loop in a uniform magnetic field, circular current loop as a magnetic dipole, the magnetic dipole moment of a revolving electron, the Moving Coil Galvanometer; conversion into ammeter and voltmeter.
22. **MAGNETISM AND MATTER: Introduction**, The bar magnet, the magnetic field lines, the electrostatic analog, Magnetism and Gauss's Law, The Earth's magnetism, magnetic declination and dip.

- 23. ELECTROMAGNETIC INDUCTION: Introduction,** The experiments of Faraday and Henry, magnetic flux, Faraday's Law of induction, Lenz's law and conservation of energy, motional electromotive force, energy consideration - a quantitative study, Eddy currents, inductance, mutual inductance, self-inductance, AC generator.
- 24. ALTERNATING CURRENT: Introduction,** AC voltage applied to a resistor, representation of AC current and voltage by rotating vectors - Phasors, AC voltage applied to an inductor, AC voltage applied to a capacitor, AC voltage applied to a series LCR circuit, Phasor – diagram solution, analytical solution, resonance, sharpness of resonance, LC oscillations, transformers.
- 25. ELECTROMAGNETIC WAVES: Introduction,** electromagnetic waves, sources of electromagnetic waves, nature of electromagnetic waves, electromagnetic spectrum: radio waves, microwaves, infrared waves, visible rays, ultraviolet rays, X-rays, gamma rays.
- 26. DUAL NATURE OF RADIATION AND MATTER: Introduction,** Electron emission, Photoelectric Effect, Hertz's observations, Hallwachs and Lenard's observations, experimental study of photoelectric effect, effect of intensity of light on photocurrent, effect of potential on photoelectric current, effect of frequency of incident radiation on stopping potential, Photoelectric effect and Wave theory of Light, Einstein's Photoelectric equation, Energy Quantum of Radiation, particle nature of light, the photon, wave nature of matter, photocell.
- 27. ATOMS: Introduction,** Alpha particle scattering and Rutherford's nuclear model of atom, alpha particle trajectory, electron orbits, atomic spectra, spectral series, Bohr model of the hydrogen atom, energy levels, Franck – Hertz experiment, the line spectra of the hydrogen atom, deBroglie's explanation of Bohr's second postulate of quantization, LASER light.
- 28. NUCLEI: Introduction,** Atomic masses and composition of nucleus, discovery of neutron, size of the nucleus, Mass - Energy, Nuclear Force, Nuclear Energy, Fission, Nuclear reactor, nuclear fusion, energy generation in stars, controlled thermonuclear fusion.
- 29. SEMICONDUCTOR ELECTRONICS: MATERIALS, DEVICES AND SIMPLE CIRCUITS: Introduction,** Classification of metals, conductors, and semiconductors on the basis of conductivity and energy bands, Band theory of solids, Intrinsic semiconductor, Extrinsic semiconductor, p-type semiconductor, n-type semiconductor, Optoelectronic junction devices, Photodiode, light emitting diode, solar cell. Junction transistor, structure and action, Basic transistor circuit configurations and transistor characteristics, transistor as a switch and as an amplifier (CE – Configuration), Feedback amplifier and transistor oscillator, Digital Electronics and Logic gates, NOT, OR, AND, NAND and NOR Gates, Integrated circuits.
- 30. COMMUNICATION SYSTEMS: Introduction,** Elements of a Communication system, basic terminology used in electronic communication systems, bandwidth of signals, bandwidth of transmission medium, propagation of electromagnetic waves, ground waves, sky waves, space wave, modulation and its necessity, size of the antenna or aerial, effective power radiated by an antenna, mixing up of signals from different transmitters, amplitude modulation, production of amplitude modulated wave, detection of amplitude modulated wave.

CHEMISTRY

- 1. ATOMIC STRUCTURE:** Developments to the Bohr's model of atom; Wave nature of electromagnetic radiation; Particle nature of electromagnetic radiation- Planck's quantum theory; Bohr's model for Hydrogen atom; Explanation of line spectrum of hydrogen; Limitations of Bohr's model; Quantum mechanical considerations of sub atomic particles; Dual behaviour of matter; Heisenberg's uncertainty principle; 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.
- 2. CLASSIFICATION OF ELEMENTS AND PERIODICITY IN PROPERTIES:** Modern periodic law and present form of the periodic table; Nomenclature of elements with atomic number greater than 100; Electronic configuration of elements and the periodic table; Electronic configuration and types of elements s,p,d and f blocks; Trends in physical properties:(a) Atomic radius, (b) Ionic radius (c) Variation of size in inner transition elements, (d) Ionization enthalpy,(e) Electron gain enthalpy, (f) Electro negativity; Periodic trends in chemical properties: (a) Valence or Oxidation states, (b) Anomalous properties of second period elements
- diagonal relationship; Periodic trends and chemical reactivity.
- 3. CHEMICAL BONDING AND MOLECULAR STRUCTURE:** Kossel - Lewis approach to chemical bonding, Octet rule, Lewis representation of simple molecules, formal charges, limitations of octet rule; Ionic or electrovalent bond - Factors favourable for the formation of ionic compounds- Crystal structure of sodium chloride, General properties of ionic compounds; Bond Parameters - bond length, bond angle, and bond enthalpy, bond order, resonance-Polarity of bonds dipole moment-Fajan rules; Valence Shell Electron Pair Repulsion (VSEPR) theory; Predicting the geometry of simple molecules; Valence bond theory-Orbital overlap concept- Directional properties of bonds-overlapping of atomic orbitals-types of overlapping and nature of covalent bonds-strength of sigma and pi bonds-Factors favouring the formation of covalent bonds; Hybridisation- different types of hybridization involving s, p and d orbitals- shapes of simple covalent molecules; Coordinate bond - definition with examples; Molecular orbital theory - Formation of molecular orbitals, Linear combination of atomic orbitals (LCAO)-conditions for combination of atomic orbitals - Energy level diagrams for molecular orbitals -Bonding in some homo nuclear diatomic molecules- H₂, He₂, Li₂, B₂, C₂, N₂ and O₂; Hydrogen bonding- cause of formation of hydrogen bond - Types of hydrogen bonds-inter and intra molecular- General properties of hydrogen bonds.
- 4. STATES OF MATTER: GASES 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;; Behaviour of real gases - Deviation from Ideal gas behaviour - Compressibility factor Vs Pressure diagrams of real gases;

5. **STOICHIOMETRY:** Laws of Chemical Combinations - Law of Conservation of Mass, Law of Definite Proportions, Law of Multiple Proportions, 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-limiting reagent; Methods of Expressing concentrations of solutions- mass percent, mole fraction, molarity, molality and normality; Redox reactions-classical idea of redox reactions, oxidation and reduction reactions-redox reactions in terms of electron transfer; Oxidation number concept; Types of Redox reactions- combination, decomposition, displacement and disproportionation reactions; Balancing of redox reactions - oxidation number method Half reaction (ion-electron) method;.
6. **THERMODYNAMICS:** Thermodynamic Terms; The system and the surroundings; Types of systems and surroundings; The state of the system; The Internal Energy as a State Function.
 (a) Work (b) Heat (c) The general case, the first law of Thermodynamics; Applications; Work; Enthalpy, H - a useful new state function; Extensive and intensive properties; The relationship between C_p and C_v ; Measurement of U and H : Calorimetry; Enthalpy change, ΔH of reactions - reaction Enthalpy (a) Standard enthalpy of reactions, (b) Enthalpy changes during transformations, (c) Standard enthalpy of formation, (d) Thermo chemical equations (e) Hess's law of constant Heat summation; Enthalpies for different types of reactions. (a) Standard enthalpy of combustion ($\Delta_c H^0$), (b) Enthalpy of atomization ($\Delta_a H^0$), phase transition, sublimation and ionization, (c) Bond Enthalpy ($\Delta_{\text{bond}} H^0$), (d) Enthalpy of solution ($\Delta_{\text{sol}} H^0$) and dilution-lattice enthalpy; Spontaneity. (a) Is decrease in enthalpy a criterion for spontaneity? Entropy and spontaneity, the second law of thermodynamics, (c) Gibbs Energy and spontaneity; Absolute entropy and the third law of thermodynamics.
7. **CHEMICAL EQUILIBRIUM AND ACIDS-BASES:** Equilibrium in Physical process; Equilibrium in chemical process - Dynamic Equilibrium; Law of chemical Equilibrium - Law of mass action and Equilibrium constant; Homogeneous Equilibria, Equilibrium constant in gaseous systems. Relationship between K_p and K_c ; Heterogeneous Equilibria; Applications of Equilibrium constant; Relationship between Equilibrium constant K , reaction quotient Q and Gibbs energy G ; Factors affecting Equilibria.-Le-chatlier principle application to industrial synthesis of Ammonia and Sulphur trioxide; Ionic Equilibrium in solutions; Acids, bases and salts- Arrhenius, Bronsted-Lowry and Lewis concepts of acids and bases; Ionisation of Acids and Bases - Ionisation constant of water and its ionic product- pH scale-ionisation constants of weak acids-ionisation 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- Buffer solutions- Solubility Equilibria of sparingly soluble salts. Solubility product constant Common ion effect on solubility of Ionic salts.
8. **HYDROGEN AND ITS COMPOUNDS:** Position of hydrogen in the periodic table; Dihydrogen- Occurrence and Isotopes; Hydrides: Ionic, covalent, and non-stoichiometric hydrides; Water: Physical properties; structure of water, ice. Chemical properties of water; hard and soft water, Temporary and permanent hardness of water; Heavy Water; Hydrogen as a fuel.
9. **THE 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 oxo Acids; Anomalous properties of Lithium: Differences and similarities with other alkali metals, Diagonal relationship; similarities between Lithium and Magnesium; Some important compounds of Sodium: Sodium Chloride

Group 2 Elements: Alkaline earth elements; Electronic configuration; Ionization enthalpy; Hydration enthalpy; Physical properties, Chemical properties; Uses; General characteristics of compounds of the Alkaline Earth Metals: Oxides, hydroxides, halides, salts of oxoacids (Carbonates; Sulphates and Nitrates); Anomalous behavior of Beryllium; its diagonal relationship with Aluminium; Some important compounds of calcium: Preparation and uses of Calcium Hydroxide, Plaster of Paris; Cement;

- 10. p- BLOCK ELEMENTS GROUP 13 (BORON FAMILY):** General introduction - Electronic configuration, Atomic radii, Ionization enthalpy, Electro negativity; Physical & Chemical properties (Note: Aluminum reactivity towards acids & alkalies is deleted) Important trends and anomalous properties of boron; Uses of boron, aluminium and their compounds.
- 11. p-BLOCK ELEMENTS - GROUP 14 (CARBON FAMILY):** 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;
- 12. ORGANIC CHEMISTRY-SOME BASIC PRINCIPLES AND TECHNIQUES AND HYDROCARBONS:** General introduction; Tetravalency of Carbon: shapes of organic compounds; Structural representations of organic compounds; Classification of organic compounds; Nomenclature of organic compounds; Isomerism; Fundamental concepts in organic reaction mechanisms; Fission of covalent bond; Nucleophiles and electrophiles; Electron movements in organic reactions; Electron displacement effects in covalent bonds: inductive effect, resonance, resonance effect, electromeric effect, hyper conjugation; Types of Organic reactions;
Hydrocarbons: Classification of Hydrocarbons; **Alkanes** - Nomenclature, isomerism (structural and conformations of ethane only); Preparation of alkanes; Properties - Physical properties and chemical Reactivity, Substitution reactions – Halogenation (free radical mechanism is deleted), Controlled Oxidation, Isomerisation, Aromatization, and reaction with steam; **Alkenes**- Nomenclature, structure of ethene, Isomerism (structural and geometrical); Methods of preparation; Properties-Physical and chemical reactions: Addition of Hydrogen, halogen, water, sulphuric acid, Hydrogen halides (Mechanism- ionic and peroxide effect, Markovnikov's, anti-Markovnikov's or Kharasch effect). Oxidation, Ozonolysis and Polymerization; **Alkynes** - Nomenclature and isomerism, structure of acetylene. Methods of preparation of acetylene; Physical properties, Chemical reactions- acidic character of acetylene, addition reactions- of hydrogen, Halogen, Hydrogen halides and water. Polymerization; **Aromatic Hydrocarbons:** Nomenclature and isomerism, Structure of benzene, Resonance and aromaticity; Preparation of benzene. Physical properties. Chemical properties: Mechanism of electrophilic substitution. Electrophilic substitution reactions- Nitration, Sulphonation, Halogenation, Friedel-Craft's alkylation and acylation; Directive influence of functional groups in mono substituted benzene, Carcinogenicity and toxicity.
- 13. SOLID STATE:** General characteristics of solid state; Amorphous and crystalline solids; Classification of crystalline solids based on different binding forces (molecular, ionic, metallic and covalent solids); Probing the structure of solids: X-ray crystallography; Crystal lattices and unit cells. Bravais lattices primitive and centered unit cells; Number of atoms in a unit cell (primitive, body centered and face centered cubic unit cell); Close packed structures: Close packing in one dimension, in two dimensions and in three dimensions- tetrahedral and octahedral voids- formula of a compound and number of voids filled- locating tetrahedral and octahedral voids; Packing efficiency in simple cubic, bcc and in hcp, ccp lattice; Calculations involving unit cell dimensions- density of the unit cell; Imperfections in solids-types of point defects-stoichiometric and non-stoichiometric defects;.

SOLUTIONS: Types of solutions; Expressing concentration of solutions - mass percentage, volume percentage, mass by volume percentage, parts per million, mole fraction, molarity and molality; Solubility: Solubility of a solid in a liquid, solubility of a gas in a liquid, Henry's law; Vapour pressure of liquid solutions: vapour pressure of liquid- liquid solutions. Raoult's law as a special case of Henry's law -vapour pressure of solutions of solids in liquids; Ideal and 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;.

15. ELECTROCHEMISTRY AND CHEMICAL KINETICS:

Electrochemistry: Electrochemical cells; Galvanic cells: measurement of electrode potentials; Nernst equation- equilibrium constant from Nernst equation- electrochemical cell and Gibbs energy of the cell reaction; Conductance of electrolytic solutions- measurement of the conductivity of ionic solutions-variation of conductivity and molar conductivity with concentration-strong electrolytes and weak electrolytes-applications of Kohlrausch's law; Electrolytic cells and electrolysis: Faraday's laws of electrolysis-products of electrolysis; Hydrogen economy.

Chemical Kinetics: Rate of a chemical reaction; Factors influencing rate of a reaction: dependence of rate on concentration- rate expression and rate constant- order of a reaction, molecularity of a reaction; Integrated rate equations-zero order reactions-first order reactions- half-life of a reaction; Pseudo first order reactions; Temperature dependence of the rate of a reaction -effect of catalyst;

16. **SURFACE CHEMISTRY: Adsorption** : Distinction between adsorption and absorption-mechanism of adsorption-types of adsorption- characteristics of physisorption-characteristics of chemisorption-adsorption isotherms-adsorption from solution phase-applications of adsorption; **Colloids**; Classification of colloids: Classification based on physical state of dispersed phase and dispersion medium- classification based on nature of interaction between dispersed phase and dispersion medium- classification based on type of particles of the dispersed phase- multi molecular, macromolecular and associated colloids- cleansing action of soaps- preparation of colloids-purification of colloidal solutions-properties of colloidal solutions: Colligative properties, Tyndal effect, colour, Brownian movement-charge on colloidal particles, electrophoresis; coagulation-precipitation methods-coagulation of lyophilic sols and protection of colloids- Colloids around us-application of colloids.

17. **p-BLOCK ELEMENTS: Group-15 Elements:** Occurrence- electronic configuration, atomic and ionic radii, ionisation enthalpy, electronegativity, physical and chemical properties; Dinitrogen- preparation, properties and uses; Compounds of nitrogen- preparation, properties and uses of ammonia; Oxides of nitrogen (note: only structures are deleted); Preparation and properties of nitric acid;

Group-16 Elements: Occurrence- electronic configuration, atomic and ionic radii, ionisation enthalpy, electron gain enthalpy, electronegativity, physical and chemical properties; Dioxygen- preparation, properties and uses; Simple oxides; Ozone- preparation, properties, structure and uses; Sulphur-allotropic forms; Sulphur dioxide- preparation, properties and uses; Oxoacids of sulphur; Sulphuric acid- properties and uses.

Group-17 Elements: Occurrence, electronic configuration, atomic and ionic radii, ionisation enthalpy, electron gain enthalpy, electronegativity, physical and chemical properties; Chlorine- preparation, properties and uses; Hydrogen chloride- preparation, properties and uses; Oxoacids of halogens; Interhalogen compounds- preparation, properties and uses.

Group-18 Elements: Occurrence, electronic configuration, ionization enthalpy, atomic radii, electron gain enthalpy, physical and chemical properties (a) Xenon-fluorine compounds- XeF_2 , XeF_4 and XeF_6 -preparation, hydrolysis and formation of fluoro anions-structures of XeF_2 , XeF_4 and XeF_6 (b) Xenon- oxygen compounds XeO_3 and XeOF_4 - their formation and structures-

18. **d AND f BLOCK ELEMENTS & COORDINATION COMPOUNDS:** d and f block elements: Position in the periodic table; Electronic configuration of the d-block elements; General properties of the transition elements (d-block) -physical properties, variation in atomic and ionic sizes of transition series, ionisation enthalpies, oxidation states, trends in the M^{2+}/M and M^{3+}/M^{2+} standard electrode potentials, trends in stability of higher oxidation states, chemical reactivity and E° values, magnetic properties, formation of coloured ions, formation of complex compounds, catalytic properties, formation of interstitial compounds, alloy formation;; Inner transition elements(f-block)-lanthanoids- electronic configuration-atomic and ionic sizes- oxidation states- Some applications of d and f block elements.

Coordination compounds: Werner's theory of coordination compounds; Definitions of some terms used in coordination compounds; Nomenclature of coordination compounds-IUPAC nomenclature; Bonding in coordination compounds. (a)Valence bond theory - magnetic properties of coordination compounds- limitations of valence bond theory (b) Crystal field theory (i) Crystal field splitting in octahedral and tetrahedral coordination entities (ii) Colour in coordination compounds- limitations of crystal field theory; Bonding in metal carbonyls; Stability of coordination compounds; applications of coordination compounds.

19. **BIOMOLECULES: Carbohydrates** - Classification of carbohydrates- Monosaccharides: preparation of glucose from sucrose and starch- Properties and structure of glucose- D,L configurations and (+), (-) configurations of glucose-Structure of fructose; Disaccharides: Sucrose- preparation, structure; Invert sugar- Structures of maltose and lactose- Polysaccharides: Structures of starch, cellulose and glycogen- Importance of carbohydrates (Note: Sucrose, lactose, maltose, starch, carbohydrates importance is deleted); **Proteins:** Aminoacids: Natural aminoacids- classification of aminoacids - structures and D and L forms-Zwitter ions; Proteins- Structures, classification, fibrous and globular- primary, secondary, tertiary and quaternary structures of proteins- Denaturation of proteins; **Vitamins:** Explanation-names- classification of vitamins - sources of vitamins-deficiency diseases of different types of vitamins; **Nucleic acids:** chemical composition of nucleic acids, structures of nucleic acids, DNA finger printing biological functions of nucleic acids;
20. **HALOALKANES AND HALOARENES:** Classification and nomenclature; Nature of C-X bond; Methods of preparation: Alkyl halides and aryl halides- from alcohols, from hydrocarbons (a) by free radical halogenation (b) by electrophilic substitution (c) by replacement of diazonium group (Sandmeyer reaction) (d) by the addition of hydrogen halides and halogens to alkenes-by halogen exchange reactions; Physical properties-melting and boiling points, density and solubility; Chemical reactions: Reactions of haloalkanes (i) Nucleophilic substitution reactions (a) SN^2 mechanism (b) SN^1 mechanism (c) stereochemical aspects of nucleophilic substitution reactions-optical activity (ii) Elimination reactions (iii) Reaction with metals-Reactions of haloarenes: (i) Nucleophilic substitution (ii) Electrophilic substitution and (iii) Reaction with metals;
21. **ORGANIC COMPOUNDS CONTAINING C, H AND O (ALCOHOLS, PHENOLS, ETHERS, ALDEHYDES, KETONES AND CARBOXYLIC ACIDS):**

Alcohols, Phenols and Ethers: Alcohols, phenols and ethers -classification; Nomenclature: (a)Alcohols, (b)phenols and (c) ethers; Structures of hydroxy and ether functional groups; Methods of preparation: Alcohols from alkenes and carbonyl compounds, from Grignard reagents; Phenols from haloarenes, benzene sulphonic acid, diazonium salts, cumene; Physical properties of alcohols and phenols; Chemical reactions of alcohols and phenols (i) Reactions involving cleavage of O-H bond in alcohols-Acidity of alcohols and phenols, esterification (ii) Reactions involving cleavage of C-O bond- reactions with HX, PX_3 , dehydration and oxidation (iii) Reactions of phenols- electrophilic aromatic substitution, Kolbe's reaction, Reimer - Tiemann reaction, reaction with zinc dust, oxidation; Ethers-Methods of preparation: By dehydration of alcohols, Williamson synthesis- Physical properties-Chemical reactions: Cleavage of C-O bond and electrophilic substitution of aromatic ethers(anisole).

Aldehydes and Ketones: Nomenclature and structure of carbonyl group; Preparation of aldehydes and ketones-(1) by oxidation of alcohols (2) by dehydrogenation of alcohols (3) from hydrocarbons - Preparation of aldehydes (1) from acyl chlorides (2) from nitriles and esters(3) from hydrocarbons- Preparation of ketones(1) from acyl chlorides (2)from nitriles (3)from benzene or substituted benzenes;Physical properties of aldehydes and ketones; Chemical reactions of aldehydes and ketones-nucleophilic addition, reduction, oxidation, reactions due to -Hydrogen and other reactions (Cannizzaro reaction, electrophilic substitution reaction); Uses of aldehydes and ketones.

Carboxylic acids: Nomenclature and structure of carboxylgroup; Methods of preparation of carboxylic acids (1)from primary alcohols and aldehydes (2) from alkylbenzenes(3)from nitriles and amides (4)from Grignard reagents (5) from acyl halides and anhydrides (6) from esters; Physical properties; Chemical reactions: (i) Reactions involving cleavage of O-H bond-acidity, reactions with metals and alkalies (ii) Reactions involving cleavage of C-OH bond-formation of anhydride, reactions with PCl_5 , PCl_3 , SOCl_2 , esterification and reaction with ammonia (iii) Reactions involving- COOH group-reduction, decarboxylation (iv) Substitution reactions in the hydrocarbon part - halogenation and ring substitution;Uses of carboxylicacids.

22. ORGANIC COMPOUNDS CONTAINING NITROGEN:

Amines: Structure of amines; Classification; Nomenclature; Preparation of amines: reduction of nitro compounds, ammonolysis of alkyl halides, reduction of nitriles, reduction of amides, Gabriel phthalimide synthesis and Hoffmann bromamide degradation reaction; Physical properties; Chemical reactions: basic character of amines, alkylation, acylation, carbyl amine reaction, reaction with nitrousacid, reaction with aryl sulphonyl chloride, electrophilic substitution of aromatic amines (aniline)- bromination, nitration and sulphonation.

Cyanides and Isocyanides:

Structure and nomenclature of cyanides and isocyanides; Preparation, physical properties and chemicalreactions of cyanides and isocyanide

MODEL QUESTION PAPER

Time: 90 Min

Max. Marks: 100

The test paper consists of 3 parts. Each part contains 30 multiple choice questions. Answer all questions in each part.

Part - A: Mathematics (40 marks)

- 4) The variance of 30 observations is 3. If each of the observations is multiplied by 3, then the variance of the resulting observations is :

1) 3 2) 9 3) 27 4) 81

Part - B: Physics (30 marks)

3. 5 bulbs each of 100 W are connected across 220 V power supply for domestic application. If each unit costs Rs. 4 then the cost per day in Rs. is

(1) 48 (2) 24 (3) 96 (4) 12

Part - C: Chemistry (30 marks)

1. Which one of the following has stable electronic configuration?

(1) N (2) C (3) F (4) Al

SIDE II

AUEET-2023**OMR ANSWER SHEET**

OMR Sheet No. :

SECTION I

Hall Ticket Number :
 Name :
 Father's Name :
 Date & Time :
 Test Code & Name :
 Centre :


AUEET-2023
OMR ANSWER SHEET
SECTION II

Test Name Code No.
 6-Year Integrated (B.Tech + M.Tech) Dual Degree
 Programmes & Twinning Programmes : 611

RESERVATION

ST	①
SC	②
BC-A	③
BC-B	④
BC-C	⑤
BC-D	⑥
BC-E	⑦
OC	⑧

OTHER RESERVATION

PH	⑨
CAP	⑩
NCC	⑪
SPORTS	⑫

SERIES CODE

⑬
⑭

UNIVERSITY EMPLOYEE CHILDREN

YES ⑬ NO ⑭

Do not write
anything in this box

ANSWERS (Use BLACK BALL POINT PEN only)

1	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4	Ⓐ	Ⓑ	Ⓒ	Ⓓ
5	Ⓐ	Ⓑ	Ⓒ	Ⓓ
6	Ⓐ	Ⓑ	Ⓒ	Ⓓ
7	Ⓐ	Ⓑ	Ⓒ	Ⓓ
8	Ⓐ	Ⓑ	Ⓒ	Ⓓ
9	Ⓐ	Ⓑ	Ⓒ	Ⓓ
10	Ⓐ	Ⓑ	Ⓒ	Ⓓ
11	Ⓐ	Ⓑ	Ⓒ	Ⓓ
12	Ⓐ	Ⓑ	Ⓒ	Ⓓ
13	Ⓐ	Ⓑ	Ⓒ	Ⓓ
14	Ⓐ	Ⓑ	Ⓒ	Ⓓ
15	Ⓐ	Ⓑ	Ⓒ	Ⓓ
16	Ⓐ	Ⓑ	Ⓒ	Ⓓ
17	Ⓐ	Ⓑ	Ⓒ	Ⓓ
18	Ⓐ	Ⓑ	Ⓒ	Ⓓ
19	Ⓐ	Ⓑ	Ⓒ	Ⓓ
20	Ⓐ	Ⓑ	Ⓒ	Ⓓ
21	Ⓐ	Ⓑ	Ⓒ	Ⓓ
22	Ⓐ	Ⓑ	Ⓒ	Ⓓ
23	Ⓐ	Ⓑ	Ⓒ	Ⓓ
24	Ⓐ	Ⓑ	Ⓒ	Ⓓ
25	Ⓐ	Ⓑ	Ⓒ	Ⓓ
26	Ⓐ	Ⓑ	Ⓒ	Ⓓ
27	Ⓐ	Ⓑ	Ⓒ	Ⓓ
28	Ⓐ	Ⓑ	Ⓒ	Ⓓ
29	Ⓐ	Ⓑ	Ⓒ	Ⓓ
30	Ⓐ	Ⓑ	Ⓒ	Ⓓ
31	Ⓐ	Ⓑ	Ⓒ	Ⓓ
32	Ⓐ	Ⓑ	Ⓒ	Ⓓ
33	Ⓐ	Ⓑ	Ⓒ	Ⓓ
34	Ⓐ	Ⓑ	Ⓒ	Ⓓ
35	Ⓐ	Ⓑ	Ⓒ	Ⓓ
36	Ⓐ	Ⓑ	Ⓒ	Ⓓ
37	Ⓐ	Ⓑ	Ⓒ	Ⓓ
38	Ⓐ	Ⓑ	Ⓒ	Ⓓ
39	Ⓐ	Ⓑ	Ⓒ	Ⓓ
40	Ⓐ	Ⓑ	Ⓒ	Ⓓ

41	Ⓐ	Ⓑ	Ⓒ	Ⓓ
42	Ⓐ	Ⓑ	Ⓒ	Ⓓ
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51	Ⓐ	Ⓑ	Ⓒ	Ⓓ
52	Ⓐ	Ⓑ	Ⓒ	Ⓓ
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68	Ⓐ	Ⓑ	Ⓒ	Ⓓ
69	Ⓐ	Ⓑ	Ⓒ	Ⓓ
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71	Ⓐ	Ⓑ	Ⓒ	Ⓓ
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73	Ⓐ	Ⓑ	Ⓒ	Ⓓ
74	Ⓐ	Ⓑ	Ⓒ	Ⓓ
75	Ⓐ	Ⓑ	Ⓒ	Ⓓ
76	Ⓐ	Ⓑ	Ⓒ	Ⓓ
77	Ⓐ	Ⓑ	Ⓒ	Ⓓ
78	Ⓐ	Ⓑ	Ⓒ	Ⓓ
79	Ⓐ	Ⓑ	Ⓒ	Ⓓ
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85	Ⓐ	Ⓑ	Ⓒ	Ⓓ
86	Ⓐ	Ⓑ	Ⓒ	Ⓓ
87	Ⓐ	Ⓑ	Ⓒ	Ⓓ
88	Ⓐ	Ⓑ	Ⓒ	Ⓓ
89	Ⓐ	Ⓑ	Ⓒ	Ⓓ
90	Ⓐ	Ⓑ	Ⓒ	Ⓓ
91	Ⓐ	Ⓑ	Ⓒ	Ⓓ
92	Ⓐ	Ⓑ	Ⓒ	Ⓓ
93	Ⓐ	Ⓑ	Ⓒ	Ⓓ
94	Ⓐ	Ⓑ	Ⓒ	Ⓓ
95	Ⓐ	Ⓑ	Ⓒ	Ⓓ
96	Ⓐ	Ⓑ	Ⓒ	Ⓓ
97	Ⓐ	Ⓑ	Ⓒ	Ⓓ
98	Ⓐ	Ⓑ	Ⓒ	Ⓓ
99	Ⓐ	Ⓑ	Ⓒ	Ⓓ
100	Ⓐ	Ⓑ	Ⓒ	Ⓓ

USE BLACK BALL POINT PEN ONLY



ANDHRA UNIVERSITY
ENGINEERING ENTRANCE TEST (AUEET) – 2023
For Andhra University
OMR ANSWER SHEET

SIDE - I

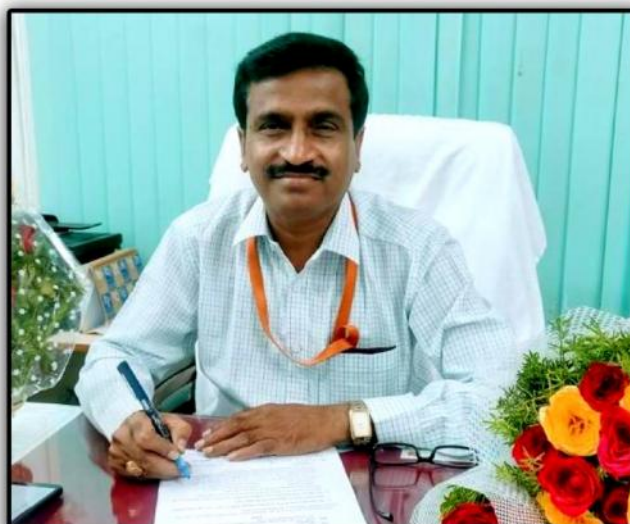
Hall Ticket Number

Question Paper Booklet No.

Signature of the Candidate

Signature of the Invigilator

INSTRUCTIONS	సూచనలు
<p>1. DO NOT fold, tear, wrinkle, tie, staple, do any rough work or make any stray marks on the OMR Answer sheet.</p> <p>2. If the OMR Sheet or Question Paper Booklet is defective ask the invigilator to change it at the beginning of the Test.</p> <p>3. Section -II : Use Black Ball Point Pen only to fill the boxes (<input type="checkbox"/>) of Series code and subject Code and the circles (O) failing which your answer sheet will be invalidated.</p> <p>(i) EXAMPLE to fill the circles :</p> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;"> <p>Correct Method :</p> </div> <div style="text-align: center;"> <p>Wrong Method :</p> </div> </div> <p>(ii) Mark your series code which is (A or B) printed on your question booklet "at the appropriate place in the OMR sheet of Section II" with Black Ball Point Pen by darkening one relevant circle out of three given, failing which your answer sheet will be invalidated.</p> <p>If your Test Booklet Series is 'A' please fill as shown below.</p> <div style="text-align: center; margin-top: 10px;"> </div> <p>4. Please obtain the signature of the invigilator in the space provided, failing which your Answer sheet will be invalidated.</p>	<p>1. ఈ పత్రము పైన పేర్కొనబడినట్లుగా, పత్రమును మడవటముగాని, గీతలు గీయడంగాని, చింపటంగాని, పిన్ చేయటం గాని చేయరాదు.</p> <p>2. OMR Sheet లో కాని Question Paper Booklet లో గాని లోపమున్నచో invigilator వద్ద నుంచి మరియొక OMR Sheet ను లేదా Question Paper Booklet ను ప్రారంభంలోనే తీసుకొనండి.</p> <p>3. Section-II: లో సిరీస్ కోడ్ మరియు పట్టెట్టు కోడ్ బాక్సులు (<input type="checkbox"/>) మరియు వృత్తములను (O) నింపడానికి నల్లని బాల్ పాయింట్ పెన్ ను మాత్రమే ఉపయోగించవలెను. లేనిచో మీ సమాధాన పత్రము పరిశీలించబడదు.</p> <p>(i) వృత్తమును నల్లని బాల్ పాయింట్ పెన్ తో నింపే విధానము.</p> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;"> <p>వృత్తమును సరిగా నింపుట</p> </div> <div style="text-align: center;"> <p>వృత్తమును తప్పుగా నింపుట</p> </div> </div> <p>(ii) మీ ప్రశ్నాపత్రము పైన ముద్రించబడిన సిరీస్ కోడ్ ను (A లేదా B) మీ సమాధాన పత్రములోని Section -II లో కేటాయించబడిన స్థలములో గల మూడు వృత్తములలో ఒకే వృత్తమును నల్లని బాల్ పాయింట్ పెన్ తో బాగుగా రుద్ది నింపవలెను. అట్లులేనిచో మీ సమాధాన పత్రము పరిశీలించబడదు.</p> <p>మీ ప్రశ్నా పత్రము సిరీస్ కోడ్ A అయినచో ఈ క్రింది విధముగా నింపవలెను.</p> <div style="text-align: center; margin-top: 10px;"> </div> <p>4. మీ పర్యవేక్షకుని (invigilator) యొక్క సంతకము మీ సమాధాన పత్రములో నిర్దేశించిన స్థలములో పొందండి. లేనిచో మీ సమాధాన పత్రము పరిశీలించబడదు.</p>



Prof. D.A. NAIDU

DIRECTOR

DIRECTORATE OF ADMISSIONS, ANDHRA UNIVERSITY

ADVISORY COMMITTEE, AUEET-2023

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<i>Rector</i>	<i>Dean, Academic Affairs</i>
<i>Principal, College of Arts & Commerce</i>	<i>Dean, College Development Council</i>
<i>Principal, College of Engineering(A)</i>	<i>Hon. Director, Computer Centre</i>
<i>Principal, College of Science & Technology</i>	<i>Director, Directorate of Admissions, Convener</i>
<i>Principal, College of Engineering for women</i>	

