

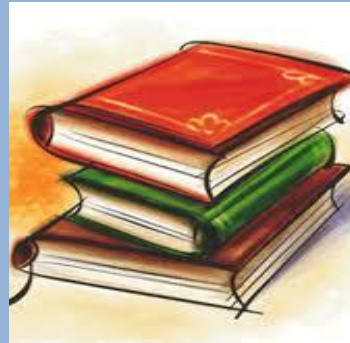
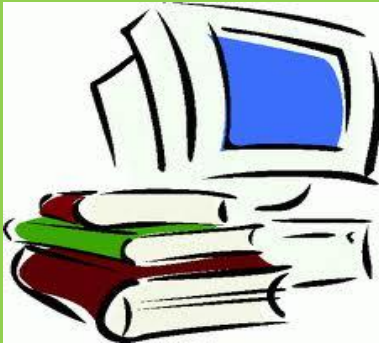
AP EAMCET 2017

Engineering, Agriculture and Medical Common Entrance Test
Conducted by JNTUK, Kakinada on behalf of APSCHE

Date of Examination: 28-04-2017
AGRICULTURE AND MEDICAL
(10.00 A.M. to 1.00 P.M. & 2.30 P.M to 5.30 P.M)

INSTRUCTION BOOKLET AGRICULTURE AND MEDICAL

ENGINEERING, AGRICULTURE & MEDICAL COMMON ENTRANCE TEST
(Being conducted on behalf of APSCHE)



Jawaharlal Nehru Technological University Kakinada
Kakinada, Andhra Pradesh, INDIA - 533003



Andhra Pradesh State Council of Higher Education
Visvesvarayya Bhavan
Khairatabad, Hyderabad, Telangana - 500 004

AGRICULTURE AND MEDICAL

ENGINEERING, AGRICULTURE & MEDICAL COMMON ENTRANCE TEST
(Being conducted on behalf of APACHE)

AP EAMCET-2017

FOR ENTRANCE TEST RELATING TO PROFESSIONAL COURSES IN

- A) B.Sc.(Ag.) / B.Sc.(Hort.) / B.V.Sc. & AH / B.F.Sc. / B.Tech. (FST) / B.Sc. (CA&BM)
- B) B.Pharm. / B.Tech.(Bio-Technology) (Bi.P.C.)
- C) Pharm-D (Bi.P.C)

Note: Information about the Entrance test is also available on the Website <http://www.sche.ap.gov.in/eamcet>

LAST DATES FOR SUBMISSION OF ONLINE APPLICATION	
WITHOUT LATE FEE	17-03-2017
WITH LATE FEE Rs. 500/-	26-03-2017
WITH LATE FEE Rs. 1000/-	10-04-2017
WITH LATE FEE Rs. 5000/-	17-04-2017
WITH LATE FEE Rs. 10000/-	22-04-2017

Address for Correspondence:

CONVENER, AP EAMCET - 2017

GROUND FLOOR, ADMINISTRATIVE BUILDING

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

KAKINADA - 533003

AP EAMCET - 2017 (Agriculture and Medical)

A Common Entrance Test designated as “Engineering, Agriculture & Medical Common Entrance Test” will be conducted by JNT University Kakinada for the academic year 2017-2018 for admission into the First Year of Professional Courses i.e. A) B.Sc.(Ag.) / B.Sc.(Hort.) / B.V.Sc. & AH / B.F.Sc. / B.Tech. (FST) / B.Sc. (CA&BM) B) B.Pharm / B.Tech.(Bio-Technology) (Bi.P.C.) C) Pharm-D (Bi.P.C)

I. PARTICULARS OF AP EAMCET – 2017

- ❖ The Test will be conducted on **28-04-2017** between **10.00 A.M. to 1.00 P.M. and 2.30 P.M to 5.30 P.M. at the Online Test Centres only.**
- ❖ The Entrance test is of 3 hour duration and the question paper consists of a total 160 questions comprising of a total of 80 questions in Biology (Botany - 40, Zoology – 40), 40 questions in Physics and 40 questions in Chemistry.
- ❖ **“All questions are objective type (multiple choice) only and each question carries one mark. The syllabus in Biology, Physics and Chemistry is furnished in Annexure–I. The model questions and model OMR Response sheet along with instructions are given in Annexure – II and Annexure-V respectively.**
- ❖ A sample/mock test will be available on www.sche.ap.gov.in/eamcet website in the month of March 2017 for practice purpose and to give the candidate look and feel of the On- Line (Computer Based) Examination.

II. ELIGIBILITY TO APPEAR FOR AP EAMCET – 2017

Candidates satisfying the following requirements shall be eligible to appear for AP EAMCET-2017:

1. Candidates should be of Indian Nationality or Persons of Indian Origin (PIO) / Overseas Citizen of India (OCI) Card Holders.
2. Candidates should belong to the state of Andhra Pradesh / Telangana. The candidates should satisfy Local/Non-Local status requirements as laid down in the Andhra Pradesh / Telangana Educational Institutions (Regulations of Admission) order, 1974 as subsequently amended (See Annexure-III).
3. **For B.V.Sc. & A.H. / B.Sc. (Ag) / B.Sc. (Hort) / B.F.Sc. / B.Tech. (FS&T) courses:**

Candidates should have passed or appeared for the final year of intermediate examination (10+2 pattern) or any examination recognized as equivalent thereto by the Board of Intermediate Education, Andhra Pradesh / Telangana, with any two / three of the subjects indicated against each course noted below:

With any two of the subjects:

- | | |
|------------------------------|--|
| a). B.Sc.(Ag.) | i. Physical Sciences
ii. Biological or Natural Sciences
iii. Agriculture
iv. Vocational Course in Agriculture |
| b). B.Sc.(Hort) | same as above |
| c). B.V.Sc. & A.H | i. Physical sciences
ii. Biological or Natural Sciences
iii. Vocational Courses in Veterinary Sciences |
| d). B.F.Sc. | i. Physical Sciences
ii. Biological or Natural Sciences
iii. Vocational Courses in Fishery Sciences |

- | | |
|-------------------------------------|---|
| e). B.Tech. (FS & T) | i. Mathematics
ii. Physical Sciences
or
i. Physical Sciences
ii. Biological or Natural sciences |
| f). B.Pharmacy & Pharm-D | i. Mathematics
ii. Physical Sciences
or
i. Physical Sciences
ii. Biological or Natural Sciences |

Note: i) Irrespective of the subjects taken at the qualifying examination, candidates seeking admission to the above courses should appear for Biology, Physics and Chemistry in AP EAMCET -2017.(AM Category).

ii) Candidates should have completed 17years of age as on 31st December of the year of admission and an upper age limit of 22 years for all the candidates and 25 years in respect of SC/ST candidates as on 31st December of the year of admission.

For B. Pharm Course:

- i. Candidates should have passed or appeared for the final year of the intermediate examination (10+2 pattern) with Biology, Physics and Chemistry as optionals, conducted by the Board of Intermediate Education, Andhra Pradesh / Telangana as equivalent thereto.
- ii. Candidates should have completed 16 years of age by the date of commencement of admission or on such other date as may be notified by the CET committee. There is no upper age limit

For B.Tech. (Bio-Technology) Course:

Candidates should have passed or appeared for the final year of the intermediate examination (10+2 pattern) with Biology, Physics and Chemistry as optionals, along with the bridge course examination in mathematics conducted by the Board of Intermediate Education, Govt. of Andhra Pradesh / Telangana shall be eligible.

For Pharm-D Course:

- i. Candidates should have passed or appeared for the final year of Intermediate Examination (10+2 pattern) with Physics, Chemistry and Biology as optional conducted by the Board of Intermediate Education, Andhra Pradesh / Telangana or any other examination recognized by the Board of Intermediate Education, Andhra Pradesh / Telangana as equivalent thereto or should have passed or appeared at the final year of the diploma examination in pharmacy course conducted by the Andhra Pradesh / Telangana State Board of Technical Education and Training or any other examination recognized as equivalent thereto by the Board of Intermediate Education, Andhra Pradesh / Telangana.
- ii. The candidates should have completed 17 years of age as on 31st December of the year of admission to the above course.

III. GENERAL INFORMATION / INSTRUCTIONS:

- a). The Convener, AP EAMCET – 2017 reserves the right to reject the application of the candidate at any stage, if:
- (i) The Online Application Form is incomplete.
 - (ii) The candidate fails to satisfy the eligibility conditions.
 - (iii) Any false or incorrect information is furnished.
 - (iv) The Online Application Form is submitted after the due date.
- No correspondence will be entertained in this regard.

b). The Convener is not responsible for non-receipt of application by the notified date and time for any reason.

IV. MEDIUM OF ENTRANCE TEST:

The question paper contains questions in “English” and “Telugu” medium. Candidates, who have studied the qualifying examination in Urdu medium and wish to avail assistance for translating the questions into Urdu, **will be allotted a Test Centre at Kurnool only.**

V. REGISTRATION FEE:

Payment of Registration Fee for submission of Online Application Form is the first step and the Registration Fee is Rs.450/- which has to be paid through the following modes:

a) AP ONLINE

b) CREDIT CARD / DEBIT CARD / NET BANKING

VI. SAME CENTRE FOR CANDIDATES APPEARING FOR BOTH ENGINEERING AND AGRICULTURE & MEDICAL:

Candidates of AM – Category who are eligible and desirous of taking the test in E - Category, in addition to the test for AM - Category should **select the option both (E & AM Category) together**, during the submission of the Online application, so that same centre can be allotted to them for both the tests. If this instruction is not followed, the candidate may be allotted different Test Centres for E & AM category tests and Convener, AP EAMCET-2017 is not responsible in allotment of different centres.

VII. REGIONAL CENTRES FOR ENTRANCE TEST:

S.No	District	Regional Test Centers		
		1	2	3
1	ANANTAPUR	Anantapuramu	Hindupur	Gooty
2	CHITTOR	Chittoor	Madanapalle	Tirupathi
3	EAST GODAVARI	Kakinada	Rajamahendravaramu	Amalapuram
4	GUNTUR	Guntur	Narasaraopeta	Bapatla
5	KRISHNA	Gudivada	Kanchikacherla	Vijayawada
6	KURNOOL	Kurnool	Nandyal	Emmiganur
7	SRI POTTI SRI RAMULU NELLORE	Gudur	Kavali	Nellore
8	PRAKASAM	Chirala	Ongole	Markapur
9	SRIKAKULAM	Rajam	Srikakulam	Tekkali
10	VISAKHAPATNAM	Visakhapatnam	Anakapalli	Madhurawada
11	VIZIANAGARAM	Vizianagaram	Kothavalasa	Bobbili
12	WEST GODAVARI	Bhimavaram	Eluru	Tadepalligudem
13	YSR KADAPA	Kadapa	Proddatur	Rajampeta
14	HYDERABAD	Hyderabad		

- Note:**
- 1.The Convener reserves the right to add or delete some online Test Centres from the list of Regional Centres notified.
 - 2.The Convener reserves the right to allot the candidates to any online Test Centre other than that opted by the candidates.
 3. Candidate has to submit not more than one application either for ‘E’ or ‘AM’ or ‘E&AM’ category test. If any candidate submits more than one application for one category, the Convener reserves the right to reject all the applications or accept any one of them.

VIII. SUBMISSION OF ONLINE APPLICATION FOR AP EAMCET – 2017

Application should be submitted through **Online** mode only.

The following information must be kept ready for filling the details during Online submission:

- a. Hall ticket Number of Qualifying Examination
- b. Hall ticket Number of S.S.C. or equivalent

- c. Date of Birth
- d. Caste in case of SC/ST/BC candidates
- e. Aadhar Number
- f. PH, NCC, Sports etc.
- g. Income Upto One Lakh or Up to Two Lakhs or More than Two Lakhs (Rupees)
- h. Study or Residence or relevant certificate for proof of local status (last 12 years)

Online submission:

For Online submission, visit the website www.sche.ap.gov.in/eamcet. The candidate has to pay Rs.450/- as Registration Fee and late fee (if applicable) by opting any of the following two modes of payment: (a) AP ONLINE (b) Debit / Credit Card / Net Banking. After filling the Online Application Form with the required details, the candidate is required to verify all the details carefully and press Submit button. Filled in Online Application Form will be generated which contains Registration Number along with filled in details. The candidate is required to take printout of Filled in Online Application Form and it is to be submitted to the Invigilator during the examination after affixing a recent color passport size photograph duly attested by the Gazetted Officer or Principal of the College where studied qualifying examination. The candidate should use the Registration Number for future correspondence.

IX. Mere appearance and qualifying at AP EAMCET-2017 does not confer any right for admission into professional courses. Candidate has to fulfill the eligibility criteria laid down in the relevant G.O at the time of admission.

X. QUALIFYING MARKS FOR AP EAMCET – 2017

The qualifying percentage of marks for the AP EAMCET-2017 is 25% of the maximum marks considered for ranking. However, for candidates belonging to Scheduled Caste and Scheduled Tribe, no minimum qualifying mark is prescribed. But their admission will be limited to the extent of seats reserved for such categories (vide G.O.Ms. No. 179, LEN&TE, dated 16.06.1986).

XI. AP EAMCET-2017 RESULTS

1. Evaluation: Every care will be taken to avoid errors in the evaluation, checking, scrutiny, tabulation and ranking.

2. Ranking:

- a. Candidates shall be ranked in the order of merit as explained in the Annexure-IV
- b. Rank obtained in AP EAMCET-2017 is valid for admission to the courses mentioned in the application form for the academic year 2017-2018 only.
- c. Rank card shall be downloaded from the website www.sche.ap.gov.in/eamcet
- d. Rank obtained with the benefit of relaxation of the minimum qualifying marks at AP EAMCET-2017 by any candidate claiming as SC/ST Category will be cancelled in case the claim is found to be invalid at the time of admission to any course of study in any participating University / Institution.

XII. The candidates should preserve the filled in online application form, the Hall Ticket and the Rank Card and produce them when called for verification.

XIII. Any malpractice in AP EAMCET-2017 will be dealt with as per rules in force vide G.O.Ms.No: 114, Edn / (IE) Dt: 13th May 1997 for the CET.

XIV. In any litigation concerning AP EAMCET-2017 Test, Convener is the person to sue and be sued. The Convener (Examination), AP EAMCET – 2017 is not responsible for allotment of seats at the time of admissions. The Commissioner of Technical Education, Andhra Pradesh is the Convener for the admissions.

XVI. Any litigation concerning AP EAMCET-2017 shall be subject to the jurisdiction of the Andhra Pradesh High Court, Hyderabad only.

XVII. HALL TICKET

The candidate should download the hall ticket from website [http:// www.sche.ap.gov.in/eamcet](http://www.sche.ap.gov.in/eamcet)

XVIII. COUNSELLING AND ALLOTMENT OF SEATS

The list of institutions for allotment of candidates with intake in each discipline and category, as per reservations through AP EAMCET–2017 would be released in the **Information Booklet** for Counseling in due course and the same information would also be released on website www.sche.ap.gov.in

IMPORTANT INSTRUCTIONS TO CANDIDATES

1. **Material to be brought on the date of examination**

Hall Ticket along with Filled in Online Application Form with duly affixed recent colour photograph attested by Gazetted Officer (or) Principal of the College where candidate has studied the qualifying examination. However, Signature of the candidate and Left Hand Thumb impression is to be filled in the respective spaces provided in the Filled in Online Application form in the presence of Invigilator only.

2. **Other important instructions**

- a. Hall ticket issued to the candidate is an important document. Candidates are required to preserve it carefully.
- b. Hall ticket is not transferable. Any tampering of Hall Ticket will automatically lead to the disqualification of the candidate
- c. Candidate shall arrive at the online examination centre at least 2 hours before commencement of the examination. This will enable the candidate to familiarize himself/herself with the online examination process.
- d. Candidate is not allowed even late by One Minute from the commencement of the examination.**
- e. Candidates are required to bring the following to the online examination centre:
 - i) Hall Ticket ii) Filled in Online Application Form iii) A good Ball Point Pen (for rough work, working sheets will be provided by the Test Centre) and iv) **Attested copy** of Caste certificate (**in case of SC/ST category candidates only**).
- f. Candidates are not allowed to carry any textual material, Calculators, DocuPen, Slide Rules, Log Tables, Electronic Watches with facilities of calculator, printed or written material, bits of papers, mobile phone, pager or any other device, except the Hall Ticket, document as required under point no. 2.(e) inside the Examination Room/Hall. If any candidate is in possession of any of the above items, his/her candidature will be treated as unfair means and his/her current examination will be cancelled & he/she will also be debarred for future examination(s) & the equipment will be seized.

GUIDELINES TO CANDIDATES

1. Please check the Hall ticket carefully for your Name, Date of Birth, Gender, Category, Test Centre Name, Date and Time of examination.
2. Candidates are advised to reach the venue at least 2 hours before the examination so as to complete the frisking and registration formalities well before the time. Registration desk will be closed 05 minutes prior to the examination.
3. The candidate must show, on demand, the Hall Ticket for admission in the examination room/hall. A candidate who does not possess the Hall Ticket issued by the Convener, AP EAMCET-2017, shall not be permitted for the examination under any circumstances by the Centre Superintendent.
4. No candidate, under any circumstances, will be allowed to enter the Examination Centre after the commencement of the examination.
5. A seat indicating Hall Ticket number will be allocated to each candidate. Candidate should find out and occupy their allotted seat only. Any candidate found to have changed room or the seat on his/her own other than allotted, his/her candidature shall be cancelled and no plea would be accepted for it.
6. The candidate should ensure that the question paper available on the computer in English and Telugu languages only.

7. No Candidate will be allowed to carry any baggage inside the Examination Centre. The Convener, AP EAMCET-17 will not be responsible for any belongings stolen or lost at the premises.
8. Smoking and eating is strictly prohibited in the examination room.
9. Tea, coffee, cold drinks or snacks are not allowed to be taken into the examination rooms during examination hours.
10. Approach the Centre Superintendent/Invigilator in the room for any technical assistance, first aid emergency or any other information during the course of examination.
11. No candidate, without the special permission of the Centre Superintendent or the Invigilator concerned, will leave his/her seat or Examination Room until the full duration of the Examination. Candidates must follow the instructions strictly as instructed by the Centre Superintendent/Invigilators.
12. For any queries or issues regarding computer based examination, the candidates may contact on toll free Call Centre No. 10884256755 which will be available on www.sche.ap.gov.in/eamcet website later on.

INSTRUCTIONS FOR ON-LINE (COMPUTER BASED) EXAMINATION

The On- Line (Computer Based) Examination will be conducted as per the following schedule.

1. A sample/mock test will be available on www.sche.ap.gov.in/eamcet website in the month of March 2017 for practice purpose and to give the candidate look and feel of the On- Line (Computer Based) Examination.
2. The test will start exactly at the time mentioned in the Hall Ticket and an announcement to this effect will be made by the invigilator.
3. The Entrance test is of 3 hour duration and the question paper consists of a total 160 questions comprising of a total of 80 questions in Biology (Botany - 40, Zoology – 40), 40 questions in Physics and 40 questions in Chemistry.
4. There is only one correct response for each question out of four responses given.
5. There is no negative marking and No deduction from the total score will be made if no response is indicated for a question.
6. All calculations/writing work are to be done only in the rough sheet provided at the centre and on completion of the test candidates must hand over the rough sheets to the invigilator on duty in the Room/Hall.
7. During the examination time, the invigilator will check Hall ticket of the candidate to satisfy himself/herself about the identity of each candidate.
8. The candidates are governed by all Rules and Regulations of the Convener, EAMCET-2017 with regard to their conduct in the Examination Hall. All cases of unfair means will be dealt with as per rules.
9. The candidates must sign and give his/her Left Hand Thumb impression on the Attendance Sheet at the appropriate place.

PROFORMA – I

**REVISED PROFORMAAS PER G.O.Ms.No.58, SOCIAL WELFARE (J) DEPT. DATED 12.05.1997
ANDHRA PRADESH / TELANGANA GAZETTE EXTRAORDINARY PART-I**

Serial No.

FORM III

S.C.

District Code :

S.T.

Emblem

Mandal Code :

B.C.

Village Code :

Certificate No.:

**COMMUNITY, NATIVITY AND DATE OF BIRTH CERTIFICATE
(Integrated Community Certificate)**

- This is to certify that Sri / Smt./Kum _____
Son/Daughter of Sri _____
of Village/ Town _____
Mandal _____
District of the state of Andhra Pradesh / Telangana belongs to _____
Community which is recognized as SC/ST/BC under:
The Constitution (Scheduled Castes) Order, 1950
The Constitution (Scheduled Tribes) Order, 1950
G.O.Ms.No.1793, Education, dated 25.09.1970 as amended from time to time BCs, SCs, STs list (Modification) Order 1956, SCs and STs (Amendment) Act, 1976.
- It is certified that Sri / Smt. / Kum. _____
is a native of _____ District of
Andhra Pradesh / Telangana.
- It is certified that the place of birth of Sri / Smt. / Kum. _____ Village / Town _____
Mandal _____ District of Andhra Pradesh / Telangana.
- It is certified that the date of birth of Sri / Smt. / Kum. _____ is Day _____ Month _____ Year _____
(in words _____) as per the declaration given by his /
her father / mother / guardian and as entered in the School records where he / she studied.

Signature:

Date:

Name in Capital letters:

Designation:

(Seal)

Explanatory Note:

- While mentioning the community, the competent Authority must mention the sub-caste (in case of SCs) and Sub-Tribe or Sub-Group (in case of STs) as listed out in the SCs and STs (Amendment) Act, 1976.

PROFORMA – II

RESIDENCE CERTIFICATE IN SUPPORT OF APPLICATION

- It is hereby certified
 - that Mr / Kum _____ son / daughter of
Sri / Smt. _____ a candidate for admission to the course
appeared for the first time for the _____ examination (being the minimum qualifying
examination for admission to the course mentioned above) in _____ (month) _____ (year).
 - that in the 7 years, immediately preceding the commencement of the aforesaid examination he / she has resided in the following place /
places falling within the area in respect of the AU/OU/SVU region (Tick appropriate one).

S.No.	Period	Village	Mandal	District
1				
2				
3				
4				
5				
6				
7				

- The above candidate is, therefore, a local candidate in relation to the area specified in Paragraph 3(1)(2)(3) of the Andhra Pradesh / Telangana Educational Institution (Regulation of Admissions) Order 1974 as amended.

Officer of the Revenue Department
(Issued by the competent authority of Revenue Dept.)

Date:

(OFFICE SEAL)

PROFORMA – III

CERTIFICATES IN SUPPORT OF NON-LOCAL STATUS FOR E CATEGORY

(A) Certificate to be furnished when the candidate has resided in the state for a period of 10 years
(Read Instructions under 3(a) of Annexure (III) of Instruction Booklet of admission)

This is to certify that Mr./ Kum. _____

Son / Daughter of Sri. / Smt. _____

Is a candidate seeking admission in to professional courses (Engineering stream & Agricultural and Medical stream) through AP EAMCET - 2017 for the Academic Year 2017-17 is a resident of _____

(Place) in _____ (District) of Andhra Pradesh / Telanagana for a total period of 10 years from the year _____ to _____ excluding the periods of study outside the state.

Place:

Date:

**Signature of the Competent
Authority from Revenue Dept.**

Office Seal:

(B) Certificate to be furnished when either of the parents of the candidate has resided in the state for a period of 10 years
(Read Instructions under 3(b) of Annexure (III) of Instruction Booklet of admission)

This is to certify that Sri/Smt. _____

Father / Mother of _____

Is a candidate seeking admission in to professional courses (Engineering stream & Agricultural and Medical stream) through AP EAMCET - 2017 for the Academic Year 2017-17, is a resident of _____

(Place) in _____ (District) of Andhra Pradesh / Telangana for a total period of 10 years from the year _____ to _____ excluding the periods of study outside the state.

Place:

Date:

**Signature of the Competent
Authority from Revenue Dept.**

Office Seal:

(C) Certificate to be furnished when the parent / spouse is an employee of the
State or Central Government or Quasi- Government Organization.

(Read Instructions under 3(c) and 3(d) of Annexure (III) of Instruction Booklet of admission)

This is to certify that Sri/Smt. _____

Father / Mother of _____

a candidate seeking admission into professional courses (Engineering stream & Agricultural and Medical stream) through AP EAMCET - 2017 for the Academic Year 2017-16, is presently employed in Andhra Pradesh / Telangana State in the Organization _____ from _____ till-date. This Organization is a State / Central / Quasi Government Organization in the State of Andhra Pradesh / Telangana.

Place:

Date

Signature of the Issuing Authority
Designation:

Office Seal:

AP EAMCET – 2017 SYLLABUS

NOTE

- ❖ In accordance to G.O.Ms.No: 16 Edn., (EC) Dept., Dt: 25th Feb' 04, AP EAMCET Committee has specified the syllabus of AP EAMCET-2017 as given hereunder.
- ❖ The syllabus is in tune with the syllabus introduced by the Board of Intermediate Education, Telangana / A.P., for Intermediate course with effect from the academic year 2014-2015(1st year) and 2015-2016 (2nd year) and is designed at the level of Intermediate Course and equivalent to (10+2) scheme of Examination conducted by Board of Intermediate Education, A.P.
- ❖ The syllabus is designed to indicate the scope of subjects included for AP EAMCET - 2017. The topics mentioned therein are not to be regarded as exhaustive. Questions may be asked in AP EAMCET-2017 Syllabus to test the student's knowledge and intelligent understanding of the subject.
- ❖ The syllabus is applicable to students of both the current and previous batches of Intermediate Course, who are desire to appear for AP EAMCET-2017.

SYLLABUS OF AGRICULTURE AND MEDICAL**Subject: BOTANY****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, Plantae 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.

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.

REPRODUCTION IN PLANTS

Modes of Reproduction: Asexual reproduction, binary fission, Sporulation, budding, fragmentation, vegetative propagation in plants, Sexual reproduction, 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.

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.

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 and Eukaryotic cells , Ultra Structure of Plant cell (structure in detail and functions in brief), Cell membrane, Cell wall, Cell organelles: Endomembrane System; Endoplasmic reticulum, Golgi bodies, Lysosomes, Vacuoles, Mitochondria, Plastids, Ribosomes, Cytoskeleton; Cilia, Flagella, Centrosome and Centriole, Nucleus; Chromosomes; Number, structural organization; Nucleosome and Microbodies.

Biomolecules: Primary and Secondary Metabolites, Structure and function of Biomacromolecules, Proteins,

Polysaccharides, Nucleic acids, Lipids.

Cell cycle and Cell Division: Cell cycle, Mitosis, Meiosis - significance.

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.

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).

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, Transpiration- Opening and Closing of Stomata, Transpiration and Photosynthesis - a compromise 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 Noncyclic 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- Discovery and Physiological Effects of Plant Growth Regulators, Auxins, Gibberellins, Cytokinins, Ethylene, Abscisic acid, Seed Dormancy, Photoperiodism, Vernalisation.

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 Lytic cycle, The Lysogenic Cycle, Viral diseases in Plants, Viral diseases in Humans.

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.

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.

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.

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.

Subject: Zoology

ZOOLOGY - Diversity of Living World

What is life?; Nature, Scope & meaning of zoology; Branches of Zoology; Need for classification- Zoos as tools for classification; Biological system of classification- (Phylogenetic classification only); Levels or Hierarchy of classification; Nomenclature - Bi & Trinominal; Species concept; Kingdom Animalia; Biodiversity – Meaning, 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.

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: Schizocoelomates & Enterocoelomates (Brief account of formation of coelom); Tissues: Epithelial, Connective, Muscular and Nervous tissues.

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) of the phyla Porifera; Cnidaria; Ctenophora; Platyhelminthes; Nematoda; Annelida (Include Earthworm as a type study strictly adhering to NCERT text book); Arthropoda; Mollusca; Echinodermata and Hemichordata.

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) of the 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 text book), Class: Reptilia, Class: Aves, Class: Mammalia.

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.

BIOLOGY & HUMAN WELFARE

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

TYPE STUDY OF PERIPLANETA AMERICANA

Habitat and habit; External features; Locomotion; Digestive system; Respiratory system; Circulatory system; Excretory system; Nervous system; Sense organs, structure of ommatidium; Reproductive system.

ECOLOGY & ENVIRONMENT

Organisms and Environment: Definitions of Ecology, population, communities, habitat, niche, biome and ecosphere; 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.

HUMAN ANATOMY AND PHYSIOLOGY-I

Digestion and absorption: Alimentary canal and digestive glands; Physiology of digestion and gastrointestinal hormones; Peristalsis, digestion, absorption and assimilation of proteins, carbohydrates and fats, egestion, Nutritional Disorders of digestive system, indigestion, constipation, vomiting, jaundice, diarrhea.

Breathing and Respiration: 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; Respiratory disorders- Asthma, Emphysema, Occupational respiratory disorders - Asbestosis, Silicosis, Siderosis, Black Lung Disease in coal miners.

HUMAN ANATOMY AND PHYSIOLOGY-II

Body Fluids and Circulation: Covered in I year composition of lymph and functions; 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.

Excretory products and their elimination: Modes of excretion - Ammonotelism, Ureotelism, Uricotelism, Human excretory system - structure of kidney and nephron; Urine formation, 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.

HUMAN ANATOMY AND PHYSIOLOGY-III

Muscular and Skeletal system: Skeletal muscle - ultra structure; Contractile proteins & muscle contraction; Skeletal system and its functions; Joints (to be dealt with relevance to practical syllabus); Disorders of the muscular and skeletal system-myasthenia gravis, tetany, muscular dystrophy, arthritis, osteoporosis, gout.

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.

HUMAN ANATOMY AND PHYSIOLOGY-IV

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).

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.

HUMAN REPRODUCTION

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; Pregnancy; placenta formation; Parturition; Lactation (elementary idea).

Reproductive Health: Need for reproductive health and prevention of sexually transmitted diseases (STD); Birth control - Need and methods; contraception and medical termination of pregnancy (MTP); Amniocentesis; infertility and assisted reproductive technologies - IVF-ET, ZIFT, GIFT (elementary idea for general awareness).

GENETICS

Heredity and variations: Pleiotropy, Multiple alleles; inheritance of and human blood groups and Rh factor; Co-dominance (blood groups as example); Elementary of idea of polygenic inheritance; skin colour in humans; sex-determination-in humans, birds, *Fumea* moth; Genic balance theory of sex-determination-in *Drosophila melanogaster*; sex-determination-in honey bees; sex linked inheritance-Haemophilia, colour blindness; Mendelian disorders in humans-Thalassemia, Haemophilia, Sickle cell anaemia, cystic fibrosis, PKU; Chromosomal disorders-Down syndrome, Turner's syndrome and Klinefelter syndrome; Genome, Human genome project and DNA finger printing.

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 Natural Selection with example (Kettlewell's experiments on *Biston betularia*), Mutation Theory of Hugo De Vries; Modern synthetic theory of Evolution-Hardy Weinberg law; Types of Natural Selection; Gene flow and genetic drift; Human evolution; Speciation - Allopatric, sympatric.

APPLIED BIOLOGY

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

Subject: PHYSICS

UNITS AND MEASUREMENTS

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.

MOTION IN A STRAIGHT LINE

Position, path length and displacement, average velocity and average speed, instantaneous velocity and speed, acceleration, kinematic equations for uniformly accelerated motion, relative velocity.

MOTION IN A PLANE

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.

LAWS OF MOTION

Aristotle's fallacy, The law of inertia, Newton's first law of motion, Newton's second law of motion, momentum, Impulse, Newton's third law of motion, Conservation of momentum, 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.

WORK, ENERGY AND POWER

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.

SYSTEMS OF PARTICLES AND ROTATIONAL MOTION

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 a particles, conservation of angular momentum, Equilibrium of a rigid body, Principle of moments, Moment of inertia, Theorems of perpendicular and parallel axes, 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.

OSCILLATIONS

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.

GRAVITATION

Kepler's laws, 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.

MECHANICAL PROPERTIES OF SOLIDS

Elastic behaviour 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, Poisson's Ratio, Elastic Potential Energy in a Stretched wire, Applications of elastic behaviour of materials.

MECHANICAL PROPERTIES OF FLUIDS

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.

THERMAL PROPERTIES OF MATTER

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, Heat transfer, Conduction, Convection, Radiation, Black body Radiation, Greenhouse Effect, Newton's law of cooling and its experimental verification.

THERMODYNAMICS

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, Heat engines, Refrigerators and heat pumps, Second law of thermodynamics, Reversible and irreversible processes, Carnot engine, Carnot's theorem.

KINETIC THEORY

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.

WAVES

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, Doppler effect: source moving and observer stationary, observer moving and source stationary, both source and observer moving.

RAY OPTICS AND OPTICAL INSTRUMENTS

Reflection of light by spherical mirrors, sign convention, focal length of spherical mirrors, the mirror equation, 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, some natural phenomena due to sunlight, the rainbow, scattering of light, optical instruments, the eye, the simple and compound microscopes, refracting telescope and Cassegrain reflecting telescope.

WAVE OPTICS

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, diffraction, the single slit diffraction, resolving power of optical instruments, the validity of ray optics, polarisation, polarisation by scattering, polarisation by reflection.

ELECTRIC CHARGES AND FIELDS

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, applications of Gauss's law, field due to an infinitely long straight uniformly charged wire, field due to a uniformly charged infinite plane sheet, field due to a uniformly charged thin spherical shell.

ELECTROSTATIC POTENTIAL AND CAPACITANCE

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.

CURRENT ELECTRICITY

Electric current, electric current in conductors, Ohm's law, drift of electrons and the origin of resistivity, mobility, limitations of Ohm's law, resistivity of various materials, colour code of resistors, Temperature dependence of resistivity, electrical energy, power, combination of resistors – series and parallel. Cells, EMF, internal resistance, cells in series and in parallel, Kirchhoff's rules, Wheatstone Bridge, Meter Bridge, Potentiometer.

MOVING CHARGES AND MAGNETISM

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, motion in combined electric and magnetic fields, velocity selector, Cyclotron, 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.

MAGNETISM AND MATTER

The bar magnet, the magnetic field lines, bar magnet as an equivalent solenoid, The dipole in a uniform magnetic field, the electrostatic analog, Magnetism and Gauss's Law, The Earth's magnetism, magnetic declination and dip, magnetisation and magnetic intensity, susceptibility, magnetic properties of materials; Diamagnetism, Paramagnetism, Ferromagnetism, Hysteresis loop, permanent magnets and electromagnets.

ELECTROMAGNETIC INDUCTION

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.

ALTERNATING CURRENT

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, power in AC circuit, the power factor, LC oscillations, transformers.

ELECTROMAGNETIC WAVES

Displacement current, Maxwell's equations, 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.

DUAL NATURE OF RADIATION AND MATTER

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, Davisson and Germer experiment.

ATOMS

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, de Broglie's explanation of Bohr's second postulate of quantization, LASER light.

NUCLEI

Atomic masses and composition of nucleus, discovery of neutron, size of the nucleus, Mass - Energy and Nuclear Binding Energy, Nuclear Force, Radioactivity, Law of radioactive decay, Alpha decay, Beta decay, Gamma decay, Nuclear Energy, Fission, Nuclear reactor, nuclear fusion, energy generation in stars, controlled thermonuclear fusion.

SEMICONDUCTOR ELECTRONICS: MATERIALS, DEVICES AND SIMPLE CIRCUITS

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, p-n junction formation, semiconductor diode, p-n junction diode under forward bias, p-n junction diode under reverse bias, Application of junction diode as a rectifier, special purpose p-n junction diodes, Zener diode, Zener diode as voltage regulator, 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.

COMMUNICATION SYSTEMS

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.

Subject: CHEMISTRY

ATOMIC STRUCTURE

Sub-atomic particles; Atomic models –Rutherford’s Nuclear model of atom; Developments to the Bohr’s model of atom; 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.

CLASSIFICATION OF ELEMENTS AND PERIODICITY IN PROPERTIES

Need to 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 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.

CHEMICAL BONDING AND MOLECULAR STRUCTURE

Kossel - Lewis approach to chemical bonding, Octet rule, 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- H_2 , He_2 , Li_2 , B_2 , C_2 , N_2 and O_2 ; Hydrogen bonding-cause of formation of hydrogen bond - Types of hydrogen bonds-inter and intra molecular-General properties of hydrogen bonds.

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; Distribution of molecular speeds - rms, average and most probable speeds-Kinetic energy of gas molecules; Behaviour of real gases - Deviation from Ideal gas behaviour - 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).

STOICHIOMETRY

Some Basic Concepts - Properties of matter - uncertainty in Measurement-significant figures, dimensional analysis; Laws of Chemical Combinations - Law of Conservation of Mass, Law of Definite Proportions, Law of Multiple Proportions, Gay Lussac’s Law of Gaseous Volumes, Dalton’s Atomic Theory, Avogadro Law, Examples; 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; Redox reactions in Titrimetry.

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; Heat capacity; The relationship between C_p and C_v ; Measurement of ΔU and ΔH : Calorimetry; Enthalpy change, $\Delta_r H$ 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 ($\Delta_c H^\ominus$), (b) Enthalpy of atomization ($\Delta_a H^\ominus$), phase transition, sublimation and ionization, (c) Bond Enthalpy ($\Delta_{\text{bond}} H^\ominus$), (d) Enthalpy of solution ($\Delta_{\text{sol}} H^\ominus$) and dilution-lattice enthalpy; Spontaneity. (a) Is decrease in enthalpy a criterion for spontaneity? (b) Entropy and spontaneity, the second law of thermodynamics, (c) Gibbs Energy and spontaneity; Gibbs Energy change and equilibrium; Absolute entropy and the third law of thermodynamics.

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-Hydrolysis of salts and pH of their solutions; Buffer solutions-designing of buffer solution-Preparation of Acidic buffer; Solubility Equilibria of sparingly soluble salts. Solubility product constant Common ion effect on solubility of Ionic salts.

HYDROGEN AND ITS COMPOUNDS

Position of hydrogen in the periodic table; Dihydrogen-Occurrence and Isotopes; Preparation of Dihydrogen; Properties of Dihydrogen; 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; Hydrogen peroxide: Preparation; Physical properties; structure and chemical properties; storage and uses; Heavy Water; Hydrogen as a fuel.

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 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 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 Oxide; Calcium Hydroxide; Calcium Carbonate; Plaster of Paris; Cement; Biological importance of Calcium and Magnesium.

p- BLOCK ELEMENTS GROUP 13 (BORON FAMILY)

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, Ortho boric acid, diborane; Uses of boron, aluminium and their compounds.

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; Some important compounds of carbon and silicon - carbonmonoxide, carbon dioxide, Silica, silicones, silicates and zeolites.

ENVIRONMENTAL CHEMISTRY

Definition of terms: Air, Water and Soil Pollutions; Environmental Pollution; Atmospheric pollution; Tropospheric Pollution; Gaseous Air Pollutants (Oxides of Sulphur; Oxides of Nitrogen; Hydrocarbons; Oxides of Carbon (CO , CO_2)). Global warming and Green house effect; Acid Rain- Particulate Pollutants- Smog; Stratospheric Pollution: Formation and breakdown of Ozone- Ozone hole- effects of depletion of the Ozone Layer; Water Pollution: Causes of Water Pollution; International standards for drinking water; Soil Pollution: Pesticides, Industrial Wastes; Strategies to control environmental pollution- waste Management- collection and disposal; Green Chemistry: Green chemistry in day-to-day life; Dry cleaning of clothes; Bleaching of paper; Synthesis of chemicals.

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, hyperconjugation; Types of Organic reactions; Methods of purification of organic compounds; Qualitative elemental analysis of organic compounds; Quantitative elemental analysis of organic compounds.

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), Combustion, Controlled Oxidation, Isomerisation, Aromatization, reaction with steam and Pyrolysis; **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, antiMarkovnikov'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' alkylation and acylation; Directive influence of functional groups in mono substituted benzene, Carcinogenicity and toxicity.

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 centred unit cells; Number of atoms in a unit cell (primitive, body centred and face centred 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; Electrical properties-conduction of electricity in metals, semiconductors and insulators- band theory of metals; Magnetic properties.

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; Abnormal molar masses-van't Hoff factor.

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; Batteries: primary batteries and secondary batteries; Fuel cells; Corrosion of metals-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 reaction; Temperature dependence of the rate of a reaction -effect of catalyst; Collision theory of chemical reaction rates.

SURFACE CHEMISTRY

Adsorption : Distinction between adsorption and absorption-mechanism of adsorption-types of adsorption-characteristics of physisorption-characteristics of chemisorptions-adsorption isotherms-adsorption from solution phase-applications of adsorption; **Catalysis**: Catalysts, promoters and poisons-auto catalysis- homogeneous and heterogeneous catalysis-adsorption theory of heterogeneous catalysis-important features of solid catalysts: (a)activity (b)selectivity-shape-selective catalysis by zeolites-enzyme catalysis-characteristics and mechanism- catalysts in industry;

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-Emulsions; Colloids around us- application of colloids.

GENERAL PRINCIPLES OF METALLURGY

Occurrence of metals; Concentration of ores-levigation, magnetic separation, froth floatation, leaching; Extraction of crude metal from concentrated ore-conversion to oxide, reduction of oxide to the metal; Thermodynamic principles of metallurgy – Ellingham diagram-limitations-applications-extraction of iron, copper and zinc from their oxides; Electrochemical principles of metallurgy; Oxidation and reduction; Refining of crude metal-distillation, liquation poling, electrolytic refining, zone refining and vapour phase refining; Uses of aluminium, copper, zinc and iron.

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; Preparation and properties of nitric acid; Phosphorous-allotropic forms; Phosphine-preparation, properties and uses; Phosphorous halides; Oxoacids of phosphorous

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- manufacture, 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-uses of noble gases.

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 $\text{M}^{3+}/\text{M}^{2+}$ standard electrode potentials, trends in stability of higher oxidation states, chemical reactivity and E^\ominus values, magnetic properties, formation of coloured ions, formation of complex compounds, catalytic properties, formation of interstitial compounds, alloy formation; Some important compounds of transition elements-oxides and oxoanions of metals-preparation, properties and uses of potassium dichromate and potassium permanganate-structures of chromate, dichromate, manganate and permanganate ions; Inner transition elements(f-block)-lanthanoids- electronic configuration-atomic and ionic sizes-oxidation states- general characteristics; Actinoids-electronic configuration atomic and ionic sizes, oxidation states, general characteristics and comparison with lanthanoids; 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; Isomerism in coordination compounds- (a)Stereo isomerism-Geometrical and optical isomerism (b)Structural isomerism-linkage, coordination, ionisation and hydrate isomerism; 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; Importance and applications of coordination compounds.

POLYMERS

Classification of Polymers -Classification based on source, structure, mode of polymerization, molecular forces and growth polymerization; Types of polymerization reactions-addition polymerization or chain growth polymerization-ionic polymerization, free radical mechanism-preparation of addition polymers-polythene, teflon and polyacrylonitrile-condensation polymerization or step growth polymerization-polyamides-preparation of Nylon 6,6 and nylon 6-poly esters-terylene-bakelite, melamine-formaldehyde polymers; copolymerization-Rubber-natural rubber-vulcanisation of rubber-Synthetic rubbers-preparation of neoprene and buna-N; Molecular mass of polymers-number average and weight average molecular masses- poly dispersity index(PDI); Biodegradable

polymers-PHBV, Nylon 2-nylon 6; Polymers of commercial importance-polypropene, polystyrene, polyvinylchloride (PVC), urea-formaldehyde resin, glyptal and bakelite - their monomers, structures and uses.

BIOMOLECULES

Carbohydrates - Classification of carbohydrates- Monosaccharides: preparation of glucose from sucrose and starch- Properties and structure of glucose- D,L configurations and (+), (-) notations 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; **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; **Enzymes**: Enzymes, mechanism of enzyme action; **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; **Hormones**: Definition, different types of hormones, their production, biological activity, diseases due to their abnormal activities.

CHEMISTRY IN EVERYDAY LIFE

Drugs and their classification: (a) Classification of drugs on the basis of pharmacological effect (b) Classification of drugs on the basis of drug action (c) Classification of drugs on the basis of chemical structure (d) Classification of drugs on the basis of molecular targets; Drug-Target interaction-Enzymes as drug targets (a) Catalytic action of enzymes (b) Drug-enzyme interaction, receptors as drug targets; Therapeutic action of different classes of drugs: antacids, antihistamines, neurologically active drugs: tranquilizers, analgesics-non-narcotic, narcotic analgesics, antimicrobials-antibiotics, antiseptics and disinfectants- antifertility drugs; Chemicals in food-artificial sweetening agents, food preservatives, antioxidants in food; Cleansing agents-soaps and synthetic detergents – types and examples.

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) SN² mechanism (b) SN¹ 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; Polyhalogen compounds: Uses and environmental effects of dichloro methane, trichloromethane triiodomethane, tetrachloro methane, freons and DDT.

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, PX₃, dehydration and oxidation (iii) Reactions of phenols- electrophilic aromatic substitution, Kolbe's reaction, Reimer - Tiemann reaction, reaction with zinc dust, oxidation; Commercially important alcohols (methanol,ethanol); **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 α - 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 PCl₅, PCl₃, SOCl₂, 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 carboxylic acids.

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 nitrous acid, reaction with aryl sulphonyl chloride, electrophilic substitution of aromatic amines (aniline)-bromination, nitration and sulphonation.

DIAZONIUM SALTS

Methods of preparation of diazonium salts (by diazotization) Physical properties; Chemical reactions: Reactions involving displacement of Nitrogen; Sandmeyer reaction, Gatterman reaction, replacement by i) iodide and fluoride ions ii) hydrogen, hydroxyl and Nitro groups; reactions involving retention of diazo group; coupling reactions; Importance of diazonium salts in synthesis of aromatic compounds.

CYANIDES AND ISOCYANIDES

Structure and nomenclature of cyanides and isocyanides; Preparation, physical properties and chemical reactions of cyanides and isocyanides.

MODEL QUESTIONS – BOTANY

1. **Assertion (A):** In the leaves of the sugarcane C_3 and C_4 cycles are spatially separated.
Reason (R) : Hatch and Slack pathway occurs in bundle sheath cells and Calvin cycle in mesophyll cells.
- 1) Both (A) and (R) are true. (R) is the correct explanation of (A)
 - 2) Both (A) and (R) are true, but (R) is not the correct explanation of (A)
 - 3) (A) is true but (R) is false
 - 4) (A) is false but (R) is true
2. Arrange the following in the order of their occurrence in the life cycle of an angiospermic plant:
 I. Primary Endosperm Nucleus II. Microsporogenesis
 III. Xenogamy IV. Pericarp
- The correct sequence is:
- 1) I, III, II, IV
 - 2) III, I, IV, II
 - 3) II, III, I, IV
 - 4) IV, I, II, III
3. If one strand of DNA molecule has the nucleotide sequence TAC AAT CGG TAA, the new stand synthesized in transcription will have the nucleotide sequence as:
- 1) ATG TTA GCC ATT
 - 2) TAC AAT CGG TAA
 - 3) AUG UUA GCC AUU
 - 4) TUC UUT CGG TUU
4. Study the following lists:
- | List I | List II |
|-----------|------------------------|
| A) Spadix | I. <i>Allium</i> |
| B) Umbel | II. <i>Tridax</i> |
| C) Spike | III. <i>Cocos</i> |
| D) Head | IV. <i>Achyranthus</i> |
| | V. <i>Hibiscus</i> |
- The correct match is:
- | | (A) | (B) | (C) | (D) |
|----|-----|-----|-----|-----|
| 1. | I | IV | V | II |
| 2. | IV | I | III | V |
| 3. | II | III | IV | I |
| 4. | III | I | IV | II |
5. Prokaryotic cell possesses the following:
- | | |
|---------------------|--------------------------|
| I. Chloroplast | II. Cell wall |
| III. 70 S ribosomes | IV. Well defined nucleus |
- The correct combination is:
- 1) I and II
 - 2) II and III
 - 3) I and III
 - 4) II and IV

MODEL QUESTIONS – ZOOLOGY

1. In human being acromian process is presnt on:
 1) Sternum 2) Skull 3) Pectoral girdle 4) Pelvic girdle

2. Identify the sequence of leg parts of cockroach from base to tip of the leg
 A) Tibia B) Coxa C) Tarsus D) Femur E) Trochanter
 Correct sequence is
 1) B-A-D-E-C 2) B-E-D-A-C 3) A-D-C-B-E 4) A-C-B-E-D

3. Multiple selection type
 Choose the correct statements with reference to Cephalopods:
 A) Shell may be external and multichambered
 B) It includes Cuttle fishes
 C) Development includes Veliger larva
 D) Blood circulation is open type
 1) All 2) A & B 3) C & D 4) A & D

4. Matching type

	SET-I	SET-II
	Scientific names	Common Names
A)	Pinctada	I) Elephant tusk shell
B)	Mytilus	II) Sea hare
C)	Dentalium	III) Pearl Oyster
D)	Aplysia	IV) Marine mussel
		V) Ship worm

Identify the correct match between SET-I and SET-II

	A	B	C	D
1)	III	IV	II	I
2)	III	I	II	V
3)	III	IV	I	II
4)	III	V	II	IV

5. Statement and Reason type
 Statement (S) During favourable conditions Euglena undergoes longitudinal binary fission.
 Reason (R) Binary fission in Euglena is described as symmetrogenic division as daughter individuals are like mirror images.
 1) Both S and R correct and R is the correct explanation to 'S'.
 2) Both S and R are correct but R is not correct explanation to 'S'.
 3) S is correct but R is not correct.
 4) S is not correct but R is correct.

MODEL QUESTIONS – PHYSICS

1. A particle starts from origin at $t=0$ with a velocity of $10 \mathbf{i}$ m/s and moves in x-y plane under the action of force which produces a constant acceleration of $(2\mathbf{i} + 3\mathbf{j}) \text{ m/s}^2$. The y – coordinate in meters of the particle at the instant its x-coordinate is 24m becomes
 (1) 12 (2) 6 (3) 18 (4) 3

2. When 0.2 kg of ice at 0°C mixed with 0.5 kg of water at 60°C in a container , the resulting temperature is 10°C . The heat of fusion of ice ($S_{\text{water}} = 4.186 \text{ J/kg/K}$)

- (1) 1.31×10^5 J/kg
(3) 10.46×10^5 J/kg

- (2) 2.62×10^5 J/kg
(4) 5.23×10^5 J/kg

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
4. A solenoid of length 1.0m has a radius of 1cm and is made up of 1000 turns. It carries a current of 2.5 A. The magnitude of the magnetic field inside the solenoid in Tesla is
(1) $\pi \times 10^{-3}$ (2) $\pi \times 10^{-4}$ (3) $\pi \times 10^{-6}$ (4) $\pi \times 10^{-5}$

MODEL QUESTIONS – CHEMISTRY

1. Which one of the following has stable electronic configuration?
(1) N (2) C (3) F (4) Al
2. Which one of the following exhibits acidity?
(1) R-OH (2) R-CHO (3) R-X (4) C₆H₅-OH
3. Assertion (A): Carbonyl compounds undergo nucleophilic addition reactions.
Reason (R): Carbonyl group is non-polar.
The correct answer is:
(1) Both (A) and (R) are true and (R) is the correct explanation of (A)
(2) Both (A) and (R) are true and (R) is not the correct explanation of (A)
(3) (A) is true but (R) is not true
(4) (A) is not true but (R) is true
4. Match the following:

LIST I

- (A) Packing efficiency in ccp structure
(B) Number of atoms in bcc unit cell
(C) Packing efficiency in simple cubic structure
(D) Number of atoms in fcc unit cell

LIST II

- (1) 2
(2) 4
(3) 52.4%
(4) 68.0%
(5) 74.0%

The correct answer is:

- | | (A) | (B) | (C) | (D) |
|-----|-----|-----|-----|-----|
| (1) | 5 | 4 | 3 | 2 |
| (2) | 3 | 2 | 1 | 4 |
| (3) | 5 | 1 | 3 | 2 |
| (4) | 4 | 1 | 2 | 3 |

ANNEXURE – III

DEFINITION OF LOCAL / NON - LOCAL STATUS

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 in which he/she appeared or first appeared in the relevant qualifying examination as the case may be.
 - 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
 - 2.1 If he/she 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 studied for the maximum period out of 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.
 - 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 examination, he/she has 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 had resided last in such periods.

- Note:**
1. Local area in respect of Andhra University (A.U. area) includes Acharya Nagarjuna University area. In respect of Sri Venkateswara University (S.V.U. area), it includes Sri Krishnadevaraya University area. In respect of Osmania University (O.U. area), it includes Kakatiya University area.
 2. The Candidate belonging to PIO / OCI category will be considered as under non local category only.
 3. Candidates coming under any of the categories given below and not satisfying the conditions mentioned in 1 or 2 above are treated as 'Non-Local' to all the three University areas specified above.
 - a. Candidates who have resided in the state of Telangana / A.P. for a total period of 10 years or more excluding the period of study outside this state.

OR
 - b. Candidates either of whose parents has resided in this state for a total period of 10 years or more excluding the periods of employment outside the state

OR
 - c. Candidates either of whose parents is employed in the State of Telangana / A.P. in the State or Central Government Public Sector Corporations, Local Bodies, Universities and other similar quasi Government Institutions within this state, at the time of submitting the application

OR
 - d. Candidates who are spouses of those employed in the State of Telangana / A.P. in the State or Central Government, Public Sector Corporations, Local Bodies, Universities and other similar quasi Government Institutions within this state, at the time of submitting the application.

For full details refer G.O.No. 646, dated 10.07.1979.

Note: Blank **Proforma III** is provided for submitting relevant information regarding Local/Non-Local status of candidates.

ANNEXURE – IV

CRITERIA FOR RANKING (AP EAMCET – 2017 “AM CATEGORY”)

As per G.O.Ms.No 73 of Higher Education(EC.2) Department, dated 28-07-2011, the candidates who have secured qualifying marks in AP EAMCET-2017 and candidates belonging to the category of Scheduled Caste and Schedule Tribe, for whom qualifying marks have not been prescribed, shall be assigned ranking in the order of merit on the basis of combined score obtained by giving 75% weightage to the marks secured in AP EAMCET-2017 and 25% weightage to the marks secured in the relevant group subjects namely Biology, Physics, Chemistry of the qualifying examination.

For the preparation of merit list, in case of more than one student securing the same combined score obtained as mentioned above, the tie shall be resolved to decide the relative ranking by successively considering the following

- i) The total marks secured in AP EAMCET-2017
- ii) The marks secured in Biology in AP EAMCET-2017
- iii) The marks secured in Physics in AP EAMCET-2017
- iv) The percentage of aggregate marks secured in the qualifying examination
- v) If the tie still persists the date of birth of the concerned candidates, the older being given preference over the younger.

The weightage of marks in the case of candidates belonging to the category of Persons of Indian Origin (PIO) / Overseas Citizen of India (OCI) Card Holders, will be decided by a committee constituted by the competent authority.