

12<sup>th</sup>  
STD

**INSTANT SUPPLEMENTARY EXAM - JUNE 2023**  
**PART - III**  
**BIOLOGY**

Reg. No. 

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TIME ALLOWED : 3.00 HOURS]

(with Answers)

[MAXIMUM MARKS : 70

**Instructions :** (1) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.

(2) Use **Blue** or **Black** ink to write and underline and pencil to draw diagrams.

**PART - I**  
**(BIO-BOTANY)**

**35 MARKS**

**SECTION - 1**

**Note :** (i) Answer **all** the questions. (8 × 1 = 8)

(ii) Choose the most appropriate answer from the given **four** alternatives and write the option code and the corresponding answer.

- In a fresh water environment like pond, rooted autotrophs are :
  - Nymphaea and typha
  - Ceratophyllum and Utricularia
  - Wolffia and pistia
  - Azolla and lemna
- Extra nuclear inheritance is a consequence of presence of genes in :
  - Mitochondria and chloroplasts
  - Endoplasmic reticulum and mitochondria
  - Ribosomes and chloroplast
  - Lysosomes and ribosomes
- The scar left by Funiculus in the seed is :
 

(a) tegmen	(b) radicle
(c) epicotyl	(d) hilum

- Which of the following is not a sedimentary cycle?
  - Nitrogen cycle
  - Phosphorous cycle
  - Sulphur cycle
  - Calcium cycle
- Find out the correctly matched pair :
 

(a) Rubber	-	Shorea robusta
(b) Dye	-	Lawsonia inermis
(c) Timber	-	Cyperus papyrus
(d) Pulp	-	Hevea brasiliensis
- In pBR 322, pBR stands for :
  - Plasmid Bacterial Recombination
  - Plasmid Bacterial Replication
  - Plasmid Boliver and Rodriguez
  - Plasmid Baltimore and Rodriguez
- People's movement for the protection of environment in Sirsi of Karnataka is :
  - Chipko movement
  - Amirtha Devi Bishwas movement
  - Appiko movement
  - None of the above
- Dwarfing gene of wheat is :
 

(a) pal 1	(b) Atomita 1
(c) Norin 10	(d) pelita 2

**SECTION - 2**

**Note :** Answer **any four** of the following questions.

(4 × 2 = 8)

- 9. Give any two names of the scientists who rediscovered Mendelism.
- 10. Write the role of Jasmine in perfuming.
- 11. What is bio-remediation?
- 12. Draw a pyramid from following Quantities of organisms. Hawks-50, plants-1000, rabbit and mouse-250 + 250, pythons and lizard - 100 + 50 respectively.
- 13. Define - Heterosis.
- 14. What is Pollenkitt?

**SECTION - 3**

**Note :** Answer **any three** of the following questions.

Q.No. 19 is **Compulsory**. (3 × 3 = 9)

- 15. Differentiate between missense mutation and nonsense mutation?
- 16. How do sacred groves help in the conservation of biodiversity?
- 17. What is Embryoids?
- 18. Mention the types of thermal stratification.
- 19. List out the functions of tapetum.

**SECTION - 4**

**Note :** Answer **all** the questions. (2 × 5 = 10)

- 20. (a) Mention the name of man-made Cereal. How it is formed?

(OR)

- (b) What are the advantages of seed dispersal?

- 21. (a) With suitable diagram explain the structure of an ovule. (OR)

- (b) List out the new breeding techniques involved in developing new traits in plant breeding.

**ANSWERS**

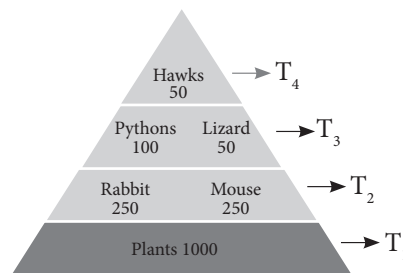
**SECTION - 1**

- 1. (a) Nymphaea and typha
- 2. (a) Mitochondria and chloroplasts
- 3. (d) hilum
- 4. (a) Nitrogen cycle
- 5. (b) Dye - Lawsonia inermis
- 6. (c) Plasmid Boliver and Rodriguez
- 7. (c) Appiko movement
- 8. (c) Norin 10

**SECTION - 2**

- 9. (i) Hugo de Vries – Holland  
(ii) Carl Correns – Germany  
(iii) Erich von Tschermak – Austria
- 10. (i) Jasmine is used for making perfumed hair oils, cosmetics and soaps.  
(ii) Jasmine blends well with other perfumes.  
(iii) It is much used in modern perfumery and cosmetics.  
(iv) It has become popular in air freshners, antiperspirants, talcum powders, shampoos and deodorants.
- 11. Bio-remediation is defined as the use of microorganisms or plants to clean up environmental pollution.

12.



**Pyramid of Number**  
(Grassland ecosystem)

13. Heterosis (hetero- different; sis - condition) : The superiority of the F1 hybrid in performance over its parents is called heterosis or hybrid vigour.
14. (i) It is an oily layer forming a thick viscous coating over pollen surface.
- (ii) Pollenkitt is contributed by tapetum and coloured Yellow (or) Orange and is Chiefly made of Carotenoids or Flavonoids.
- (iii) It attracts insects and protects damage from UV radiation.

**SECTION - 3**

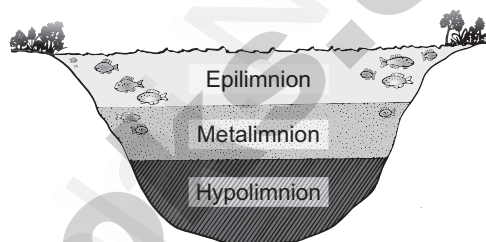
15.

Ans.

	Missense mutation	Non-sense mutation
1.	The mutation where the codon for one amino acid is changed into a codon for another amino acid	The mutations where codon for one amino acid is changed into a termination or stop codon
2.	Other name is non-synonymous mutations.	Other name is termination mutation.
3.	Change in amino acid encoded.	Creates translational termination codon (UAA, UAG or UGA)

16. (i) Sacred groves are the patches or grove of cultivated trees which are community protected and are based on strong religious belief systems.
- (ii) These groves provide a number of ecosystem services to the neighbourhood like protecting watershed, fodder, medicinal plants and micro climate control.

17. Somatic embryogenesis is the formation of embryos from the callus tissue directly and these embryos are called Embryoids or from the in vitro cells directly form pre-embryonic cells which differentiate into embryoids.
18. **Thermal Stratification :**  
It is usually found in aquatic habitat. The change in the temperature profile with increasing depth in a water body is called thermal stratification.



Thermal stratification of pond

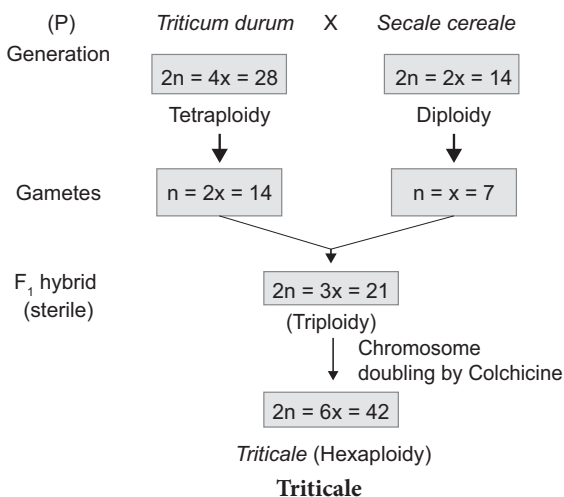
**3 kinds of thermal stratifications:**

- (i) **Epilimnion** - The upper layer of warmer water.
- (ii) **Metalimnion** - The middle layer with a zone of gradual decrease in temperature.
- (iii) **Hypolimnion** - The bottom layer of colder water.
19. **Functions of tapetum :**
- (i) It supplies nutrition to the developing microspores.
- (ii) It contributes sporopollenin through ubisch bodies pollen wall formation.
- (iii) The pollenkitt material is contributed by tapetal cells and is later transferred to the pollen surface.
- (iv) Exine proteins responsible for 'rejection reaction' of the stigma are present in the cavities of the exine. These proteins are derived from tapetal cells.

SECTION - 4

20. (a) Triticale is the successful first man made cereal. Depending on the ploidy level.

Formation of triticale:



Triticale can be divided into three main groups:

- (i) **Tetraploidy:** Crosses between diploid wheat and rye.
- (ii) **Hexaploidy:** Crosses between tetraploid wheat *Triticum durum* (macaroni wheat) and rye.
- (iii) **Octoploidy:** Crosses between hexaploid wheat *T. aestivum* (bread wheat) and rye.

Hexaploidy Triticale hybrid plants demonstrate characteristics of both macaroni wheat and rye. For example, they combine the high-protein content of wheat with rye's high content of the amino acid lysine, which is low in wheat.

**Colchicine**, an alkaloid applied in low concentration to the growing tips of the plants to induce polyploidy.

(OR)

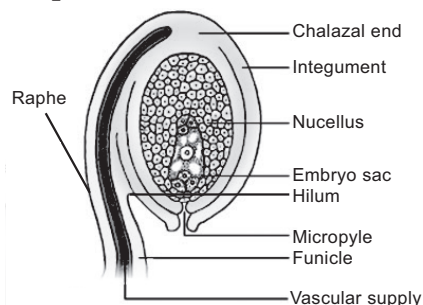
(b) Advantages of seed dispersal:

- (i) Seeds escape from mortality near the parent plants due to predation by animals or getting diseases.

- (ii) Dispersal also gives a chance to occupy favourable sites for growth.
- (iii) It is an important process in the movement of plant genes. Particularly this is the only method available for self-fertilized flowers and maternally transmitted genes in out crossing plants.
- (iv) Seed dispersal by animals help in conservation of many species even in human altered ecosystems.
- (v) It acts as a key for proper functioning and establishment of many ecosystems from deserts to evergreen forests. It used for maintenance of biodiversity conservation and restoration of ecosystems.

21. (a)

- (i) Ovule is also called megasporangium and is protected by one or two covering called integuments..
- (ii) A mature ovule consists of a stalk and a body. Stalk or **funiculus** is present at the base and it attaches the ovule to the placenta.
- (iii) The point of attachment of funicle to the body of the ovule is known as **hilum**. It represents the junction between ovule and funicle.
- (iv) In an inverted ovule, the funicle is adnate to the body of the ovule forming a ridge called **raphe**.



Structure of ovule

- (v) Body of the ovule is made up of central mass of parenchymatous tissue called **nucellus**, has large reserve food materials.

- (vi) Nucellus is enveloped by one or two protective coverings called **integuments**.
- (vii) Integuments encloses the nucellus completely but forms a pore at the top called **micropyle**.
- (viii) Ovule with one or two integuments are said to be **unitegmic** or **bitegmic** ovules.
- (ix) The basal region of the body of the ovule where the nucellus, the integument and the funicle merge is called as **chalaza**.
- (x) Large, oval, sac-like structure in the nucellus toward the micropylar end called **embryo sac** or **female gametophyte**.
- (xi) It develops from the functional megaspore formed within the nucellus.
- (xii) In some species (unitegmic tenuinucellate), the inner layer of the integument may become specialised to perform the nutritive function for the embryo sac and is called as **endothelium** or **integumentary tapetum**  
**Example : Asteraceae.**

Two types of ovule based on the position of the sporogenous cell.

(a) **Tenuinucellate type:**

- 1. Sporogenous cell is hypodermal with a single layer of nucellar tissue around it.
- 2. It has very small nucellus.

(b) **Crassinucellate type:**

- 1. Ovules with **subhypodermal sporogenous cell**.
- 2. It has fairly large nucellus.

- (xiii) Group of cells found at the base of the ovule between the chalaza and embryo sac is called **hypostase**.
- (xiv) Thick-walled cells found above the micropylar end above the embryo sac is called **epistase**.

(OR)

(b) **NBT - New Breeding Techniques.**

NBT are a collection of methods that could increase and accelerate the development of new traits in plant breeding. These techniques often involve genome editing, to modify DNA at specific locations **within the plants** to produce new traits in crop plants. The various methods of achieving these changes in traits include the following.

- (i) Cutting and modifying the genome during the repair process by tools like CRISPR / Cas.
- (ii) Genome editing to introduce changes in few base pairs using a technique called Oligonucleotide-directed mutagenesis (ODM).
- (iii) Transferring a gene from an identical or closely related species (cisgenesis).
- (iv) Organising processes that alter gene activity without altering the DNA itself (epigenetic methods).





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**PART - II  
(Bio-Zoology) 35 Marks**

**SECTION - I**

- Note :** (i) Answer **all** the questions (8 × 1 = 8)  
(ii) Choose the most appropriate answer from the given **four** alternatives and write the option code and the corresponding answer.

1. An ideal disinfectant for waste water treatment is:
 

(a) U-V rays	(b) Chlorination	(c) Boiling	(d) Ozonisation
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2. All Populations in a given physical area are defined as :
 

(a) Biome	(b) Ecosystem	(c) Territory	(d) Biotic factors
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3. The type of parthenogenesis in which only males are produced :
 

(a) Arrhenotoky	(b) Thelytoky	(c) Amphitoky	(d) Plasmotomy
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4. The Phenomenon of "Industrial Melanism" demonstrates \_\_\_\_\_.
 

(a) Natural selection	(b) Induced mutation
(c) Reproductive isolation	(d) Geographical isolation
5. Identify the group which includes sexually transmitted diseases caused by bacteria only?
 

(a) Syphilis, gonorrhoea and candidiasis	(b) Syphilis, chlamydiasis and gonorrhoea
(c) Syphilis, gonorrhoea and trichomoniasis	(d) Syphilis, trichomoniasis and pediculosis
6. The male sex hormone, testosterone is secreted by :
 

(a) Sertoli cells	(b) Leydig cells	(c) Epididymis	(d) Prostate gland
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7. Identify the correct sequence of event with reference to the central dogma of protein synthesis :
 

(a) Transcription, Translation, Replication	(b) Transcription, Replication, Translation
(c) Duplication, Translation, Transcription	(d) Replication, Transcription, Translation
8. Match the following :

**Colume I**

- (1) Leishmania donavani
  - (2) Wuchereria bancrofti
  - (3) Trypanosoma gambiense
  - (4) Entamoeba histolytica
- (a) (1)-(ii), (2)-(iv), (3)-(iii), (4)-(i)  
(c) (1)-(iii), (2)-(i), (3)-(ii), (4)-(iv)

**Colume II**

- (i) Amoebiasis
  - (ii) Kala - azar
  - (iii) Sleeping sickness
  - (iv) Filariasis
- (b) (1)-(ii), (2)-(iv), (3)-(i), (4)-(iii)  
(d) (1)-(i), (2)-(iv), (3)-(iii), (4)-(ii)

**SECTION - II**

**Note :** Answer **any four** of the following questions.

(4 × 2 = 8)

9. Differentiate between External and Internal fertilization
10. Write the preventive measures of STDs.
11. Write any two objections to Darwinism.
12. Define : Zymology
13. What are stem cells?
14. Amazon forest is considered to be the lungs of the planet earth. Justify this statement.

**SECTION - III**

**Note :** Answer **any three** of the following questions.

Q.No. 19 is **Compulsory**. (3 × 3 = 9)

15. Why the human genome project is called a mega project?
16. What is Bioremediation?
17. Differentiate between Somatic cell gene therapy and Germline gene therapy.
18. 'Red data book' - What do you know about it?
19. Differentiate 'J' and 'S' shaped curves.

**SECTION - IV**

**Note :** Answer the following questions. (2 × 5 = 10)

20. (a) HGP is the windows for treatment of various genetic disorders. Justify the statement.

(OR)

(b) Describe the process of Oogenesis.

21. (a) Auto-immunity is a misdirected immune response. Justify.

(OR)

(b) What are the effects of noise pollution?

**ANSWERS**

**SECTION - I**

1. (a) U-V Rays
2. (a) Biome
3. (a) Arrhenotoky
4. (a) Natural selection
5. (b) Syphilis, chlamydia and gonorrhoea
6. (b) Leydig cell
7. (d) Replication, Transcription, Translation
8. (a) (1)-(ii), (2)-(iv), (3)-(iii), (4)-(i)

**SECTION - II**

9.

External fertilization	Internal fertilization
The fusion of male and female gametes takes place outside the body of female organisms in the water medium. <b>Eg:</b> sponges, fishes and amphibians.	The fusion of male and female gametes takes place within the body of female organisms. <b>Eg:</b> reptiles, aves and mammals.

10. **Prevention of STDs (Sexually Transmitted Diseases)**

- (i) Avoid sex with unknown partner/ multiple partners
- (ii) Use condoms
- (iii) In case of doubt, consult a doctor for diagnosis and get complete treatment.

11. (i) Darwin failed to explain the mechanism of variation.

(ii) Darwinism explains the survival of the fittest but not the arrival of the fittest.

12. Zymology is an applied science which deals with the biochemical process of fermentation and its practical uses.

13. (i) Stem cells are undifferentiated cells found in most of the multicellular animals.

(ii) Stem cells are capable of self renewal and exhibit 'cellular potency'.

14. (i) Tropical rain forests occupied about 14% of Earth's land surface earlier which is reducing now.

(ii) The Amazon Rain forest is a classical example of a Tropical Rain forest and is a vast area harbouring millions of species.

(iii) It is the largest Tropical forest in the world with all the features.

(iv) The amazon rain forest is considered to be the lungs of the plant due to its capability of absorbing about 25% of Earth's total carbon dioxide emission.

(v) It behaves similarly to a pair of human lungs, absorbing the carbon dioxide from the atmosphere and releasing oxygen.

SECTION - III

- 15. (i) The international Human Genome Project was launched in the year 1990. It was a mega project and took 13 years to complete.
- (ii) The human genome is about 25 times larger than the genome of any organism. Human genome is said to have approximately  $3 \times 10^9$  bp).
- (iii) HGP was closely associated with the rapid development of a new area in biology called bioinformatics.
- (iv) The methodologies of the Human Genome Project involved 2 major approaches.

**1<sup>st</sup> approach:** Focused on identifying all the genes that are expressed as RNA (ESTs – Expressed Sequence Tags).

**2<sup>nd</sup> approach - Sequence annotation:**

- (i) Sequencing the whole set of genome, that contains all the coding and non-coding sequences and later assigning different regions in the sequences with functions.
  - (ii) These sequences were subsequently annotated and are assigned to each chromosome.
16. (i) The use of naturally occurring or genetically engineered microorganisms to reduce or degrade pollutants is called bioremediation.
- (ii) Bioremediation is less expensive and more sustainable than other remediations available.
- (iii) It is grouped into insitu bioremediation (treatment of contaminated soil or water in the site) and ex situ bioremediation (treatment of contaminated soil or water that is removed from the site and treated)

17.

S.No	Somatic ell gene therapy	Germ line gene therapy
(i)	Therapeutic genes transferred into the somatic cells.	Therapeutic genes transferred into the germ cells.
(ii)	Introduction of genes into bone marrow cells, blood cells, skin cells etc.,	Genes introduced into eggs and sperms.
(iii)	Will not be inherited in later generations.	Heritable and passed on to later generations.

18. **Red Data Book :**

- (i) Red Data book or Red list is a catalogue of taxa facing risk of extinction.
- (ii) WCU – World Conservation Union maintains the Red Data book.

**The purpose of preparation of Red List are:**

- (i) To create awareness on the degree of threat to biodiversity.
- (ii) Identification and documentation of species at high risk of extinction.
- (iii) Provide global index on declining biodiversity.
- (iv) Preparing conservation priorities and help in conservation of action.
- (v) Information on international agreements on conservation of biological diversity.



19.

S.No	J shaped curve	S shaped curve
(i)	Population increases rapidly in an exponential fashion and then stops abruptly due to environmental resistance.	Population increases slowly at first, then more rapidly and gradually slows down as environmental resistance increases, whereby equilibrium is reached and maintained.
(ii)	Eg: Insects	Eg: Small mammals

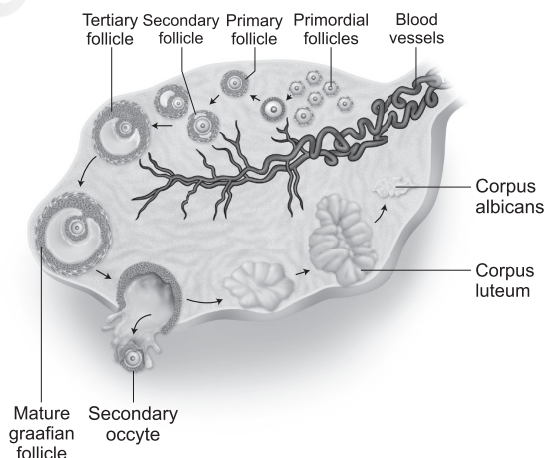
**SECTION - IV**

20.

- (a) (i) The mapping of human chromosomes is possible to examine a person's DNA and to identify genetic abnormalities.
- (ii) This is extremely useful in diagnosing diseases and to provide genetic counselling to those planning to have children.
- (iii) This kind of information would also create possibilities for new gene therapies.
- (iv) Besides providing clues to understand human biology, learning about non-human organisms, DNA sequences can lead to an understanding of their natural capabilities that can be applied towards solving challenges in healthcare, agriculture, energy production and environmental remediation.
- (v) A new era of molecular medicine, characterized by looking into the most fundamental causes of disease than treating the symptoms will be an important advantage.

(OR)

- (b) (i) Oogenesis is the process of development of the female gamete or ovum or egg in the ovaries. During foetal development, certain cells in the germinal epithelium of the foetal ovary divide by mitosis and produce millions of egg mother cells or oogonia. The oogonial cells start dividing and enter into Prophase I of meiotic division I to form the primary oocytes which are temporarily arrested at this stage.
- (ii) The primary oocytes then get surrounded by a single layer of granulosa cells to form the primordial or primary follicles. A large number of follicles degenerate during the period from birth to puberty, so at puberty only 60,000 to 80,000 follicles are left in each ovary.
- (iii) The primary follicle gets surrounded by many layers of granulosa cells and a new theca layer to form the secondary follicle. A fluid filled space, the antrum develops in the follicle and gets transformed into a tertiary follicle. The theca layer gets organized into an inner theca interna and an outer theca externa.



- (iv) It is an unequal division resulting in the formation of a large haploid secondary oocyte and a first polar body. During Fertilization, the secondary oocyte undergoes second meiotic division and produces a large cell, the ovum and a second polar body.
- (v) The second polar body also degenerates. The tertiary follicle eventually becomes a mature follicle or Graafian follicle. If Fertilization does not take place, second meiotic division is never completed and the egg disintegrates. At the end of gametogenesis in females, each primary oocyte gives rise to only one haploid ovum.

21.

- (a)
  - (i) Autoimmunity is due to an abnormal immune response in which the immune system fails to properly distinguish between self and non-self and attacks its own body.
  - (ii) Our body produces antibodies (auto antibodies) and cytotoxic T cells that destroy our own tissues.
  - (iii) If a disease-state results, it is referred to as auto-immune disease. Thus, autoimmunity is a misdirected immune response.
  - (iv) Autoimmunity is evidenced by the presence of auto antibodies and T cells that are reactive with host antigens. When the cells act as antigens in the same body, they are called autoantigens.
  - (v) Eg., Multiple sclerosis, Rheumatoid arthritis, Hashimoto's thyroiditis, Graves' disease (thyroid gland) and Addison's disease (adrenal glands) are the autoimmune diseases.

(OR)

- (b)
  - (i) According to the USEPA (United States Environmental Protection Agency) there are direct links between noise and health. Heart disease, high blood pressure, stress related illness, sleep disruption, hearing loss (deafness), and productivity loss are the problems related to noise pollution.
  - (ii) Increased stress and tension, nervousness, irritability, anxiety, depression and panic attacks.
  - (iii) Peptic ulcer, severe head ache, memory loss.
  - (iv) Marine animals are affected by noise pollution from offshore activities and port activities.
  - (v) Fire crackers frighten animals. Birds are often affected by increased air traffic.

