Annual Syllabus
Session: 2022-23
Class - XII
Biology (044)

Orientation and Recapitulation: Discussion on importance of Biology, scope of Biology and other topics of interest.

Unit-VI Reproduction
Marks 16

Chapter-2: Sexual Reproduction in Flowering Plants

Flower structure; development of male and female gametophytes; pollination - types, agencies and examples; out breeding devices; pollen-pistil interaction; double fertilization; post fertilization events - development of endosperm and embryo, development of seed and formation of fruit; special modes- apomixis, parthenocarpy, polyembryony; Significance of seed dispersal and fruit formation.

Chapter-3: Human Reproduction

Male and female reproductive systems; microscopic anatomy of testis and ovary; gametogenesis -spermatogenesis and oogenesis; menstrual cycle; fertilisation, embryo development upto blastocyst formation, implantation; pregnancy and placenta formation (elementary idea); parturition (elementary idea); lactation (elementary idea).

Chapter-4: Reproductive Health

Need for reproductive health and prevention of Sexually Transmitted Diseases (STDs); birth control - need and methods, contraception and medical termination of pregnancy (MTP); amniocentesis; infertility and assisted reproductive technologies - IVF, ZIFT, GIFT (elementary idea for general awareness).

Practicals

(Practicals should be conducted alongside the concepts taught in theory classes.**)**

- Prepare a temporary mount to observe pollen germination.
- Pollen germination on stigma through a permanent slide
- Flowers adapted to pollination by different agencies (wind, insects, birds)
- Controlled pollination - emasculation, tagging and bagging
- Identification of stages of gamete development, i.e., T.S. of testis and T.S. of ovary through permanent slides (from grasshopper/mice).
- T.S. of blastula through permanent slides (Mammalian).

Unit-VII Genetics and Evolution
Marks 20

Chapter-5: Principles of Inheritance and Variation

Heredity and variation: Mendelian inheritance; deviations from Mendelism – incomplete dominance, co-dominance, multiple alleles and inheritance of blood groups, pleiotropy; elementary idea of polygenic inheritance; chromosome theory of inheritance; chromosomes and genes; Sex determination - in humans, birds and honey bee; linkage and crossing over; sex linked inheritance - haemophilia, colour blindness; Mendelian disorders in humans - thalassemia; chromosomal disorders in humans; Down's syndrome, Turner's and Klinefelter's syndromes.

Chapter-6: Molecular Basis of Inheritance

Search for genetic material and DNA as genetic material; Structure of DNA and RNA; DNA packaging; DNA replication; Central Dogma; transcription, genetic code, translation; gene 8 expression and regulation - lac operon; Genome, Human and rice genome projects; DNA fingerprinting.

Chapter-7: Evolution

Origin of life; biological evolution and evidences for biological evolution (paleontology, comparative anatomy, embryology and molecular evidences); Darwin's contribution, modern synthetic theory of evolution; mechanism of evolution - variation (mutation and recombination) and natural selection with examples, types of natural selection; Gene flow and genetic drift; Hardy - Weinberg's principle; adaptive radiation; human evolution.

Practicals

(Practicals should be conducted alongside the concepts taught in theory classes.**)**

- Meiosis in onion bud cell or grasshopper testis through permanent slides.
- Prepared pedigree charts of any one of the genetic traits such as rolling of tongue, blood groups, ear lobes, widow's peak and colour blindness.
- Mendelian inheritance using seeds of different colour/sizes of any plant (monohybrid and dihybrid ratio verification)
- Flash cards or models showing examples of homologous and analogous organs

Unit-VIII Biology and Human Welfare
Marks: 12

Chapter-8: Human Health and Diseases

Pathogens; parasites causing human diseases (malaria, dengue, chikungunya, filariasis, ascariasis, typhoid, pneumonia, common cold, amoebiasis, ring worm) and their control; Basic concepts of immunology - vaccines; cancer, HIV and AIDS; Adolescence - drug and alcohol abuse.

Chapter-10: Microbes in Human Welfare

Microbes in food processing, industrial production, sewage treatment, energy generation and microbes as bio-control agents and bio-fertilizers. Antibiotics; production and judicious use.

Practicals

(Practicals should be conducted alongside the concepts taught in theory classes.**)**

- Common disease-causing organisms like *Ascaris, Entamoeba, Plasmodium*, any fungus causing ringworm through permanent slides, models or virtual images. Comment on symptoms of diseases that they cause.

Unit-IX Biotechnology and its Applications
Marks: 12

Chapter-11: Biotechnology - Principles and Processes

Genetic Engineering (Recombinant DNA Technology).

Chapter-12: Biotechnology and its Applications

Application of biotechnology in health and agriculture: Human insulin and vaccine production, stem cell technology, gene therapy; genetically modified organisms - Bt crops; transgenic animals; biosafety issues, biopiracy and patents.

Practicals

(Practicals should be conducted alongside the concepts taught in theory classes.**)**

- Prepare a temporary mount of onion root tip to study mitosis.
- Isolate DNA from available plant material such as spinach, green pea seeds, papaya, etc.

- **Note: Completion of mid-term syllabus by 30th September 2022.**

MID-TERM EXAMINATION

Unit-X Ecology and Environment
Marks: 10

Chapter-13: Organisms and Populations

Population interactions - mutualism, competition, predation, parasitism; population attributes - growth, birth rate and death rate, age distribution. (Topics excluded: Organism and its Environment, Major Aboitic Factors, Responses to Abioitic Factors, Adaptations)

Chapter-14: Ecosystem

Ecosystems: Patterns, components; productivity and decomposition; energy flow; pyramids of number, biomass, energy
(***Topics excluded: Ecological Succession and Nutrient Cycles***)

Chapter-15: Biodiversity and its Conservation

Biodiversity-Concept, patterns, importance; loss of biodiversity; biodiversity conservation; hotspots, endangered organisms, extinction, Red Data Book, Sacred Groves, biosphere reserves, national parks, wildlife, sanctuaries and Ramsar sites.

Practicals

(Practicals should be conducted alongside the concepts taught in theory classes.**)**

- Study the plant population density by quadrat method.
- Study the plant population frequency by quadrat method.
- Models specimen showing symbiotic association in root nodules of leguminous plants, *Cuscuta* on host, lichens.

- Annual syllabus is to be completed by 15th December 2022.
- Investigatory project and its submission
- **REVISION of whole syllabus and related practicals.**

Common Pre- Board Examination

- Revision and board's practical examination.
- Board's examination 2022-23