



**SECOND YEAR HIGHER SECONDARY  
SECOND TERMINAL EXAMINATION, DECEMBER-2023**

Part - III

Time : 2 Hours

**BIOLOGY**

Cool-off time : 15 Minutes

**(Botany & Zoology)**

Preparatory Time : 10 Minutes

Maximum : 60 scores

**General Instructions to Candidates :**

- There is a 'Cool-off time' of 15 minutes in addition to the writing time. Further there is a '10 minutes' 'Preparatory Time' at the end of the Botany Examination and before the commencement of Zoology Examination.
- Use the 'Cool-off time' to get familiar with questions and to plan your answers.
- Read questions carefully before answering.
- Read the instructions carefully.
- Calculations, figures and graphs should be shown in the answer sheet itself.
- Malayalam version of the questions is also provided.
- Give equations wherever necessary.
- Electronic devices except non-programmable calculators are not allowed in the Examination Hall.

**വിദ്യാർത്ഥികൾക്കുള്ള പൊതുനിർദ്ദേശങ്ങൾ :**

- നിർദ്ദിഷ്ട സമയത്തിന് പുറമെ 15 മിനിറ്റ് 'കൂൾ ഓഫ് ടൈം' ഉണ്ടായിരിക്കും. കൂടാതെ ബോട്ടനി പരീക്ഷയ്ക്കുശേഷം സുവോളജി പരീക്ഷ തുടങ്ങുന്നതിനുമുമ്പ് '10 മിനിറ്റ്' തയ്യാറെടുപ്പുകൾ നടത്തുന്നതിനായി നല്കുന്നതാണ്. ഈ വേളകളിൽ ചോദ്യങ്ങൾക്ക് ഉത്തരം എഴുതാനോ, മറ്റുള്ളവരുമായി ആശയ വിനിമയം നടത്താനോ പാടില്ല.
- 'കൂൾ ഓഫ് ടൈം' ചോദ്യങ്ങൾ പരിചയപ്പെടാനും ഉത്തരങ്ങൾ ആസൂത്രണം ചെയ്യാനും ഉപയോഗിക്കുക.
- ഉത്തരങ്ങൾ എഴുതുന്നതിന് മുമ്പ് ചോദ്യങ്ങൾ ശ്രദ്ധാപൂർവ്വം വായിക്കണം.
- നിർദ്ദേശങ്ങൾ മുഴുവനും ശ്രദ്ധാപൂർവ്വം വായിക്കണം.
- കണക്ക് കൂട്ടലുകൾ, ചിത്രങ്ങൾ, ഗ്രാഫുകൾ, എന്നിവ ഉത്തരപേപ്പറിൽ തന്നെ ഉണ്ടായിരിക്കണം.
- ചോദ്യങ്ങൾ മലയാളത്തിലും നല്കിയിട്ടുണ്ട്.
- ആവശ്യമുള്ള സ്ഥലത്ത് സമവാക്യങ്ങൾ കൊടുക്കണം.
- ഡ്രോഗ്രാമുകൾ ചെയ്യാനാകാത്ത കാൽക്കുലേറ്ററുകൾ ഒഴികെയുള്ള ഒരു ഇലക്ട്രോണിക് ഉപകരണവും പരീക്ഷാഹാളിൽ ഉപയോഗിക്കുവാൻ പാടില്ല.

**PART - A**

**BOTANY**

(Maximum : 30 scores)

Time : 1 Hour

I. Answer any 3 questions from 1 to 5. Each carries 1 score.

(3 × 1 = 3)

1. Recombinant DNA is directly injected into the nucleus of an animal by a method called \_\_\_\_\_.

- (a) Microinjection                      (b) Biolistics  
(c) Heat shock                              (d) Disarmed pathogen vector

2. Crystals of Bt. toxin produced by some bacteria do not kill the bacteria themselves because

- (a) bacteria are resistant to the toxin.  
(b) toxin is immature.  
(c) toxin is inactive.  
(d) bacteria encloses toxin in specific sac.

3. Name the interaction in which one species is harmed and other is unaffected.

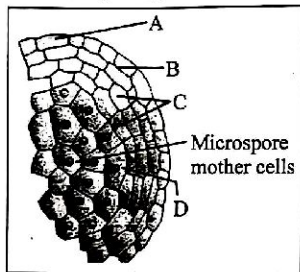
4. Fruit developed without fertilisation are called \_\_\_\_\_.

5. Select the correct pair.

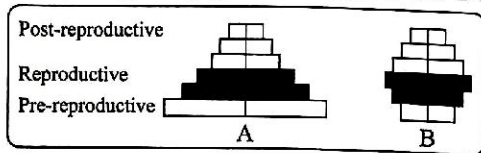
| A              | B         |
|----------------|-----------|
| (i) Plant cell | Cellulase |
| (ii) Bacteria  | Chitinase |
| (iii) Fungus   | Protease  |
| (iv) Protein   | Lysozyme  |

II. Answer any 9 questions from 6 to 16. Each carries 2 scores.

6. (a) Expand ELISA.  
(b) Write down the basic principle involved in this technique.
7. Two characteristics of population density is given below. Explain the terms.  
(a) Natality  
(b) Emmigration
8. Observe the given figure of microsporangium and label the parts (a) (b) (c) and (d).



9. Agrobacterium vectors are used to introduce nematode specific genes into the host plants.  
(a) Name the nematode which infect roots of tobacco plants.  
(b) Define RNA interference (RNAi)
10. Observe the figure given below :  
(a) What are age pyramids ?  
(b) Identify the type of age pyramid labelled as 'A' and 'B'.

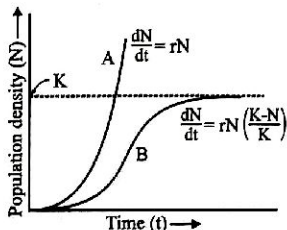


11. Amplification of Gene of interest is done using Polymerase chain reaction.  
Name the enzyme used in PCR and write the characteristic feature of this enzyme.

12. Fill in the blanks with type of interaction observed among the following species :

| Species A         | Species B  | Type of Interaction |
|-------------------|------------|---------------------|
| Fig Tree          | Wasp       | (a)                 |
| Orchid            | Mango Tree | (b)                 |
| Cuckoo            | Crow       | (c)                 |
| Abingdon Tortoise | Goat       | (d)                 |

13. Water pollinated flowers have many peculiarities. Write down any four such peculiarity.
14. Explain the method of genetically engineered human insulin production by 'Eli Lilly' in 1983.
15. Explant and totipotency are two terms related to tissue culture. Define these two terms.
16. Observe the figure given below :



- (a) Identify the population growth curve A and B.
- (b) What do  $r$  and  $K$  stand for in the equation given in the figure.

**III. Answer any 3 questions from 17 to 20. Each carries 3 scores.**

(3 × 3 = 9)

17. EcoRI is an example of restriction endonuclease enzyme.
- (a) Name the bacteria from which EcoRI is isolated.
- (b) Explain the naming procedure of EcoRI.

18. Predators act as conduits for energy transfer across trophic levels.

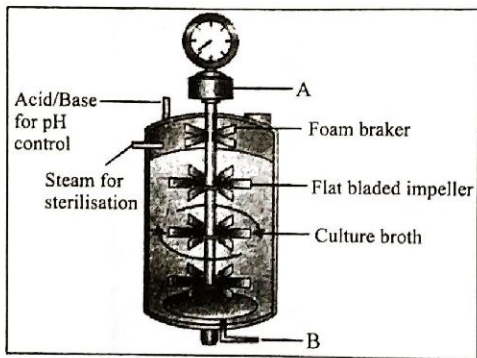
Write any three roles of predators.

19. Transgenic rats, pigs, sheep, rabbits etc. have been produced by rDNA technology.

(a) What are transgenic animals ?

(b) Write two benefits of transgenic animals.

20. Observe the figure given below :



(a) Identify the instrument in the figure.

(b) Label the parts 'A' and 'B'.

(c) Write any one use of this instrument.

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**PART - B**

**ZOOLOGY**

(Maximum : 30 scores)

Time : 1 Hour

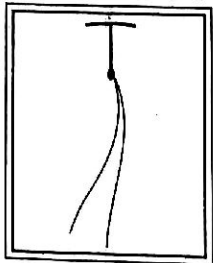
**I. Answer any 3 questions from 1 to 5. Each carries 1 score. (3 × 1 = 3)**

1. The man like primates lived around 15 million years ago were named as \_\_\_\_\_.
2. Name the scientist who proposed the term "X Body".
3. From the given Karyotypes select the Karyotypes of a person having Klinefelter's syndrome.  
(22A + XXY, 22A + XO, 22A + XX, 23A + XX)
4. Transcriptionally active stage of Chromatin is known as \_\_\_\_\_.
5. Pick out the correct one.
  - (i) AUG is a start codon.
  - (ii) AUG is a stop codon.

**II. Answer any 9 questions from 6 to 16. Each carries 2 scores. (9 × 2 = 18)**

6. Define the following terms :
  - (a) Implantation
  - (b) Colostrum
7. Explain about Foetal Ejection Reflex.

8. (i) Observe the given photograph and identify the type of contraceptive method.

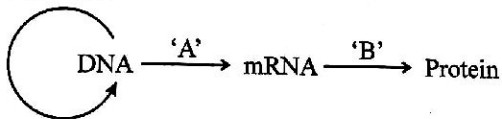


- (ii) Name three groups of IUDs.

9. (i) Expand the term STIs.  
(ii) Comment on any two methods to control STIs.
10. Using Punnet square, try to find out the nature of offspring of a Testcross.
11. Write about any four salient features of Double helical structure of DNA.
12. Differentiate between Convergent evolution and Divergent evolution.

13. (i) Identify and label 'A' and 'B' in the following step :

Replication



- (ii) When the flow of information takes place in reverse direction, as in some viruses, it is named as \_\_\_\_\_.
14. Regulation of gene expression occurs at various levels. Write the four levels at which regulation of gene expression is exerted in Eukaryotes.
15. Explain the terms
- (i) ELISA  
(ii) MALT

16. Match the following :

|                      |                 |
|----------------------|-----------------|
| (1) Salmonella Typhi | (a) Malaria     |
| (2) Rhino virus      | (b) Pneumonia   |
| (3) Pneumococcus     | (c) Common cold |
| (4) Plasmodium       | (d) Typhoid     |
|                      | (e) Aids        |

III. Answer any 3 questions from 17 to 20. Each carries 3 scores.

(3 × 3 = 9)

17. Prepare a pamphlet regarding how to control and prevent drug abuse.

18. Cancer is one of the most dreaded disease among human beings.

(1) What is the peculiarity of cancerous cells ?

(2) Define carcinogens.

(3) Name two types of tumor cells.

19. (1) Define HGP.

(2) Comment on any four salient features of HGP.

20. Arrange various evolutionary forms of man according to their period of existence :

| Period                 | Organism             |
|------------------------|----------------------|
| (1) 15 mya             | (a) Homo sapiens     |
| (2) 2-3 mya            | (b) Dryo pithecus    |
| (3) 2 mya              | (c) Australopithecus |
| (4) 1.5 mya            | (d) Neanderthals     |
| (5) 100000 – 40000 yrs | (e) Homoerectus      |
| (6) 75000 – 10000      | (f) Homohabilis      |