CLASS-XII

BIOLOGY (Code No. 054)

Time: 3 Hrs **Theory: 70 Marks**

Practical: 25 Marks
Internal assessment : 05 Marks

Total: 100 Marks

Syllabus (Theory)

Class XII

Session 2020-21

Max Marks 70 **Time allowed 3 Hours**

Unit	Title	No. of periods	Marks
I	Reproduction	30	14
II	Genetics and Evolution	40	18
III	Biology and Human Welfare	30	14
IV	Biotechnology and its Applications	30	10
V	Ecology and Environment	30	14
	Total	**160**	**70**

SCHEMATIC DISTRIBUTION OF MARKS

Unit	Chapter	Section A 1 mark questions	Section B 2 marks questions	Section C 3 marks questions	Section D 3marks questions (Diagram based)	Section E 5 marks questions	Total marks
Reproduction							
	2. Sexual reproduction in flowering plants	1	--	-	1	1 or 1(One question should be from chapter 2 and other choice question should be from chapter 3)	4
	3. Human Reproduction	-	1 or 1	-	-		7
	4. Reproductive health	Or 1	-	1	-		3
Genetics and Evolution	5. Heredity and variation	-	1	1+1	-	1 OR 1 (One question should be from chapter 5 and	8
	6. Molecular bases of inheretance	-	1	1 or 1	-		10

						other choice question should be from chapter 6)	
Biology and Human welfare	8.Human health and diseases	1	1	1	1	-	9
	10. Microbes in human welfare	Or 1	1	1	-	-	5
Biotechnology and its applications	Biotechnology- Principles and processes	1	-	1	-	-	4
	Biotechnology and its applications	1	1	1	-	-	6
Ecology and environment	13. Organisms and populations	-	-	(1 or 1) 1 from chapter 13 and choice from ch 15	1	1	8
	15. Biodiversity and conservation	1	1		-	Or 1	6
No. Of questions		5	7	9	3	3	70

Instructions to the paper setter

1. There are a total of 27 questions and five sections in the question paper. All questions are compulsory.
2. Section A contains question numbers 1 to 5, multiple choice questions of one mark each.
3. Section B contains question numbers 6 to 12, short answer type I questions of two marks each.
4. Section C contains question numbers 13 to 21, short answer type II questions of three marks each.
5. Section D contains question number 22 to 24, diagram/illustration/graph based short answer type questions of three marks each.
6. Section E contains question numbers 25 to 27, long answer type questions of five marks each.
7. There is no overall choice in the question paper. However, internal choices are provided in two questions of one mark, one question of two marks, two questions of three marks and all three questions of five marks. An examinee is to attempt any one of the questions out of the two given in the question paper with the same question number.
8. There should be at least one comparison based question.
9. Language used should be clearly understood and specific.

ਵਿਸ਼ਵ ਭਰ ਵਿੱਚ Covid-19 ਮਹਾਂਮਾਰੀ ਦੇ ਮੱਦੇ ਨਜ਼ਰ ਸਕੂਲ ਬੰਦ ਹੋਣ ਕਾਰਨ ਵੱਖ-ਵੱਖ ਸ਼੍ਰੇਣੀਆਂ ਦੀ ਪੜ੍ਹਾਈ ਦਾ ਬਹੁਤ ਨੁਕਸਾਨ ਹੋਇਆ ਹੈ। ਇਸ ਕਰਕੇ ਪੰਜਾਬ ਸਕੂਲ ਸਿੱਖਿਆ ਬੋਰਡ ਵੱਲੋਂ ਅਕਾਦਮਿਕ ਸਾਲ 2020-21 ਲਈ ਨੌਵੀਂ ਤੋਂ ਬਾਰ੍ਹਵੀਂ ਸ਼੍ਰੇਣੀਆਂ ਦੇ ਪਾਠਕ੍ਰਮ ਨੂੰ ਘਟਾਉਣ ਦਾ ਫੈਸਲਾ ਲਿਆ ਗਿਆ ਹੈ। ਸਿੱਖਣ ਪੱਧਰ ਦੀ ਮਹੱਤਤਾ ਨੂੰ ਮੁੱਖ ਰੱਖਦੇ ਹੋਏ ਸਿਲੇਬਸ ਇਸ ਢੰਗ ਨਾਲ ਘਟਾਉਣ ਦੀ ਕੋਸ਼ਿਸ਼ ਕੀਤੀ ਗਈ ਹੈ ਕਿ ਵਿਸ਼ੇ ਦੇ ਮੂਲ ਸੰਕਲਪ ਨੂੰ ਹਾਨੀ ਨਾ ਪਹੁੰਚੇ।

ਸਕੂਲ ਮੁਖੀਆਂ ਅਤੇ ਅਧਿਆਪਕਾਂ ਵੱਲੋਂ ਇਸ ਗੱਲ ਦਾ ਖਾਸ ਧਿਆਨ ਰੱਖਿਆ ਜਾਵੇ ਕਿ ਦੂਜੇ Topics ਨਾਲ ਰਾਬਤਾ ਰੱਖਣ ਲਈ ਲੋੜ ਅਨੁਸਾਰ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਘਟਾਏ ਗਏ Topics ਨੂੰ ਵੀ ਪੜ੍ਹਾਇਆ ਜਾਣਾ ਉਚਿਤ ਹੋਵੇਗਾ ਬੇਸ਼ਕ ਇਹ Topics ਆਂਤਰਿਕ ਮੁਲਾਂਕਣ ਅਤੇ ਸਾਲਾਨਾ ਇਮਤਿਹਾਨਾਂ ਦਾ ਹਿੱਸਾ ਨਹੀਂ ਹੋਣਗੇ।

ਘਟਾਏ ਗਏ ਸਲੇਬਸ ਦਾ ਵੇਰਵਾ ਹੇਠ ਦਿੱਤਾ ਗਿਆ ਹੈ।

Deleted Portion

CLASS XII

- **Under Unit Unit-VI Reproduction**
    - **Chapter-1: Reproduction in Organism**
        - 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 formation, fragmentation; vegetative propagation in plants.

- **Under Unit-VII Genetics and Evolution**
    - **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.

- **Under Unit-VIII Biology and Human Welfare**
    - **Chapter 9: Strategies for Enhancement in Food Production**
        - Animal husbandry, Plant breeding, tissue culture, single cell protein.

- **Under Unit-X Ecology and Environment**
    - **Chapter-14: Ecosystem**
        - 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).
    - **Chapter 16: 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 impact and mitigation; ozone layer depletion; deforestation; exemplifying case study as success story addressing environmental issue(s).

Syllabus (Theory)

Unit I: Reproduction

Chapter 1 Reproduction in organisms:

Reproduction, a characteristic feature of all organism for continuation of species; Modes of reproduction-Asexual and sexual reproduction; Modes – Binary fission, sporulation, budding, gemmule, fragmentation; vegetative propagation in plants.

Chapter 2 Sexual reproduction in flowering plants:

Flower structure; Development of male and female gametophytes; Pollination-types, agencies and examples; Outbreedings 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 & 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 (STD); Birth control – Need and Methods, Contraception and Medical Termination of Pregnancy (MTP); Amniocentesis; Infertility and assisted reproductive technologies-IVF, ZIFT, GIFT (Elementary ides for general awareness).

Unit II. Genetics and Evolution

Chapter 5 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, 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 expression and regulation- Lac Operon; Genome and human genome project; DNA finger printing.

Chapter 7 Evolution:

Origin of life; Biological evolution and evidences for biological evolution (Paleontological, Comparative anatomy, embryology and molecular evidence); 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 III. Biology and Human Welfare

Chapter 8 Human Health and Disease:

Pathogens/ parasites causing human diseases (Malaria, Filariasis, Ascariasis, Typhoid, Pneumonia, common cold, amoebiasis, dengue, chickengunia, ring worm); Basic concepts of immunology-vaccines; Cancer, HIV and AID's; Adolescence, drug and alcochol abuse.

Chapter 9 Strategies for Enhancement in Food Production

Improvement in food production: plant breeding, tissues culture, single cell protein, Bifortification, Apiculture and animal husbandary.

Chapter 10 Microbes in human welfare:

In household food processing, industrial production, sewage treatment, energy generation and Microbes as biocontrol agents and biofertilizers, Antibiotics-production.

Unit IV. Biotechnology and its applications

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, gene therapy; genetically modified organisms- Bt crops; Transgenic Animals; Biosafety issues-Biopiracy and patents.

Unit V. Ecology and environment

Chapter 13 Organisms and populations

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.

Chapter 14 Ecosystem:

Patterns, components; productivity and decompositions; Energy flow; Pyramids of number, biomass, energy; Nutrients cycling (carbon and phosphorous); Ecological succession; Ecological Services-Carbon fixation, pollination, oxygen release.

Chapter 15 Biodiversity and Conservation:

Concepts of Biodiversity; Patterns of Biodiversity; Importance of Biodiversity; Loss of Biodiversity; Biodiversity conservation; Hotspots, endangered organisms, extinction, Red Data Book, biosphere reserves, National parks and sanctuaries.

Chapter 16 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 global warming; Ozone depletion; Deforestation; Any three case studies as success stories addressing environmental issues.

STRUCTURE OF QUESTION PAPER (PRACTICAL)

Time Allowed : Three hours
Max. Marks: 25

Evaluation Scheme		
One Major Experiment		4 Marks
One Minor Experiment		3 Marks
Slide Preparation		3 Marks
Spotting		7 Marks
Practical Record + Viva Voce	Credit to the students' work over the academic session may be given	4 Marks
Project Record + Viva Voce		4 Marks
Total		25 Marks

DELETED PORTIONS CLASS XII: PRACTICAL

A: List of Experiments

1. Study the presence of suspended particulate matter in air at two widely different sites.
2. Study the plant population density by quadrat method.
3. Study the plant population frequency by quadrat method.

B. Study/Observer of the following (spotting)

1. Pollen germination on stigma through a permanent slide or scanning electron micrograph.
2. Mendelian inheritance using seeds of different colour/sizes of any plant.
3. Controlled pollination - emasculation, tagging and bagging.

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. Isolate 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, insects, birds).
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(Mammalian).
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 colourblindness.
8. Controlled pollination - emasculation, tagging and bagging.
9. Common disease causing organisms like Ascaris, Entamoeba, Plasmodium, any fungus causing ringworm through permanent slides or specimens. Comment on symptoms of diseases 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.

Internal assessment :

Total = 05 Marks

Book Bank =2 marks
Average of Periodic assessment tests = 3 marks