CLASS XII (2014-15)
(THEORY)

Time: 3 Hours Max. Marks: 70

Unit	Title	No. of Periods	Marks
1.	Reproduction	30	14
2.	Genetics and Evolution	40	18
3.	Biology and Human Welfare	30	14
4.	Biotechnology and its Applications	30	10
5.	Ecology and Environment	30	14
	Total	160	70

Unit 1: Reproduction 30 periods

Reproduction in organisms: Reproduction, a characteristic feature of all organisms for continuation of species; modes of reproduction - asexual and sexual reproduction; asexual reproduction - binary fission, sporulation, budding, gemmule, fragmentation; vegetative propagation in plants.

Sexual reproduction in flowering plants: Flower structure; development of male and female gametophytes; pollination - types, agencies and examples; outbreeding 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.

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).

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).

Unit 2: Genetics and Evolution 40 Periods

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.

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 expression and regulation - lac operon; genome and human and rice genome projects; DNA fingerprinting.

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.

Unit 3: Biology and Human Welfare 30 Periods

Health and disease: Pathogens; parasites causing human diseases (malaria, dengue, chickengunia, 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.

Improvement in food production: Plant breeding, tissue culture, single cell protein, Biofortification, Apiculture and Animal husbandry.

Microbes in human welfare: In household food processing, industrial production, sewage treatment, energy generation and as biocontrol agents and biofertilizers. Antibiotics; production and judicious use.

Unit 4: Biotechnology and Its Applications 30 Periods

Principles and processes of biotechnology: Genetic Engineering (Recombinant DNA Technology).

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, bio piracy and patents.

Unit 5: Ecology and Environment 30 Periods

Organisms and environment: Habitat and niche, population and ecological adaptations; population interactions - mutualism, competition, predation, parasitism; population attributes - growth, birth rate and death rate, age distribution.

Ecosystems: Patterns, components; productivity and decomposition; energy flow; pyramids of number, biomass, energy; nutrient cycles (carbon and phosphorous); ecological succession; ecological services - carbon fixation, pollination, seed dispersal, oxygen release (in brief).

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

Environmental issues: Air pollution and its control; water pollution and its control; agrochemicals and their effects; solid waste management; radioactive waste management; greenhouse effect and climate change; ozone layer depletion; deforestation; any one case study as success story addressing environmental issue(s).

PRACTICALS

Evaluation Scheme	Maximum Marks: 30
One Major Experiment	5 Marks
One Minor Experiment	4 Marks
Slide Preparation	5 Marks
Spotting	7 Marks
Practical Record+Viva Voce	4 Marks
Project Record + Viva Voce	5 Marks
Total	30 Marks

A. List of Experiments 60 Periods

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. 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 organism.
4. Study the presence of suspended particulate matter in air at two widely different sites.
5. Study the plant population density by quadrat method.
6. Study the plant population frequency by quadrat method.
7. Prepare a temporary mount of onion root tip to study mitosis.
8. Study the effect of different temperatures and three different pH on the activity of salivary amylase on starch.
9. Isolation of DNA from available plant material such as spinach, green pea seeds, papaya, etc.

B. Study/observation of the following (Spotting)

1. Flowers adapted to pollination by different agencies (wind, insect, bird).
2. Pollen germination on stigma through a permanent slide.
3. Identification of stages of gamete development, i.e., T.S. of testis and T.S. of ovary through permanent slides (from grasshopper/mice).
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 colour/sizes of any plant.
7. 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.
8. Controlled pollination - emasculation, tagging and bagging.
9. Common disease causing organisms like Ascaris, Entamoeba, Plasmodium, Roundworm through permanent slides or specimens. Comment on symptoms of disease that they cause.
10. Two plants and two animals (models/virtual images) found in xeric conditions. Comment upon their morphological adaptations.
11. Two plants and two animals (models/virtual images) found in aquatic conditions. Comment upon their morphological adaptations.

Practical Examination for Visually Impaired Students of Classes XI and XII

Evaluation Scheme

Time Allowed: Two hours Max. Marks: 30

Identification/Familiarity with the apparatus	5 marks
Written test (Based on given / prescribed practicals)	10 marks
Practical Records	5 marks
Viva	10 marks
Total	30 marks

General Guidelines

- The practical examination will be of two hour duration.
- A separate list of ten experiments is included here.

- The written examination in practicals for these students will be conducted at the time of practical examination of all other students.
- The written test will be of 30 minutes duration.
- The question paper given to the students should be legibly typed. It should contain a total of 15 practical skill based very short answer type questions. A student would be required to answer any 10 questions.
- A writer may be allowed to such students as per CBSE examination rules.
- All questions included in the question papers should be related to the listed practicals. Every question should require about two minutes to be answered.
- These students are also required to maintain a practical file. A student is expected to record at least five of the listed experiments as per the specific instructions for each subject. These practicals should be duly checked and signed by the internal examiner.
- The format of writing any experiment in the practical file should include aim, apparatus required, simple theory, procedure, related practical skills, precautions etc.
- Questions may be generated jointly by the external/internal examiners and used for assessment.
- The viva questions may include questions based on basic theory/principle/concept, apparatus/materials/ chemicals required, procedure, precautions, sources of error etc.

Class XII

A. Items for Identification/ familiarity with the apparatus for assessment in practicals (All experiments)

Beaker, flask, petridishes, soil from different sites- sandy, clayey, loamy, small potted plants, aluminium foil, paint brush, test tubes, starch solution, iodine, ice cubes, Bunsen burner/water bath, large colourful flowers, Maize inflorescence, model of developmental stages highlighting morula and blastula of frog, beads of different shapes (cubes, round) /size, smooth and rough, tags of different shapes, bags, *Ascaris*, Cacti (opuntia, mammalaria)

B. List of Practicals

1. Study of the soil obtained from at least two different sites for their texture and water holding capacity.
2. Study of presence of suspended particulate matter in air at two widely different sites.
3. Study of the effect of different temperatures on the activity of salivary amylase.
4. Study of flowers adapted to pollination by different agencies (wind, insects).
5. Identification of T.S of morula or blastula of frog.
6. Study of Mendelian inheritance pattern using beads of different colour/sizes.
7. Prepararation of pedigree charts of genetic traits such as rolling of tongue, colour blindness.
8. Study of emasculation, tagging and bagging by trying out an exercise on controlled pollination.
9. Identify common disease causing organisms like *Ascaris* and learn some common symptoms of the disease that they cause.
10. Comment upon the morphological adaptations of plants found in xerophytic conditions.

Note: The above practicals may be carried out in an experiential manner rather than recording observations.

Prescribed Books:

1. Biology, Class-XII, Published by NCERT.
2. The list of other related books and manuals brought out by NCERT (consider multimedia also)

BIOLOGY (Code No. 044)
QUESTION PAPER DESIGN
Class - XII (2014-15)

Time 3 Hours Max. Marks: 70

S. No.	Typology of Questions	Very Short Answer (VSA) (1 mark)	Short Answer-I (SA-I) (2 marks)	Short Answer –II (SA-II) (3 marks)	Value based question (4 marks)	Long Answer (LA) (5 marks)	Total Marks	% Weightage
1.	Remembering- (Knowledge based Simple recall questions, to know specific facts, terms, concepts, principles, or theories, Identify, define, or recite, information)	2	1	1	–	–	7	10%
2	Understanding- (Comprehension -To be familiar with meaning and to understand conceptually, interpret, compare, contrast, explain, paraphrase information)	–	2	4	–	1	21	30%
3	Application (Use abstract information in concrete situation, to apply knowledge to new situations, Use given content to interpret a situation, provide an example, or solve a problem)	–	2	4	–	1	21	30%
4	High Order Thinking Skills (Analysis & Synthesis- Classify, compare, contrast, or differentiate between	2	–	1	–	1	10	14%

	different pieces of information, Organize and/or integrate unique pieces of information from a variety of sources)							
5	Evaluation and Multi-Disciplinary (Appraise, judge, and/or justify the value or worth of a decision or outcome, or to predict outcomes based on values)	1	–	2	1	–	11	16%
	TOTAL	5x1=5	5x2=10	12x3=36	4x1=4	5x3=15	70(26)	100%

QUESTION WISE BREAK UP

Type of Question	Mark(s) per Question	Total No. of Questions	Total Marks
VSA	1	5	05
SA-I	2	5	10
SA-II	3	12	36
VBQ	4	1	04
LA	5	3	15
Total		26	70

1. Internal Choice: *There is no overall choice in the paper. However, there is an internal choice in one question of 2 marks weightage, one question of 3 marks weightage and all three questions of 5 marks weightage.*

2. *The above template is only a sample. Suitable internal variations may be made for generating similar templates keeping the overall weightage to different form of questions and typology of questions same.*