SIR C R REDDY COLLEGE FOR WOMEN

(Affiliated to AdikaviNannaya University, Rajahmahendravaram)

Vatluru (Post), Pedapadu Mandal, West Godavari Dist., (A.P)

PG ENTRANCE COACHING

For

M.Sc. Life sciences

Date: 01-Aug-2020 To 30-Aug-2020

Time: 9:30 am to 12:30 Pm

Organized by

CAREER GUIDANCE & PLACEMENT CELL

2019–2020

INDEX

About Programme

The Career Guidance and Placement Cell at Sir CR Reddy College for Women organized PG entrance coaching classes for NANNAYACET 2020 in Commerce, Mathematics, Physics, Chemistry, and Life Sciences. These classes were conducted by senior faculty members who specialize in the respective subjects at the college.

Program: PG Entrance Coaching for Subject

Subjects Covered:

- M..sc Life science (Zoology ,Botany)

Target Audience:

- III B.Com and B.Sc. students aspiring for postgraduate studies (M.Com/M.Sc.)

Duration:

- August1st, 2020, to Aug30th, 2020 (30 days)

Time:

9:30 AM to 12:30 PM (Morning sessions)

Resource Persons:

Smt .S.Anuradha

Smt. Dr.Ch.Swapna

Organized By:

- Career Guidance and Placement Cell at Sir CR Reddy College for Women

Program Overview:

- Specifically designed coaching program focusing on NANNAYACET 2020 for M.Sc. aspirants.
- Conducted by seasoned faculty members from Sir CR Reddy College, each specializing in Mathematics.
- Comprehensive curriculum comprising subject-specific lectures, problem-solving sessions, practice tests, and exam strategy workshops.
- Tailored content to acquaint students with the NANNAYACET exam pattern, syllabi, and effective preparation methodologies.

Benefits for III B.Com/B.Sc. Students:

- Early guidance and preparation assistance for M.Sc. entrance exams.
- Exposure to exam patterns, aiding in better preparedness.
- Access to experienced faculty for subject-specific guidance and doubt resolution.
- Enhanced readiness for M.Sc. studies by initiating preparation in advance.

This coaching program aims to support B.Sc. students in their aspirations for pursuing postgraduate studies by providing structured coaching specifically aligned with the requirements of the NANNAYACET 2020 examination.

Learning Objectives and Learning Outcomes

Learning Objectives:

1. Subject Mastery: To facilitate a comprehensive understanding of the core concepts and subject-specific knowledge required for M. Com/M.Sc. entrance exams.
2. Exam Familiarity: To familiarize students with the exam pattern, question types, and syllabi specific to NANNAYACET 2020.
3. Problem-Solving Skills: To enhance problem-solving abilities and critical thinking necessary to tackle complex questions in the entrance exams.
4. Time Management: To equip students with effective time management strategies for the exam and optimize their performance within the stipulated time frame.
5. Exam Strategy: To provide guidance on effective exam strategies, including question selection, prioritization, and efficient answering techniques.

Expected Outcomes:

1. Strong Foundation: Students are expected to build a strong foundational understanding of their respective subjects, providing a basis for advanced studies.
2. Improved Performance: Enhanced problem-solving skills and a better grasp of exam patterns can result in improved performance in mock tests and the actual entrance exam.
3. Confidence: Through regular practice and guidance, students are likely to gain confidence in handling diverse questions and scenarios during the examination.
4. Effective Preparation: Students should be better prepared to face the challenges of the entrance exams by utilizing learned strategies and subject-specific knowledge.
5. Readiness for Postgraduate Studies: The coaching program aims to prepare students adequately for the rigors of postgraduate studies in their chosen fields.

Permission Letter

26-07-2020
Eluru

To
The Principal
Sir C.R.Reddy College for Women
Eluru

Subject: Request to grant permission to conduct P.G Entrance test Coaching Classes to final year students.

This is to bring to your kind notice that, Career Guidance and Placement Cell is planning to conduct P.G Entrance test Coaching Classes for interested III B.Sc/B.Com students specializing life Sciences, Mathematics, Physics, Chemistry, Commerce .

The coaching classes aim is to provide additional support and guidance to our ambitious students who aspire to excel in their respective fields and we believe that providing coaching classes with in our college will not only benefit our students but also contribute to the overall academic excellence of our institution. These classes will be conducted for about 30 days i.e., from 1St August 2020 to 30th August 2020. The duration of these classes will be from 9:30 am to 12:30 pm. I kindly request your approval for this initiative, as it aligns with our commitment to fostering academic excellence and preparing our students for successful futures.

Thanking you Madam,

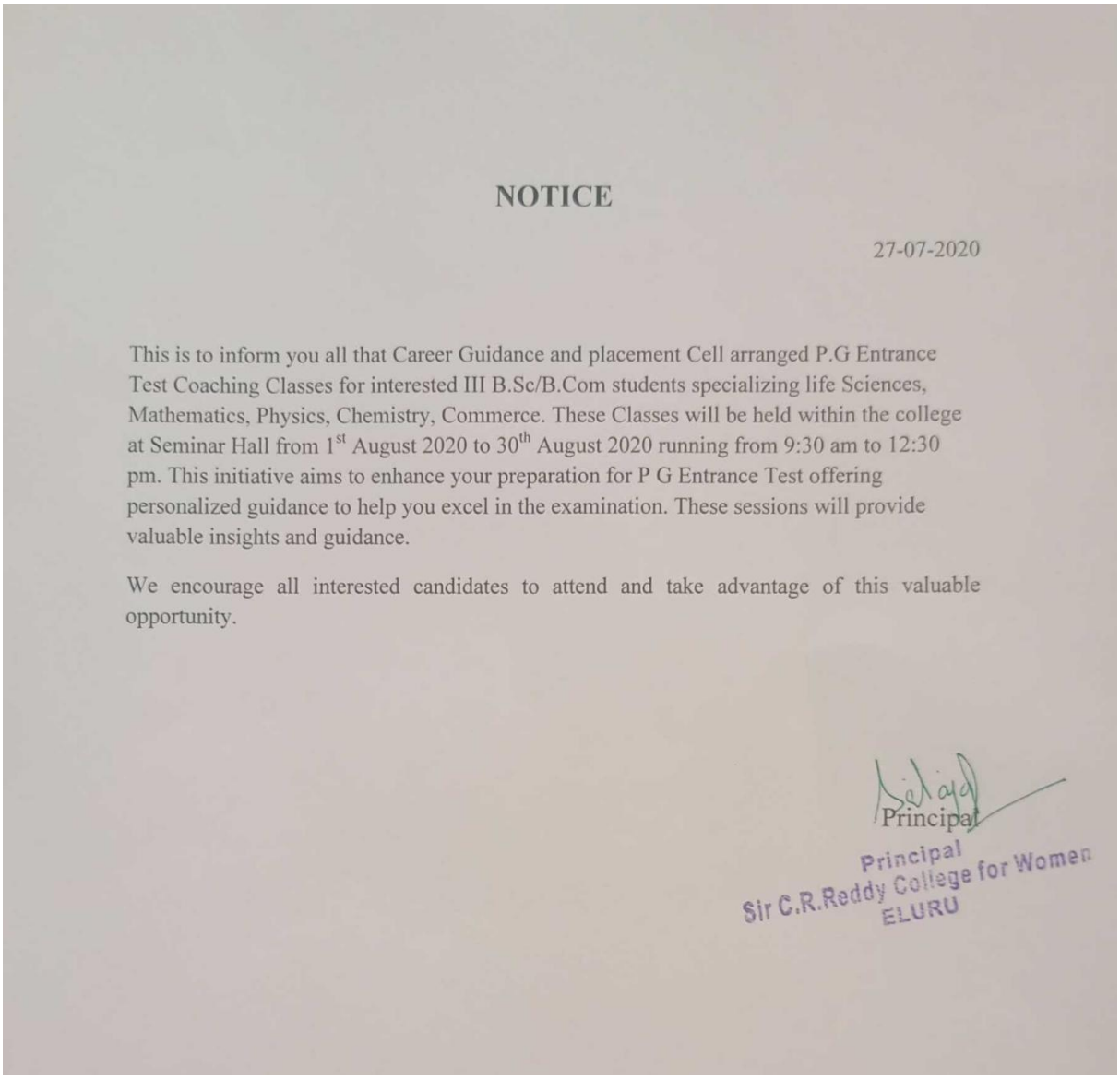
Permitted

Principal
Sir C.R.Reddy College for Women
ELURU

Yours Faithfully,

(Coordinator)
Career Guidance and Placement Cell

Notice to Students



NOTICE

27-07-2020

This is to inform you all that Career Guidance and placement Cell arranged P.G Entrance Test Coaching Classes for interested III B.Sc/B.Com students specializing life Sciences, Mathematics, Physics, Chemistry, Commerce. These Classes will be held within the college at Seminar Hall from 1st August 2020 to 30th August 2020 running from 9:30 am to 12:30 pm. This initiative aims to enhance your preparation for P G Entrance Test offering personalized guidance to help you excel in the examination. These sessions will provide valuable insights and guidance.

We encourage all interested candidates to attend and take advantage of this valuable opportunity.

Principal

Principal
Sir C.R.Reddy College for Women
ELURU

Course Structure

- Life Sciences subjects are related to the study of various life processes in plants, animals, and other living organisms.

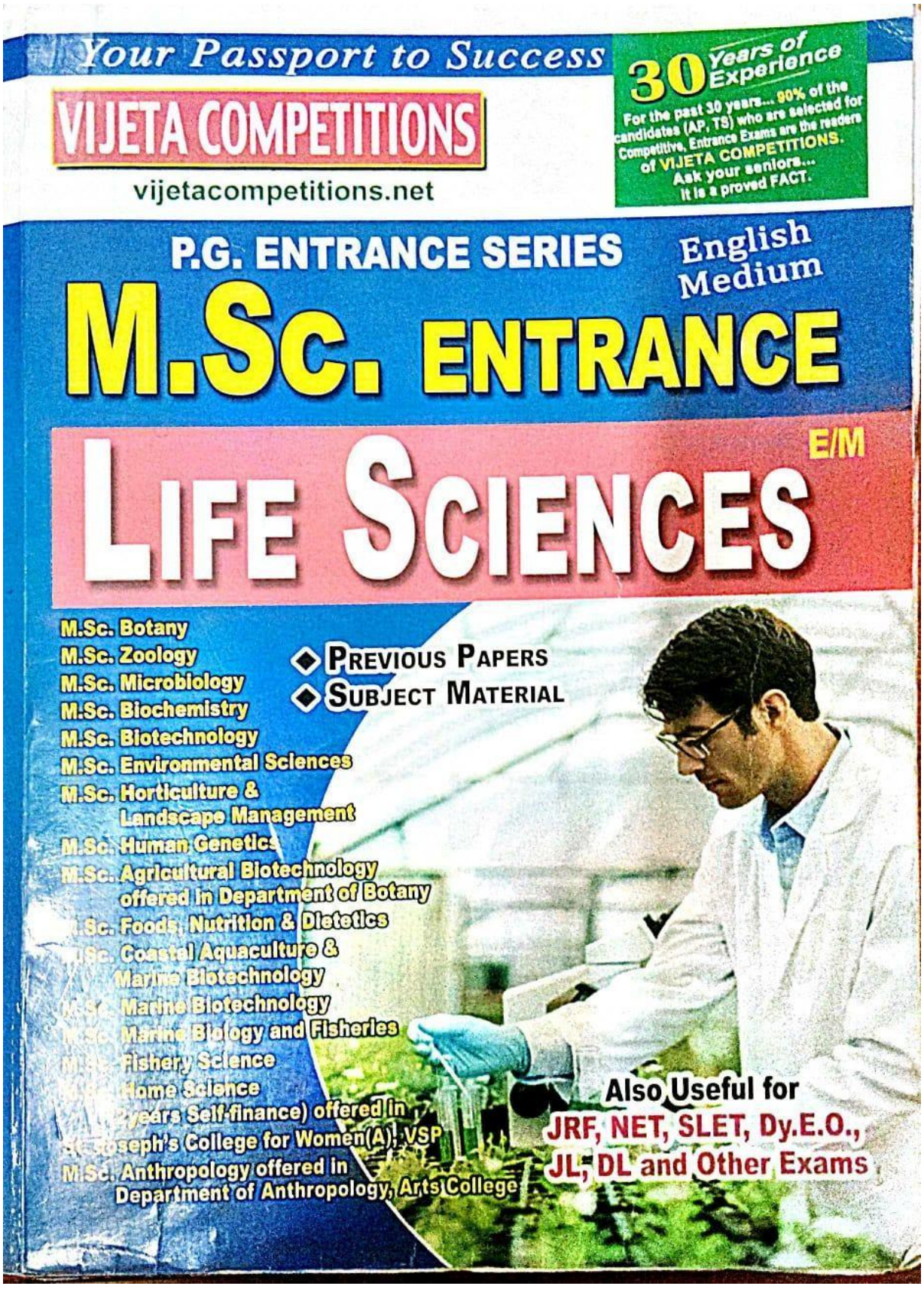
- The syllabus for MSc Zoology includes topics on Animal Physiology, Immunology, Genetics and Evolution, Animal Diversity, Animal Ecology and Reproductive Biology.
- M Sc Zoology subjects include Animal Behaviour, Parasitology, Mammalogy, Comparative Anatomy, Endocrinology and Marine Biology.
- Some of the key areas that make up the life sciences include:

Biology, the study of living organisms, the study of the structure and function of living organisms.

Genetics, the study of genes, heredity, and the passing of traits.

- Plant Biology, Biochemistry, Food Science, Biotechnology, Bioinformatics, Agricultural Science, Molecular Biology, Botany, Zoology, and Chemistry are the primary MSc Life Science subjects covered in this course.

- The life sciences are broken down into many fields, such as botany, zoology, marine biology, and virology. The study of the life sciences includes cell biology, genetics, molecular biology, botany, microbiology, zoology, evolution, ecology, and physiology.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M.Sc. Agricultural Biotechnology offered in Department of Botany
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◆ PREVIOUS PAPERS
◆ SUBJECT MATERIAL
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JRF, NET, SLET, Dy.E.O.,
JL, DL and Other Exams

SYLLABUS

Max. Marks: 100

1. **Cell Biology:** Ultrastructure of prokaryotic and eukaryotic cell, Structure and function of cell organelles. Cell division - Mitosis and Meiosis. Chromosomes structure, Karyotyping.
2. **Genetics:** Mendelian principles, Gene Interaction, Linkage and Crossing over, Sex determination, Sex linkage, Mutations - Genic and chromosomal (Structural and numerical); Chromosomal aberrations in humans. Recombination in prokaryotes transformation, conjugation, transduction, sexduction. Extra genomic inheritance.
3. **Molecular Biology and Genetic Engineering:** Structure of eukaryotic gene, DNA and RNA structure, DNA replication in pro and eukaryotes, Transcription and translation in pro and eukaryotes, genetic code. Regulation of gene expression in prokaryotes, Principles of recombinant DNA technology. DNA vectors, Transgenesis. Applications of genetic engineering.
4. **Biotechnology:** Plant and animal cell culture, cloning, Fermentors types and process, Biopesticides, Biofertilizers, Bioremediation, Renewable and non - renewable energy resources, Non-conventional fuels.
5. **Biomolecules:** Carbohydrates, proteins, amino acids, lipids, vitamins and porphyrins.Enzymes - classification and mode of action, enzyme assay, enzyme units, enzyme inhibition, enzyme kinetics, Factors regulating enzyme action.
6. **Immunology:** Types of immunity, cells and organelles of immune system, Antigen – antibody reaction. Immunotechniques, Hypersensitivity, Vaccines.
7. **Techniques:** Microscopy - Light and Electron, Centrifugation, Chromatography, Eletrophoresis, Colorimetric and Spectrophotometric techniques, Blotting techniques, PCR, DNA finger printing.
8. **Ecology, Environment and Evolution:** Theories and evidences of organic evolution, Hardy – Weinberg law. Components of an ecosystem, Ecological pyramids, Biogeochemical cycles, Ecological adaptations. Climatic and edaphic and biotic factors. Ecological sucession - Hydrosere and xerosere, Natural resources, Biodiversity, current environmental issues, Environmental pollution, Global warming and climate change.
9. **Physiology:** Structure and function of liver, kidney and heart, composition of blood, blood types, blood coagulation, Digestion and absorption, Endocrinology, Muscle and Nervous system.
10. **Metabolism:** Metabolism of carbohydrates, lipids, proteins, aminoacids and nucleic acids. Biological oxidation and bioenergetics.
11. **Animal Science:** Biology of invertebrates and chordates, Embryology of chordates, Classification of marine environment - Physical and chemical parameters, Marine, estuarine, reservoir and riverine fisheries, Cultivation of fin and shell fish. Culture practices.
12. **Plant Science:** Classification of cryptogams and phanerogams. General characteristics of taxonomic groups at class and family level Water relations and mineral nutrition of plants, Plant growth regulators, Ethnobotany and medicinal plants, Biology of plant seed, Photosynthesis.
13. **Microbiology:** Microbes - Types, distribution and biology. Isolation and cultivation of bacteria and virus. Staining techniques. Bacterial growth curve, Microbial diseases - food and water borne, insect borne, contact diseases in humans. Microbial diseases in plants - by bacteria, fungi and virus, Plant microbe - interactions.
14. **Nutrition:** Biological value of proteins, protein malnutrition, disorders, Chemistry and physiological role of vitamins and minerals in living systems.

AUCET
(LIFE SCIENCES)

PREVIOUS PAPER 2019

1. **In mitochondria cytochromes are situated in**
   1. Matrix 2. Outer membrane
   3. Inner membrane 4. None of the above
2. **What is the organelle that eliminates harmful drugs from body?**
   1. Smooth Endoplasmic Reticulum
   2. Rough Endoplasmic Reticulum
   3. Lysosomes
   4. Mitochondria
3. **A chromosome is made up of DNA and ____**
   1. Lipids 2. Proteins
   c. Genes 4. Sugars
4. **At which phase of cell cycle DNA replication in occurred?**
   1. G_0 phase 2. G_1 phase
   3. S phase 4. G_2 phase
5. **Which of the following stages in considered to be the longest phase in mitosis?**
   1. Prophase 2. Metaphase
   3. Anaphase 4. Telophase
6. **Chromatin is made up of**
   1. DNA 2. Proteins
   3. DNA and Proteins 4. None of the above
7. **Which of the following is correct with regard to aneuploidy?**
   1. Inversion
   2. 2n+1
   3. All aneuploids die before birth
   4. 4n state
8. **The DNA sequence TAGCGA is represented in m-RNA as**
   1. ATGCCT 2. ATCGCT
   3. AUCGCU 4. AUGCGU
9. **Which of following factors is the reason for causing cancer?**
   1. Mutations in genes
   2. Faulty DNA repair
   3. longer telomere length
   4. All of the above
10. **Cloning vectors are used for**
    1. Transfer a gene 2. Copy a gene
    3. Produce a gene 4. Remove a gene
11. **Hairy roots are produced by using of**
    1. Agrobacterium trumefaciense
    2. Agrobacteriuuna rhizogenes
    3. Agrobacterium vitis
    4. Agrobacterium rubi
12. **The synthesis of DNA in E.coli is by**
    1. DNA polymerase-I 2. RNA polymerase-I
    3. DNA ligase 4. DNA polymerase-III
13. **What is the first transgenic plant?**
    1. Rice 2. Maize 3. Cotton 4. Tobacco
14. **Which of the following vector has highest capacity?**
    1. Cosmid
    2. Yeast Artificial Chromosome
    3. Yeast. integrative vector
    4. Bacteriophage vector
15. **How the amino acids are jointed with each other?**
    1. Hydrogen bond 2. Ionic bond
    3. Peptide bond 4. Carbon bond
16. **Predominant antibody in serum is**
    1. IgG 2. IgD 3. IgE 4. IgA
17. **Which one of the following organelle does not has ribosome?**
    1. Cytoplasm 2. Nucleus
    3. Mitochondria 4. Chloroplast
18. **pH of lysosome has ____ nature.**
    1. Neutral 2. Acidic
    3. Basic 4. None of the above
19. **Which one of the following vitamins contains Cobalt?**
    1. Vitamin A 2. Vitamin C
    3. Vitamin B_{12} 4. Vitamin K
20. **What is the main function of enzymes?**
    1. Increase the rate of chemical reaction.
    2. They are always stored in active form.
    3. They are consumed chemical reactions.
    4. The raise the activation energy.
21. **If the free energy change ΔG in a reaction is a negative value, it indicates that the**
    1. Reaction releases energy
    2. Reaction absorbs energy
    3. Reaction is negative
    4. Reaction is positive
22. **IgE makes a bond with**
    1. Dendritic cells 2. Macrophages
    3. B-Cells 4. Mast cells
23. **The antibodies are**
    1. Carbohydrates 2. Proteins
    3. Lipids 4. Germs
24. **What is the first recombinant antigen vaccine approved for humans?**
    1. Hepatitis B vaccine 2. Hib vaccine
    3. DTT vaccine 4. Var vaccine

25. **PCR is used for a**
1. To diagnose genetic diseases
2. To solve crimes
3. To study gene function
4. All of the above

26. **One of the following is a bio-insecticide bacterium.**
1. Bacillus thuringiensis 2. Beauveria bassiana
3. Trichoderma viride 4. Phytophthora palmiuora

27. **Agarose is made up by the repetitive units of**
1. Agarobiose 2. Arabinose
3. Agar 4. Chitin

28. **DNA foot printing is a suitable technique for identifying which of the following?**
1. t-RNA in mixture
2. 1-RNA in mixture
3. Intrins within DNA
4. Protein binding site within DNA

29. **Which of the following is a positively charged matrix for ion exchange chromatography?**
1. CM cellulose 2. DEAE cellulose
3. Phospho cellulose 4. None of the above

30. **The hydrochloric acid in stomach converts**
1. Disaccharide to monosaccharide
2. Pepsinogen to pepsin
3. Prorenin to rennin
4. Polypeptide to peptide

31. **End products of aerobic respiration are**
1. Sugar, oxygen, energy 2. Water energy, oxygen
3. CO_2, energy, oxygen 4. CO_2, H_20, energy

32. **The component of plasma responsible for maintaining osmotic pressure of blood is**
1. Plasmin 2. Albumin
3. Fibrinogen 4. Gamma globulin

33. **Cardiac output =**
1. HR × SV 2. HR/SV
3. EDV – ESV 4. HR × BP

34. **The Urochrome gives ____ colour to the urine.**
1. Yellow 2. Orange 3. Red 4. Blue

35. **Most re-absorption of salts and water occurs in**
1. Proximal convoluted tubule
2. Loop of Henley
3. Collecting tubule
4. Distal convoluted tubule

36. **Which of the following is not an amino acid derivative?**
1. Epinephrine 2. Melatonin
3. Thyroxine 4. Luteinizing hormone

37. **What is the relationship between respiration and photosynthesis?**
1. Reciprocal relationship
2. Reverse relationship
3. Same relationship
4. No relationship

38. **'Sandal spike' disease is caused by**
1. Fungi 2. Mycoplasma
3. Bacteria 4. Virus

39. **Dimorphic chloroplasts are present in**
1. Zea mays 2. Arachis hypogaea
3. Algae 4. Cyanobacterium

40. **What is the amino acid that acts as precursor for it Auxin biosynthesis?**
1. Tyrosine 2. Tryptophan
3. Thiamine 4. Phynyl alanine

41. **Cytokinins are chemically**
1. Purines 2. Pyrimidines
3. Nitrogenous bases 4. Poly nucleotides

42. **Non flowering plants are called as**
1. Phanerogams 2. Cryptogams
3. Gymnosperms 4. Angiosperms

43. **Last stage of plant succession is**
1. Climax community 2. Seral community
3. Competitive exclusion 4. Ecotype

44. **Ozone layer is present in**
1. Troposphere 2. Stratosphere
3. Mesosphere 4. Ionosphere

45. **Which of the following is not a green house gas?**
1. CO_2 2. CH_4 3. C_2H_6 4. N_2O

46. **Most biodiversity hotspots are situated in ____**
1. Temperate zones 2. Tropical forests
3. Wet lands 4. Mountains

47. **Marasmus disease is caused due to the deficiency of**
1. Protein-energy malnutrition
2. Carbohydrate deficiency
3. Fat deficiency
4. Protein deficiency

48. **The pathogen which causes throat infections is**
1. Corynebacterium diphtheriae
2. Streptococcus pneumoniae
3. Streptococcus aureus
4. Salmonella typhi

49. **Leaf blight disease in rice is caused by**
1. Virus 2. Bacteria 3. Prion 4. Fungi

50. **Gastric ulcers are caused by**
1. Helicobacter Pylori 2. Pseudomonas
3. Mycobacteriui 4. Lactobacillus

51. **Micro consumers are popularly known as**
1. Primary consumer 2. Secondary consumer
3. Tertiary consumer 4. Decomposers

52. **Who proposed energy flow diagram of root spring?**
1. H.T.Odum 2. Teal H.T.
3. A.G.Tansley 4. E.P.Odum. A.G.

CHROMOSOME STRUCTURE & FUNCTION

Chromosomes are the rod-shaped, dark-stained bodies as seen during metaphase stage of mitosis when the cells are stained with a suitable basic dye and viewed under a light microscope. Chromosomes were first described by **Strausberger** in 1875. The term 'chromosome', however, was first used by **Waldeyer** in 1888. They were given the name **chromosome** (chroma = colour + soma = body) due to their marked affinity for basic dyses. As a consequence of this, they are stained rather deeply, while the remaining cytoplasm remains relatively unstained.

Chromosomes are clearly visible as distinct bodies during the stages of cell division only. Their number can be counted with relative ease only during mitotic metaphase. The interphase nucleus, on the other hand, does not exhibit any structure resembling chromosomes under the light microscope. Studies by Boveri in 1890 and subsequently by other workers clearly established that the integrity of metaphase chromosomes is maintained through the interphase.

Chromosomes are composed of thin chromatin threads called ***chromatin fibers***. These fibers undergo folding, coiling and supercoiling during prophase so that the chromosomes become progressively thicker and smaller.

CHROMOSOME NUMBER

Each species has a definite and, generally, a constant chromosome number. **Somatic chromosome number** is the number or chromosomes found in somatic, more specifically meristematic, tissues of a species and is represented by 2n. Ordinarily, somatic cells contain two copies of each chromosome. The two copies of a chromosome are ordinarily identical in morphology, gene content and gene order; they are known as **homologous chromosomes.**

Gametic chromosome number is precisely one half of the somatic number and is represented by n. It denotes the number of chromosomes found in the gametes of a species.

CHROMOSOME SIZE

In contrast to other cell organelles, the size of chromosomes shows a remarkable variation depending upon the stage of cell division. Chromosomes are the longest and the thinnest during interphase, so that they are not even visible under light microscope. With the onset of prophase, there is a progressive decrease in their length accompanied with an increase in thickness (diameter). Chromosomes are the smallest during anaphase. But chromosomes are the most easily observed and studied during mitotic metaphase when they are very thick, quite short and well spread in the cell. Therefore, chromosome measurements are generally taken during mitotic metaphase.

The size of mitotic metaphase chromosomes of animal and plant species generally varies between 0.5 μ and 25 μ in length, and between 0.2 μ and 3.0 μ in diameter. The longest metaphase chromosomes are found in Trillium; the longest chromosome is 22 μ.

CHROMOSOME MORPHOLOGY

Chromosome appearance (morphology) changes with the stage of cell division. Mitotic metaphase chromosomes are the most suitable for studies on chromosome morphology. In such chromosomes, the following structural features (except chromomere) are seen under the light microscope. (1) chromatid, (2) centromere, (3) telomere, (4) secondary constriction and satellite, and (5) chromomere.

CHROMATID

Each metaphase chromosome appears to be longitudinally divided into two identical parts each of which is known as chromatid. The two chromatids of a chromosome appear to be 'joined' of 'fused' (in fact, they are only 'held together' rather closely) together at a point called **centromere**. The two chromatids of a chromosome separate from each other during mitotic anaphase (and during anaphase II of meiosis) and move to the opposite poles. As a consequence, each chromosome is represented by a single chromatid during telophase.

The DNA of each telophase chromosome (composed of a single chromatid) replicates during the synthesis (S) phase of interphase. This produces an identical copy of the chromatid so that during prophase and metaphase each chromosome is made up of two chromatids. Since the two chromatids making up a prophase chromosome are produced through replication of a single chromatid, they are referred to as **sister chromatids**. In contrast, the chromatids of homologous chromosomes are referred to as **nonsister chromatids**.

It is almost universally accepted that **chromatid is the structural and functional unit of chromosomes and that it is not further subdivisible into smaller subunits without adversely affecting its structural integrity and functional capability**.

CENTROMERE

The region where two sister chromatids of a chromosome appear to be 'joined' or 'held together' during mitotic metaphase is known as **centromere**. Under light microscope, centromere generally appears as a constriction (a narrowed region) in the chromosome. There fore, it is also termed as **primary constriction**. But sometimes, centromeric regions do not take up any stain and they appear as gaps in the chromosome.

During cell division, spindle fibers (more particularly, chromosomal fibers attach to centromeres. As a result, centromeres are the first parts of chromosomes to be seen

moving towards the opposite poles during anaphase. The remaining regions of chromosomes lag behind and appear as if they were being pulled by the centromere. Therefore, it appears as if the anaphase chromosome movement is due to the centromeres of chromosomes, hence they are also known as **kinetochores**.

In most species, each chromosome has a single centromere in a fixed position, which does not change except due to structural chromosome aberrations. Therefore, the position of centromere serves as an important landmark in the identification of different chromosomes of a species. Chromosomes are divided into two transverse parts by their centromeres; these parts are called **arms**. In most cases, one arm of a chromosome is longer than the other, hence they are termed as **long arm** and **short arm**, respectively. Chromosomes may be divided into the following four classes on the basis of the position of their centromeres: 1. Metacentric, 2. Submetacentric, 3. Acrocentric and 4. Telocentric

METACENTRIC CHROMOSOMES

In such chromosomes, centromere is located in the centre of chromosomes, i.e., the centromere is **median**. The two arms of such chromosome are equal, and the arm ratio is 1 : 1. Metacentric chromosomes appear as 'V' - shaped during anaphase

SUBMETACENTRIC CHROMOSOMES

When the centromere is located on one side of the central point of chromosome, i.e., the centromere is submedian, such chromosomes are known **submetacentric.** Such chromosomes appear either as 'V' or 'J' during anaphase, depending on how close or far-removed their centrosmeres are from their central points.

ACROCENTRIC CHROMOSOMES

Centromeres located close to one end of chromosomes are known as subterminal, and the chromosomes having them are called **subtelocentric** or **acrocentric**. Acrocentric chromosomes may appear either as 'j' or 'rod-shaped' during anaphase depending on the closeness of their centromeres to the telomere.

TELOCENTRIC CHROMOSOMES

Centromeres located at one end of the chromosome (i.e., in the position normally occupied by one of the telomeres) are called **terminal**, and the chromosomes having them are known as **telocentric chromosomes**. The telocentric chromosomes always appear 'rod-shaped' during anaphase. Generally, telocentric chromosomes are unstable. Most naturally occuring telocentic chromosomes are believed to be, ill reality, acrocentric. Telocentric chromosomes are believed to originate by a transverse division **(mis-division)** of centromere.

As stated earlier, in most species each chromosome has a single centromere; such chromosomes are termed as **monocentric**. But in some species, each chromosome has more than one centromere; such chromosomes are called **polycelltric**. Polycentric chromosomes are found in Luzula, in generative tissues of Ascaris megalocephala univalens and in Thyanta. In each of the above cases, the centromeric property is confined to one or more definite points of the chromosomes so that such centromeres are referred to as **localized**. However, in many insects, e.g. most homopteran and hemipteran insects, the centromeric activity is nonlocalized and spread over the entire chromosome length; such centromeres are known as **diffuse** or **celltromeres**.

The structure of centromere shows considerable variation under light microscope. Lima-de-Faria proposed three models of centromere structure on the basis of extensive studies of chromosomes during meiosis. According to these models, centromeres are made up of either thin fibrils almost invisible under the light microscope or of four or five kinetochore granules in addition to the thin fibrils.

Under scanning electron microscope, centromere appears as a relatively much thinner region than the rest of the chromosomes. Further, the two sister chromatids are only 'held together' in the centromeric region due to adhesion; they are often separated in the centromeric region as well. Centromeres appear to be composed of the same 300 A° chromatin fibers, which are the unit of chromosome organisation, and no kinetochore granules are visible.

In thin sections of chromosomes, the ultrastructure of centromere reveals relatively more densely packed 300 A° chromatin fibers and two spindle attachment granules one in each of the two sister chromatids. The centromeric granules are dense bodies to which spindle fibers attach during cell division.

Centromeres contain highly repetitive DNA called **satellite-DNA** or **sat-DNA**. This class of DNA usually forms one or more minor bands distinct from the rest of the chromosomal DNA under cesium chloride density gradient ultracentrifugation. In most cases, centromeric region is almost the last segment of chromosomes to replicate during late S phase.

In case of yeast, a sequence of 120 bp is concerned with the centromeric function; this is called CEN **sequence**. CEN sequence has the following 3 elements : a 9 bp left boundary CDE-I element, an 11 bp right boundary CDE - III element and a central CDE-ll element of 8 - 90 bp, which is > 90% A + T and is critical for centromere function.

TELOMERE

The two ends of a chromosome are known as **telomeres**. They are highly stable and telomeres of different chromosomes do not fuse or unite. But when telomers are damaged or removed due to chromosome breakage, the damaged chromosome ends are highly unstable; such ends readily fuse or unite with broken ends of other chromosomes. It is generally accepted that the structural integrity and individuality of chromosomes is maintained due to telomeres.

At the level of chromosome morphology, telomeres are only conceptual entities in that they do not represent any distinct structural feature that can be seen under either light or electron microscope. Electron micrographs of telometers of metaphase chromosomes reveal that they are made up of loops of the typical 300 A° chromatin fibers. In the interphase nucleus, each chromosome is attached with the nuclear envelope at the periphery of an annulus by one of its telomeres. It may be pointed out that during interphase chromosomes are fully uncoiled and extended, and are represented by chromatin fibers of about 300 A° diameter.

At the molecular level, telomeric region of the chromosome is made up of a repeating sequence, which is 3'TTGGGG5' is Tetrahymena, 3'TTTAGGG5'in Arabidopsis and 3TTAGGG5' in man. In Arabidopsis, 350 tandem repeats of this subunit occur in one telomere. In tetrahymena the telomeric region is extended by the enzyme telomerase following chromosome replication; this compensates for the reduction in telomere length that necessarily occurs at every cell division. The terminal portion of the telomeric region is postulated to be single-stranded. It has been suggested that the single-stranded region folds back on itself to form a hairpin loop in which the opposite G residues base-pair.

SECONDARY CONSTRICTION

In some chromosomes, a second constriction, in addition to that due to centromere (the primary constrtction), is also present; this additional constriction is known as **secondary constriction**. Secondary constrictions may appear as constrictions or as gaps in chromosomes. But sometimes they may not be observable at all. Generally, secondary constrictions are located in the short arm of chromosomes near one end, but in many chromosomes they are located in the long arm and/or nearer to the centromere than to the telomere.

The chromosome region lying between the secondary constriction and the nearest telomere is known as **satellite**. Therefore, chromosomes having secondary constrictions are called **satellite chromosomes** or **sat-chromosomes**. [It may be pointed out that this satellite is not related to the sat-DNA]

The position of secondary constriction in a **sat-chromosome** is fixed and remains constant. In some species, somatic cells contain two (and gametes have one) sat-chromosomes, in some others four sat-chromosomes are found (e.g., Vicia hajastana;), while in some others six or more such chromosomes are present (e.g., human somatic cells have 10 sat-chromosomes).

Nucleolus is always associated with the secondary constrictions of sat chromosomes. Therefore, secondary constrictions are also called **nucleolus organiser regions** (NOR) and sat-chromosomes are often referred to as nucleous organiser chromosomes (NOC). NOR of each sat-chromosome contains several hundred copies of the gene coding for ribosomal (rRNA).

CHROMOMERE

In some species, e.g., maize, amphibia etc., chromosomes during the first prophase of meiosis (more particularly, during pachytene), show small bead-like structures called **chromomeres**. The distribution of chromomeres in a chromosome is highly characteristic and constant, the pattern of distribution being different ..... different chromosomes. Homologous chromosomes always show an identical pattern of chromomere distribution. Chromomeres are most clearly visible in the dipteran giant salivary gland chromosomes as dark staining bands.

KARYOTYPE

The general morphology (i.e., the size of chromosomes, the position of centromeres, the presence of secondary constrictions and the size of satellite bodies) of the somatic chromosome complement of an individual constitutes its **karyotype**. Ordinarily, karyotypes are presented by arranging the chromosomes of somatic complement in the descending order of size keeping their centromeres in a straight line. Thus the longest chromosome is placed on the extreme left and the smallest one on the extreme right. The sex chromosomes usually are placed in their appropriate positions according to their size, and are marked as X and Y.

IDIOTYPE

The karyotype of a species may be represented diagrammatically (in contrast to the actual photographs of chromosomes in karyotype) showing all the morphological features of the chromosomes; such a diagram is known as **idiotype.** Ordinarily, idiotypes are prepared for the haploid chromosome complement of a species. An idiotype gives the same amount of information as does karyotype.

HETEROCHROMATIN AND EUCHROMATIN

The material of which chromosomes are composed is called **chromatin**. Chromatin has been classified into the following two groups: (l) heterochromatin and (2) euchromatin. This was mainly based on the stainability of chromatin with basic dyes during the various stages of cell cycle.

1. **Euchromatin.** It takes up little stain during interphase, stains only lightly during prophase, but is deeply stained during metaphase.
2. **Heterochromatin:** It takes up deep stain during interphase and prophase while during metaphase it is stained lightly.

The distribution of heterochromatin in chromosomes has been extensively investigated by analysing early and mid-prophase chromosomes. During these stages, there are three deeply staining structures in chromosomes: (i) chromomeres (ii) centromeric regions and (iii) knobs. **Chromomeres** may not represent true heterochromatin. Centromeric regions invariably contain heterochromatin. Knobs are spherical structures, usually several times the diameter of the concerned chromosomes. They are present

2 GENETICS

CLASSICAL GENETICS (Mendel's Approach)

It has been recognised since prehistoric days that progeny of human beings look like human beings, while those of animals like dog and cat are similar to dog and cat respectively. These observations are expressed as widely quoted proverbs, such as, like begets like'. When a child is borne, people look for its resemblance with the parents and close blood relatives. This implies that the development of characters of a baby is somehow related to those of its parents, or of others in its immediate ancestry. Questions relating to the nature and the basis for this relationship have occupied the thoughts of man for centuries. But systematic attmepts to seek answers of these questions began only in the eighteenth century when several scientists began studies on plant hybridization. These studies laid the foundation for the investigations of **Gregor J. Mendel** (1822-1884). They still remain the most brilliant and the most conclusive experiments in genetic analysis supporting the Laws of Mendel.

CONCLUSIONS OF THE SCIENTISTS BEFORE MENDEL

A number of scientists had worked on plant hybridization during 18th and 19th centuries prior to Mendel. Some of the more notable scientists are Joseph Koelreuter, John Goss, Sargeret, Gaertner, Darwin, Herbert, Lecoq, Vichura and Naudin. **Koelreuter** conducted extensive studies on hybridization in tobacco between 1760 and 1766. He noted uniformity and heterosis in F_1 (first filial generation ; filial progeny) and appearance of increased variation in F_2.

Gaertner (1722-1850), **Naudin** (1815-1909), **Darwin** (1809-1882) and others confirmed the observations and conclusions of Koelreuter. Gaertner used a backcross programme to convert one species into another. Essentially, he transferred the nucleus of one species into the cytoplasm of another species.

The following important conclusions were available to Mendel from the studies of his predecessors.

1. In F_1 hybrids, some characters are identical to those of one of the two parents, some others are similar to those of the other parent, while some others are intermediate between those of the two parents.
2. Characters of F_1 and F_2 progeny produced by reciprocal crosses are identical. This observation clearly demonstrates that the contributions of male and female parents to the characters of progeny are equal.
3. F_1 progeny from a single cross are uniform in their characters. That is all the plants in F_1 from a cross are similar to each other. But F_2 generation shows a large variation for different characteristics.
4. In F_2 generation, some plants have characters similar to one parent, which some others are similar to the other parent in their appearance. The appearance of parental forms in F_2 was called **reversion.** But a majority of the plants were intermediate in appearance between the two parents.
5. Some plants in F_2 have entirely new character forms.

REASONS FOR FAILURE OF MENDEL'S PREDECESSORS

In his 1865 paper, Mendel presented a brilliant analysis of the deficiencies in the experimental approaches of his predecessors. These are summarised below.

1. These **scientists studied the plant as a whole**, i.e., its total appearance consisting of a large number of characters.
2. Therefore, the **plants could not be classified into few clear-cut classes**. These workers did not attempt an exhaustive classification of the difference form of the characters present in the progeny.
3. The scientists were more concerned with the description of various form appearing in the progeny. An attempt to determine the frequencies of different character forms in the progeny was not made.
4. In many cases, the data from different generations were not kept accurate and separately.
5. In many cases, a complete control on pollination in the F_1 was lacking.
6. In many studies, the F_1 was an interspecific hybrid exhibiting paratial to considerable sterility.
7. The number of plants studied in F_2 was relatively small.
8. In addition, most of the characters studied by the earlier workers were quantitative in nature.

GREGOR JOHANN MENDEL

Mendel was born in 1822 near Brunn in Austria, now Brno in Czechoslovakia, in the family of a poor farmer.

After completing his studies, he returned to Brunn in 1854 where he was appointed as a substitute science teacher. His performance as a teacher was excellent. In addition, he worked as a priest in the local church. He lived in a house located within the premises of the church. He began to collect pea seeds for his experiments in 1857 from commercial seed growers all over the Europe. He conducted all his experiments within the kitchen garden of his house with the help of his own resources. He carried out seven years of painstaking, sincere, devoted and exhaustive experimentation. He presented his findings before the Natural History Society of Brunn at two of its meetings of February 8 and March 8, 1865. This paper, entitled 'Experiments in Plant Hybridization' was presented in German language. It was published in the annual proceedings of the Society in 1866. This volume of the proceedings was distributed to many libraries of Europe and North America.

Gregor Mendel died in 1884 at an age 62 years. In 1900, sixteen years after Mendel's death, three scientists, namely **De vries** in Holland, **Correns** in Germany and **Tschermak** in Austria, arrived at the same conclusions as those of Mendel. These three scientists, working independently, discovered the paper by Mendel. After this rediscovery, there was a spurt of interest in the Mendel's findings. The science of Genetics was thus truly borne.

SELECTION OF PEA AS AN EXPERIMENTAL MATERIAL

The choice of pea for hybridization by Mendel was based on a deep understanding of the problems of such studies. Pea offered the following advantages as an experimental material.

1. In the available varieties, several characters had two contrasting forms which were easily distinguishable from each other. The permitted an easy classification of F_2 and F_3 progeny from various crosses into clear-cut classes.
2. The flower structure of pea ensures self-pollination. This was experimentally verified by Mendel.
3. Pea flowers are relatively large. Therefore, emasculation and pollination pea flowers is quite easy.
4. The duration of pea crop is of a single season. As a result, every year of generation of pea can be grown.
5. Pea seeds are large and present no problem in germination. Pea plants are relatively easy to grow and each plant occupies only a small space.

REASONS FOR MENDEL'S SUCCESS

The following factors together account for Mendel's success.

1. **The most important factor was his ability for an accurate and clear analysis of the reasons for failure of earlier workers.**
2. At first, Mendel studied the inheritance of only pair of control characters at a time. Only after he formulated the law government inheritance of pairs of contrasting characters, he tried to study inheritance of two and three character pairs.
3. Mendel selected pea varieties that had clearly ent forms of one or more characters. The differ between the two forms of a pair of contrasting ters was so large and clear-cut that the individua a population could be easily and accurately class as having one or the other contrasting character.
4. Mendel classified all the plants of a populations on basis of the contrasting characters under study kept an accurate record of the numbers of plants seeds) in each category for every generation.
5. Mendel carried out his experiments with great and elaborateness.
6. His knowledge of mathematics was a definite asset the interpretation of his findings.
7. Mendel was able to formulate appropriate hypothe on the basis of the explanation he offered for experimental findings. Further, he proceeded to these hypotheses experimentally to prove the correctness of his explanations.

But in the final analysis, Mendel was undoubtedly lucky. (1) The seven characters selected by Mendel showed qualitative inheritance. Not a single trait was inherited quantitatively. (2) The contrasting forms of each of the seven characters were governed by a single gene. (3) Further, in each case one form was completely dominant over the other. (4) Of the seven characters studied by Mendel, the genes for two were located in one chromosome, while three others were present in another chromosome. But out of these, only two where close enough to distort the dihybrid ratio of 9 : 3 : 3 : 1. Luckily, Mendel did not study this character pair.

LAWS OF MENDEL

From his studies in pea, Mendel proposed the two basic laws of genetics; (1) law of segregation and (2) law of indepe ndent assortment (chapter 9). These laws provided the foun dation on which the science of genetics has developed. The law of segregation is universally applicable, but the law of independent assortment does not apply to linked genes.

Mendel also explained the phenomenon of **Dominance**. But dominance is not regarded as a law.

LAW OF SEGREGATION

According to this law, *the two alleles of a gene remain separate and do not contaminate each other in the F₁ hybrid*. At the time of gamete formation in F_1, the two alleles separate and pass into different gametes.

Thus each somatic cell of an individual has two copies (or alleles) of a gene. But each gamete has only a single copy (or allele) of any gene. As a result, a somatic cell may be either pure (containing two identical copies of a gene, e.g., AA) or hybrid (containing two dissimilar copies of a gene, e.g., Aa) for a gene. But, of neccessity, the gametes are always pure for every gene since they have only one copy of each gene (either A or a). Therefore, the term **'law of purity of gametes'** sometimes used to describe the law of segregation.

SIR C R REDDY COLLEGE FOR WOMEN ,ELURU

CAREER GUIDANCE AND PLACEMENT CELL

AUCET COACHING

STUDENTS ATTENDENCE LIST (2019- 2020)

Sl	Roll no	Name of the student	Group	Signature of the student
1	174002	BODIGADLA KRANTHI	III BSC CBZ	B. Kranthi
2	174006	GUDURI PADMINI	III BSC CBZ	G. Padmini
3	174004	CHUNDURU RAMYA	III BSC CBZ	Ch. Ramya
4	174042	RASA MOUNIKA	III BSC CBZ	R. Mounika
5	174007	KANKIPATI SANTHI	III BSC CBZ	K. SANTHI
6	174010	KURAKULA DURGA BHAVANI	III BSC CBZ	K. Durga bhavani
7	174014	NEERUKONDA SAI DEEPIKA	III BSC CBZ	N. S. Deepika
8	174014	NAGAMALLI SANDHYA	III BSC CBZ	N. Sandhya
9	17403	CHAVATAPALLI GEETHA	III BSC CBZ	Ch. Geetha
10	174019	UPPALAPATI LAKSHMI	III BSC CBZ	U. Lakshmi
11	174020	YALAMANCHILI NAMRATHA	III BSC CBZ	Y. Namratha
12	174021	ALLURI PAVANNANDESWARI	III BSC CBZ	A. Pavannandeswari
13	174017	PIPPARA RANI	III BSC CBZ	P. Rani
14	174032	KORIPALLI GEETHA MADHURI	III BSC CBZ	K G. Madhuri
15	174018	SRIPADA DURGA KAMAKSHI KAVYA	III BSC CBZ	S.P K Kavya
16	174038	MOHAMMAD NASEEMA	III BSC CBZ	MD. Naseema
17	174039	MUVVALA BINDHU	III BSC CBZ	M. Bindhu
18	174043	SARIHADDU PRASANNA KUMARI	III BSC CBZ	S. P. Kumari
19	174008	KEDASI BHARATHI	III BSC CBZ	K. Bharathi
20	174015	NIJAPARAPU PRIYANKA	III BSC CBZ	N. Priyanka
21	174051	VANAPALLI NAGASAI KIRANMAI	III BSC CBZ	V. Naga Sai Kiranmai
22	174055	SUDHEERA MATTA	III BSC CBZ	S. Matta
23	174029	GUJJULA SANDHYA RANI	III BSC CBZ	G. Sandhya rani

24	174032	K.GEETHA MADHURI	III BSC CBZ	K. Geetha madhuri
25	174036	MADICHARLA MOUNIKA	III BSC CBZ	M. Mounika.
26	174024	CHAVATAPALLI GEETHA	III BSC CBZ	Ch. Geetha
27	174025	CHENNUBOYINA YASODA	III BSC CBZ	C. Yasoda
28	174047	TALLIBOINA CHAMUNDESWARI	III BSC CBZ	T. Chamundeswari
29	174027	GERA JERUSHA	III BSC CBZ	G. Jerusha
30	174028	ISETTI AKHILA BHUVANESWARI	III BSC CBZ	I. Akhila Bhuvan
31	174029	GUJJULA SANDHYA RANI	III BSC CBZ	G. Sandhya Rani
32	174030	S.DIVYA NAYANA BHARGAVI	III BSC CBZ	S.D.N Bhargavi
33	174031	JAMMISETTI MARY SOWJANYA	III BSC CBZ	J. Mary Sowjanya
34	174032	KORIPALLI GEETHA MADHURI	III BSC CBZ	K. Geethamadhuri

Students Attendance Register

SIR C R REDDY COLLEGE FOR WOMEN , ELURU

CAREER GUIDANCE & PLACEMENT CELL

NANNAYA SET COACHING 2019-2020

SUB: LIFE SCIENCES (BOTANY, ZOOLOGY)

S.NO	ROLL.NO	CLASS	NAME OF THE STUDENT
1	174002	III CBZ	BODIGADLA KRANTHI
2	174006	III CBZ	GUDURI PADMINI
3	174004	III CBZ	CHUNDURU RAMYA
4	174042	III CBZ	RASA MOUNIKA
5	174007	III CBZ	KANKIPATI SANTHI
6	174010	III CBZ	KURAKULA DURGA
7	174014	III CBZ	NEERUKONDA SAI
8	174014	III CBZ	NAGAMALLI SANDHYA
9	17403	III CBZ	CHAVATAPALLI GEETHA
10	174019	III CBZ	UPPALAPATI LAKSHMI
11	174020	III CBZ	YALAMANCHILI
12	174021	III CBZ	ALLURI PAVANNANDESWARI
13	174017	III CBZ	PIPPARA RANI
14	174032	III CBZ	KORIPALLI GEETHA
15	174018	III CBZ	SRIPADA DURGA KAMAKSHI KAVYA

16	174038	III CBZ	MOHAMMAD NASEEMA	
17	174039	III CBZ	MUVVALA BINDHU	
18	174043	III CBZ	SARIHADDU PRASANNA	
19	174008	III CBZ	KEDASI BHARATHI	
20	174015	III CBZ	NIJAPARAPU PRIYANKA	
21	174051	III CBZ	VANAPALLI NAGASAI	
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24	174032	III CBZ	K.GEETHA MADHURI	
25	174036	III CBZ	MADICHARLA MOUNIKA	
26	174024	III CBZ	CHAVATAPALLI GEETHA	
27	174025	III CBZ	CHENNUBOYINA	
28	174047	III CBZ	TALLIBOINA CHAMUNDESWARI	
29	174027	III CBZ	GERA JERUSHA	
30	174028	III CBZ	ISETTI AKHILA	
31	174029	III CBZ	GUJJULA SANDHYA RANI	
32	174030	III CBZ	GUNJAE RANI	
33	174031	III CBZ	JAMMISETTI MARY	
34	174032	III CBZ	KORIPALLI GEETHA	

SIGNATURE

REPORT

PROGRAMME:PG Entrance COACHING FOR III B.Sc. aspirants in Life sciences subject

In association with IQAC &In accordance with the resolution made during the meeting and documented in the minutes, it was unanimously agreed to arrange PG entrance coaching classes for interested students pursuing III M.Sc Life sciences (Zoology,Botany)This significantdecision forms an integral part of the report on the PG entrance coaching classes in **Life sciences** subject conducted from 01-Aug-2020 To 30 -Aug-2020 from 9:30am to 12:30pm .These classes were conducted senior and expert faculty from the concerned department.

Approximately 34 motivated students actively participated in the coaching sessions These meticulously organized classes aimed to prepare the students comprehensively for the upcoming PG entrance examinations scheduled in the month of Oct 2020. The coaching sessions were diligently conducted from 9:30 AM to 12:30 PM, adhering to a structured curriculum meticulously designed to equip students with the essential skills and knowledge required for success in the examination.

The outcomes of these coaching classes have been highly encouraging. All the students were qualified in the exam . Students showcased exceptional performance, securing Close remarkable pg. ranks demonstrating both their commitment and the effectiveness of the coaching program. Furthermore, all participating students successfully qualified for the examination, marking a significant achievement resulting from our collaborative endeavor.

The successful arrangement of these coaching classes aligns directly with the decision made during the meeting These sessions facilitated a conducive learning environment, significantly contributing to the preparedness and success of the students preparing for the PG entrance examination.

Their dedication has been instrumental in empowering our students for academic success.

LIST OF STUDENTS QUALIFIED IN PG ENTRANCE EXAM
(2019-20)

SL NO	NAME OF THE STUDENT	GROUP
1	UPPALAPATI LAKSHMI	CBZ

DIRECTORATE OF ADMISSIONS
ACHARYA NAGARJUNA UNIVERSITY, GUNTUR
ANUPGCET - 2019 :: RANK CARD

Hall Ticket No	31010565	Reg. No	56859

Student Name : UPPALAPATI LAKSHMI
Father's Name : UPPALAPATI VENKATA RAO
DOB : 05-05-1996
Gender : Female
Category : OC

Address

DoorNo : 402-1
Street : OC COLONY
Town : G.KOTHAPALLI
City : ELURU
District : WEST GODAVARI : DISTRICT
State : ANDHRA PRADESH
Pin : 534447
Mobile : 7995676432

App. No	Test Name	MARKS	RANK
15654	101-Life Sciences	47	80

Note :

- Admission into any course in the order of respective Test Rank and subject to fulfilment of eligibility criteria as per Prospectus.
- Any correction in biodata should be brought to the notice of the Director at the time of counseling.
- This rank card should be presented at the time of counseling and certificate verification.

ANUPGCET - 2019
DIRECTOR, DOA

Photo Gallery

Coaching classes