Class No. : .....

Name : .....

2026

# SECOND YEAR HIGHER SECONDARY SECOND TERMINAL EXAMINATION, DECEMBER-2022

Part – III

Time : 2 Hours

## BIOLOGY

Cool-off time : 15 Minutes

## (Botany & Zoology)

Maximum : 60 Scores

***General Instructions to Candidates :***

- There is a 'Cool-off time' of 15 minutes in addition to the writing time.
- 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.
- '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.
- പ്രോഗ്രാമുകൾ ചെയ്യാനാകാത്ത കാൽക്കുലേറ്ററുകൾ ഒഴികെയുള്ള ഒരു ഇലക്ട്രോണിക് ഉപകരണവും പരീക്ഷാഹാളിൽ ഉപയോഗിക്കുവാൻ പാടില്ല.

## PART – A

## BOTANY

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

1. Exine of pollen grain is made up of _____

   (a) Pectin (b) Cellulose

   (c) Sporopollenin (d) Chitin

2. Thermostable DNA polymerase enzyme 'Taq Polymerase' is isolated from _____ bacteria.

   (a) *Thermus aquaticus*

   (b) *Escherichia coli*

   (c) *Salmonella typhemerium*

   (d) *Streptococcus pneumoniae*

3. Which of the following is a perispermous seed ?

   (a) Pea (b) Black Pepper

   (c) Wheat (d) Barley

4. Name the instrument used to produce large quantity of recombinant protein.

5. The parasitic bird lays its egg in the nest of the host and the host bird incubate it. Name the type of parasitic interaction.

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

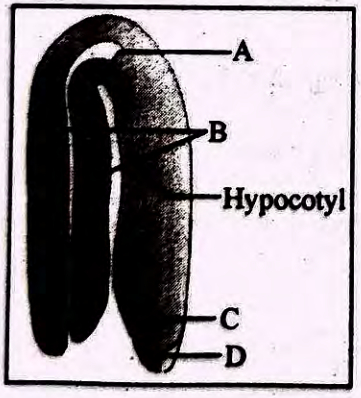
6. Describe two methods by which Alien DNA is introduced into host directly.

7. Two out breeding devices developed by plants to prevent self-pollination is given below.

Complete the chart adding two more points.

- Self-incompactibility
- Unisexual flowers.
- 
- 

8. Observe the diagram and label the parts A, B, C and D.




9. What are palindromic DNA nucleotide sequences ? Write one example for palindromic sequence.

10. Bt cotton is a genetically modified plant.

(a) What does 'Bt' stand for ?

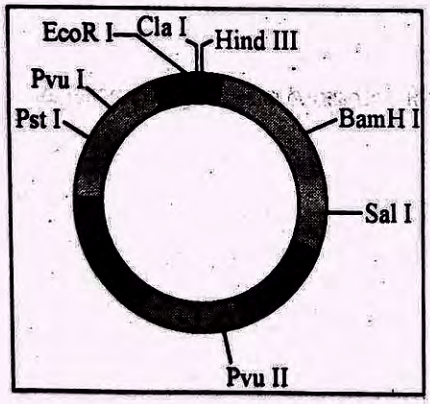
(b) What is the specific feature of 'Bt' cotton plant ?

11. Write the four factors that affect population density.

12. Observe the diagram.

(a) Identify the cloning vector.

(b) Write three characteristic features of a cloning vector.




13. Gene therapy is a corrective therapy for hereditary diseases. How is adenosine deaminase deficiency using Gene therapy ?

14. Fill in the blanks with indicators given below :

| Competition, Parasitism, Mycorrhiza, Sparrow eating seed. |
|---|

| Name of interaction | Example |
|---|---|
| Mutualism | A |
| B | Abington tortoise and Goat |
| C | Cuscuta on hedge plant |
| Predation | D |

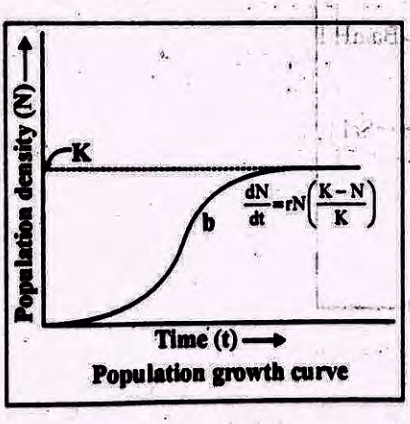
15. Observe the chart.

(a) Identify the population growth curve.

(b) What do the following represent ?

(i) r

(ii) K




16. (a) What is RNA interference ?

(b) Name the vector used to introduce nematode specific gene into host plant.

**III. Answer any 3 questions from 17 to 20. Each carries 3 scores.** **(3 × 3 = 9)**

17. Microsporangium is surrounded by four wall layers.

    (a) Name the four wall layers.

    (b) Write the function of these layers.

18. Genetically modified plants have been useful in many ways.

    Write any three uses of genetic modification in plants.

19. Given below are the features of flowers pollinated by wind, water and insect. Arrange them in corresponding columns.

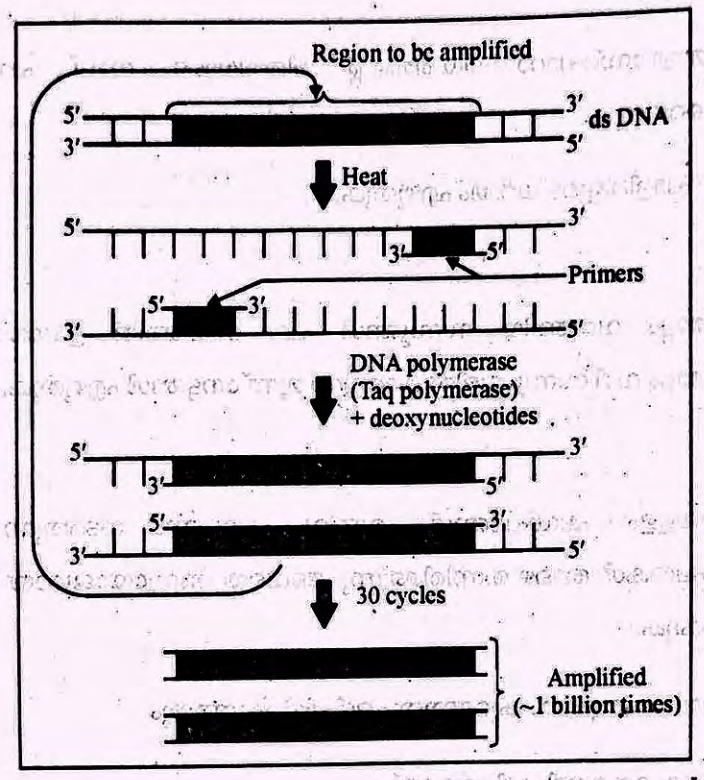
- Pollen grains are light and non-sticky.
- Pollen grains are sticky.
- Pollen grains are large ribbon like.
- Pollen grains have muscilage covering.
- Flowers are large, colourful fragrant.
- Single ovule present.

| Wind | Water | Insect |
|---|---|---|
| • | • | • |
| • | • | • |

20. (a) Identify the process.

(b) Write the steps of this process.

(c) What is a primer ?



## PART – B

## ZOOLOGY

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

1. Find the odd one out and give reason :

   Cervix, Fallopian tube, Vas deferens, Vagina

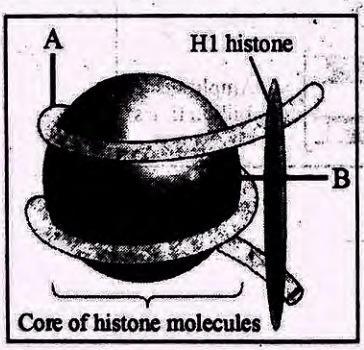
2. Write the use and misuse of amniocentesis.

3. In human being the cause of a genetic disorder is the presence of an additional copy of the chromosome number 21

   (Trisomy of 21)

   Identify the disorder.

4. Observe the given diagram of nucleosome and identify the parts 'A' and 'B'.




5. Australian marsupials and Darwins finches are the examples of _____.

   (a) Analogous organs

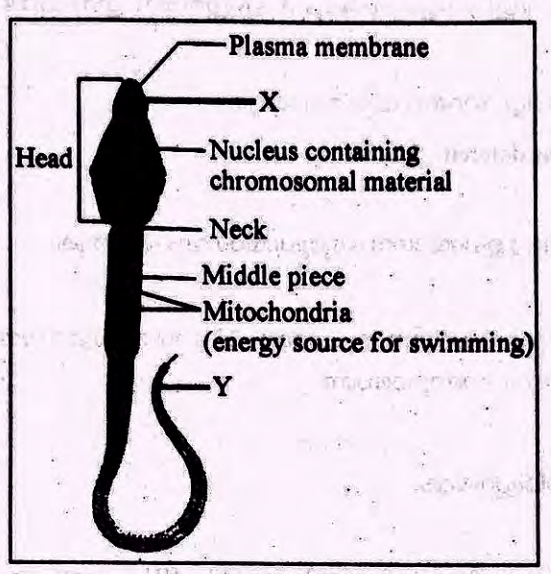
   (b) Adaptive radiation

   (c) Pan spermia

   (d) Paleontology

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

6. Observe the diagram and answer the following questions :




(a) Name the parts 'X' and 'Y'.

(b) Write the functions of 'X' and 'Y'.

7. Identify the wrong statement and correct it :

(a) Menstrual cycle ceases during pregnancy.

(b) Seminal vesicle is a part of female reproductive system.

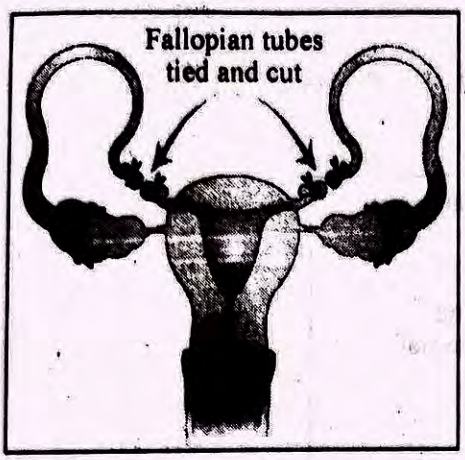
(c) The process of fusion of a sperm and ovum is called fertilisation.

8. Write any one function of the following in the reproductive system of human :

(a) Corpus luteum

(b) Sertoli cells

9. Observe the diagram.




(a) Identify the process of sterilisation shown in the picture.

(b) How does this method help in contraception ?

10. 'Human ABO blood group is an example of co-dominance.' Do you agree with this statement ? Justify.

11. A cross between red flowered and white flowered plants of Snapdragon produced pink flowered plants in F1 generation.

(a) Identify the genetic phenomenon.

(b) Illustrate the cross and find out the offsprings in F2 generation.

12. Explain chromosomal mechanism of sex determination in Drosophila. (Write any two points)

13. S Strain → inject into mice → Mice die

R Strain → inject into mice → Mice live

S Strain → inject into mice → Mice live

(Heat killed)

S Strain + R Strain → inject into mice → Mice die

(Heat killed) (Live)

(a) Identify the above experiment.

(b) Mice died when a mixture of heat killed S strain and live R strain is injected. Why ? Explain.

14. Classify the following groups of organs/structures into homologous and analogous organs :

(a) Flippers of Penguins and Dolphins

(b) Forelimbs of Man, Cheetah, Whale, Bat

(c) Wing of Butterfly and Birds

(d) Thorn of Bougainvillea and Tendril of cucurbita.

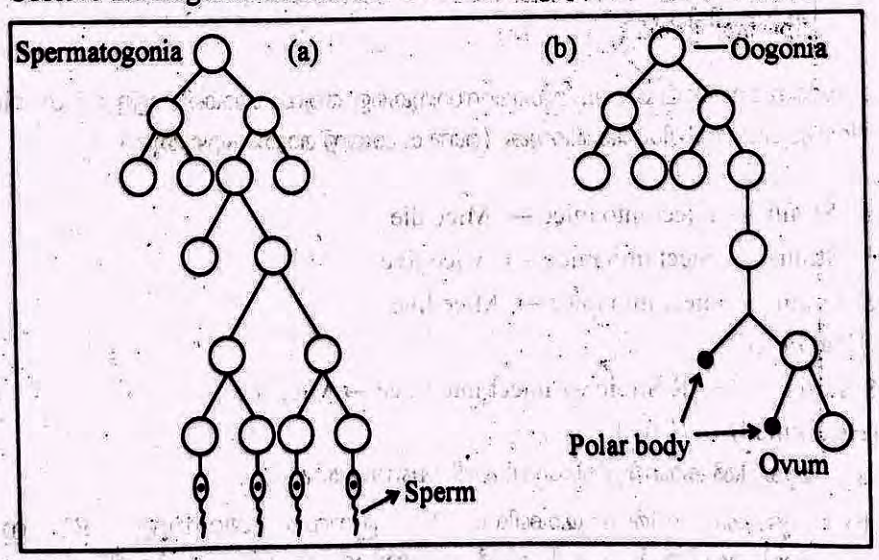
15. What is Hardy-Weinberg Principle ? Mention any two factors that affect Hardy – Weinberg equlibrium.

16. Match the following :

| A<br>Diseases | B<br>Organisms |
|---|---|
| Malaria | Rhinovirus |
| Filariasis | Trichophyton |
| Common cold | Wuchereria |
| Ring worm disease | Plasmodium |

**III. Answer any 3 questions from 17 to 20. Each carries 3 scores.** **(3 × 3 = 9)**

17. Observe the diagrams and answer the following questions.




(a) Name the process 'a' and 'b'.

(b) Write any four differences between 'a' and 'b'.

18. Expand the following and explain any one of them :

(a) IUI

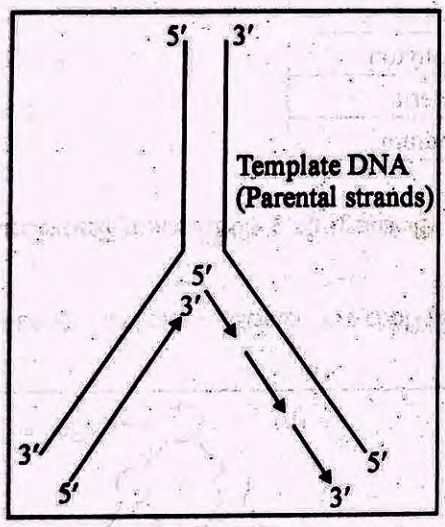
(b) ZIFT

(c) GIFT

(d) MTP

19. In eukaryotes, hn RNA (heterogenous nuclear RNA – Precursor of mRNA) undergo processing like Splicing, Capping and Tailing. Explain Splicing, Capping and Tailing.

20. Observe the diagram and answer the following :




(a) Identify the process.

(b) Name two enzymes and their role in this process.