JKBOSE Class 12 Biology Syllabus

BIOLOGY

Maximum Marks: 100

Theory: Marks 70

Practicals: Marks 30

Time: 3 hour

SECTION A (Botany)

Marks: 35

Unit-I: Reproduction in Flowering Plants

Marks:07

Asexual Reproduction: Vegetative propagation in plants, micropropagation.

Sexual Reproduction: Flower structure, Development of male & female gametophytes. Pollination: types, agencies & examples, Out breeding devices. Pollen- Pistil interaction, Double fertilization, Post fertilization events, Development of endosperm, embryo, seed and fruit. Special modes: apomixis and polyembryony, significance of seed & fruit formation.

Unit-II: Genetics

Marks 09

- Heredity and variation
- Mendelian inheritance, Deviations from Mendelism: incomplete dominance, co-dominance, Multiple alleles, Pleiotropy, Chromosomal theory of inheritance, Elementary idea of polygenic inheritance, Chromosomes & genes,
- Search for genetic material & DNA as genetic material: Structure of DNA & RNA, DNA packaging, DNA Replication (Semiconservative), Central dogma, Protein Biosynthesis: Transcription, translation, genetic code, Gene expression and regulation (lac-operon).

Unit-III: Biology and Human welfare

Marks: 07

- **Plant breeding:** Introduction, steps in plant breeding and application of plant breeding, and single cell protein, Biofortification.
- **Tissue culture:** Cellular totipotency, technique and application of tissue culture
- **Microbes in Human Welfare:** in household food processing, industrial production, sewage treatment, Production of energy (Biogas), biocontrol agent (Biopesticides) & Biofertilizers.
- Genetically Modified organism- Bt crops
- Biopiracy and patents.

Unit- IV: Ecology and Environment

Marks: 12

Meaning of ecology, environment, habitat and niche: Organisms and environment.

Population and ecological adaptations: Population Interactions-mutualism, competition, predation, parasitism. Population attributes-growth, birth rate and death rate, age distribution.

Ecosystems: Patterns, Components, energy flow, nutrient cycling (carbon and phosphorus), decomposition and productivity. Pyramids of number, biomass, energy. Ecological succession. Ecological Services: Carbon fixation, Pollination, Oxygen release.

Biodiversity and its conservation: Threats to, and need for biodiversity conservation. Hotspots, endangered organisms, extinction, Red Data Book. Biodiversity conservation-biosphere reserves, national parks and sanctuaries.

Environmental Issues: Air and water pollution and their control, solid waste management, agrochemicals and their effects, Radioactive waste management, Green house effect and global warming, Ozone depletion in stratosphere, Deforestation, Any three case studies as success stories addressing environmental issues.

SECTION B (Zoology) — 35 Marks

Unit-I : Reproduction — Marks 11

i) **Asexual Reproduction:** Uniparental, modes: binary fission, sporulation, budding, gemmule, fragmentation, regeneration.

ii) **Human Reproduction**- Male and female reproductive systems, Microscopic anatomy of testis & ovary; Gametogenesis (spermatogenesis & oogenesis. Menstrual cycle), Fertilization, embryo development upto blastocyst formation, implantation; Pregnancy and placenta formation (elementary idea), Parturition (elementary idea) and Lactation (elementary idea).

iii) **Reproductive Health:** Need for reproductive health & prevention of Sexually Transmitted Diseases (STD), Birth control- need & methods, Contraception and Medical Termination of Pregnancy (MTP), Amniocentesis, Infertility & assisted reproductive technologies: IVF, ZIFT, GIFT (Elementary idea for general awareness).

Unit–II: Genetics and Evolution — Marks 12

- Sex determination in humans, birds and honeybee.
- Inheritance pattern of Hemophilia and Color blindness in human beings.
- Mendelian Disorders in humans: Chromosomal disorders in humans, Down's syndrome, Turner's & Klinefelter's syndromes.
- Genome and Human Genome project.
- DNA fingerprinting.
- Origin of life: Theories & evidences with special reference to Darwin & Modern Synthetic theory of evolution, Hardy – Weinberg's principal. Adaptive radiation.
- Origin and evolution of Man.

Unit-III : Biology and Human Welfare — Marks 07

- **Health and Disease:** Basic concepts of immunology, vaccines; pathogens, parasites causing human diseases (Typhoid, Hepatitis, Malaria, Filariasis, Ascariasis, Common Cold, Amoebiasis, Ring Worm); Cancer, HIV and AIDS.
- **Insects & human welfare:** Silk, honey, lac.
- Adolescence, drug & alcohol abuse.
- Poultry, Dairy Farming

Unit IV: Biotechnology and its Application — Marks 05

i) Genetic Engineering (Recombinant DNA technology), cloning

ii) Applications in Health: Human insulin & vaccine production, gene therapy

iii) Biosafety issues.

Practicals **Time: 3 Hours** **Marks: 30**
External: 20 **Internal:10**

Botany based Practicals: 15 Marks

i) Internal assessment: 05 marks
ii) External assessment: 10 marks

Zoology based Practicals: 15 Marks

i) Internal assessment: 05 marks
ii) External assessment: 10 marks

List of Experiments

1. Study pollen germination on a slide.
2. Collect and study soil from at least two different sites and study them for texture, moisture content, pH and water holding capacity of soil. Correlate with the kinds of plants found in them.
3. Collect water from two different water bodies around you and study them for pH, clarity and presence of any living organisms.
4. Study the presence of suspended particulate matter in air at the two widely different sites.
5. Study of plant population density by quadrat method.
6. Study of plant population frequency by quadrat method.
7. Prepare a temporary mount of onion root tip to study mitosis.
8. To study the effect of the different temperatures and three different pH on the activity of salivary amylase on starch.

Study/observation of the following (Spotting)

1. Flowers adapted to pollination by different agencies (wind, insect)
2. Pollen germination on stigma through a permanent slide.
3. Identification of stages of gamete development i.e. T.S. testis and T.S. ovary through permanent slides. (from any mammal)
4. Meiosis in onion bud cell or grasshopper testis through permanent slides.
5. T.S. of blastula through permanent slides.
6. Mendelian inheritance using seeds of different color / size of any plant.
7. Prepared pedigree charts of genetic traits such as rolling of tongue, blood groups, widow's peak, and color blindness.
8. Exercise on controlled pollination-Emasculation, tagging and bagging.
9. Identification of common disease causing organisms like Ascaris, Entamoeba, Plasmodium, Ringworm through permanent slides or specimens. Comment on symptoms of diseases that they cause.
10. Two plants and two animals found in xerophytic conditions. Comment upon their morphological adaptations.
11. Plants and animals found in aquatic conditions. Comment upon their morphological adaptations.

Book Prescribed A Textbook of Biology for class XII published by NCERT, New Delhi.