Reg. No. : .....

Name : .....

Code No. 8017

For Scheme-I Candidates only

Second Year – 2015
SAY / IMPROVEMENT

Time : 2 Hours
Cool-off time : 20 Minutes
Preparatory Time : 5 Minutes

Part – III

BIOLOGY

Maximum : 60 Scores

General Instructions to Candidates :

- There is a 'cool-off time' of 10 minutes each for Botany and Zoology in addition to the writing time of 1 hour each. Further there is '5 minutes' 'Preparatory Time' at the end of the Botany Examination and before the commencement of Zoology Examination.
- You are not allowed to write your answers nor to discuss anything with others during the 'cool-off time' and 'Preparatory Time'.
- Use the 'cool-off time' to get familiar with questions and to plan your answers.
- Read questions carefully before answering.
- All questions are compulsory and only internal choice is allowed.
- When you select a question, all the sub-questions must be answered from the same question itself.
- 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.

PART – A
BOTANY

(Maximum : 30 Scores) **Time : 1 Hour**

Cool-off time : 10 Minutes

1. (a) Yeast asexually multiples by budding whereas *Penicillium* by _____.
   (b) Bryophyllum vegetatively multiples by adventitious buds water hyacinth by _____. **(Score : ½ + ½ = 1)**

2. By observing the relationship of the first pair fills up the blanks.
   (a) Net primary productivity = Gross primary productivity – Respiration.
   Gross primary productivity is _____.
   (b) Carbon : Gaseous cycle
   Phosphorus : _____. **(Score : ½ + ½ = 1)**

3. In a Grama Panchayat, Members wanted to start a Bee-keeping industry. What are your suggestions for successful bee keeping ? (4 points) **(Scores : 2)**

4. Observe the relation in the first pair and fill up the blank in the seco

(a)

Crop	Variety	Resistant to disease
Brassica	Pusa Swarnim	Wheat rust
Chilli	_____	Chilly mosaic virus

(Score : ½)

(b)

Crop	Variety	Insect pest
Okra	Pusa sawani	Shoot & Fruit borer
Flat bean	_____	Jassids, fruit borer and aphids

(Score : ½)

5. A multinational company successfully cloned a gene of interest and also optimized the conditions to induce the expression of target protein.
   (a) Name the apparatus for large scale production of such proteins. **(Score : ½)**
   (b) Briefly explain the apparatus. **(Scores : 1½)**

6. Observe the equation.

$$\frac{dN}{dt} = rN\frac{(K-N)}{K}$$

(a) Which type of growth curve does it represents ? **(Score : ½)**

(b) What do the following notations represent :

(a) N
(b) r
(c) K

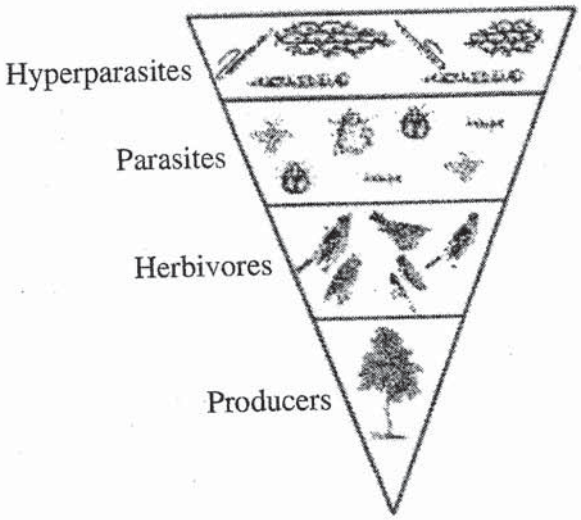
(Scores : 1½)

7. A farmer approached an Agriculture officer to tell his grievance i.e., reduction in tobacco yield due to root damage by nematodes.

(a) What is your suggestion to prevent this infestation ? **(Score : ½)**

(b) Briefly explain the process. **(Scores : 1½)**

8. Field survey by a team of students recorded the following data related to number of organisms in an ecosystem and plotted that into a figure shown below :



Observe the figure and explain the pyramid. **(Scores : 2)**

9. In a scientific forum you are allotted a topic 'Causes of biodiversity losses'. Describe any two major reasons for this. **(Scores : 2)**

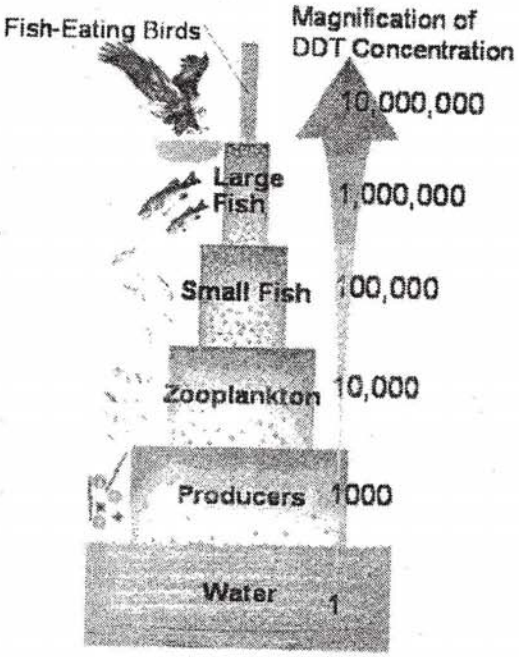
10. The chromosome number of onion is = 16 (2n). Find the chromosome number in the following cells with reasons.

(a) Endosperm cell

(b) Zygote

(Scores : 1 + 1 = 2)

11. Observe the diagram and answer the following :



(a) Suggest the reasons for the presence of DDT in the water.

(b) Fish eating birds of this area have higher DDT concentration in their body. Justify.

(c) What will be the impact of DDT in the birds ? **(Scores : 1 + 2 = 4)**

OR

11. United Nations Framework convention on climate change, an international treaty signed by 194 countries to cooperatively discuss global climate change and its impact.

As a science student,

(a) What is global warming ? **(Score : 1)**

(b) Explain the reasons and give suggestions to control global warming ? **(Scores : 3)**

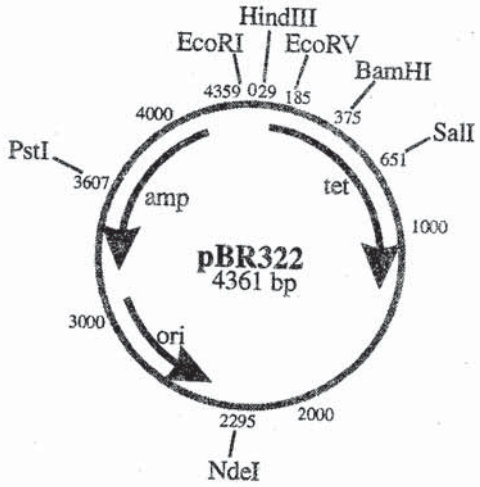
12. You are supplied with three different flowers such as Maize, *Vallisneria* and Rose and they have different pollinating agents also.

(a) Differentiate the type of pollination.

(b) Write their various adaptability in the plants suited to pollination.

(Scores : 1 + 3 = 4)

13. Observe the cloning vector and explain the following :



i) Ori

ii) Bam HI

(Scores : 1 + 1 = 2)

14. One of the speaker in the National Children's Science Congress delivered a talk about Transgenic animals. Explore any 2 benefits of Transgenic animals. **(Scores : 2)**

15. Hydrosere succession stages are given below. Arrange them in order.

Scrub stage – forest – submerged free floating – Marsh Meadow – Submerged stage – Reed swamp – Phytoplankton.

(Score : 1)

PART – B
ZOOLOGY

(Maximum : 30 Scores) **Time : 1 Hour**

Cool-off time : 10 Minutes

1. Choose the odd one from the following and write the common feature of others :

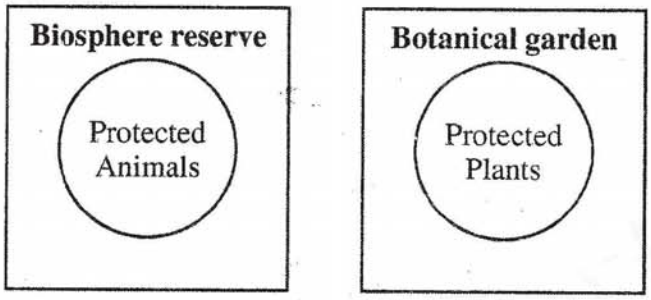
   (a) Estrogen

   (b) Androgen

   (c) Relaxin

   (d) Progesterone **(Score : 1)**

2 Two approaches for the conservation of biodiversity is shown as A and B.



A B

(a) Identify the type of biodiversity conservation shown in A and B.

(b) Write the difference between the two types of biodiversity conservation shown in A and B.

(c) Which of the above approach is more desirable when there is an urgent need to save a species ?

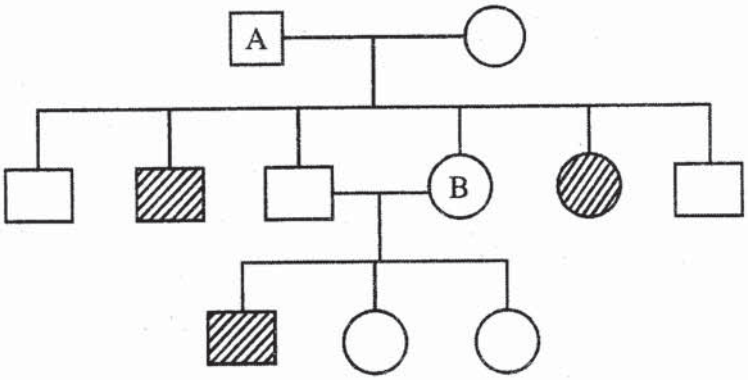
(Scores : 3)

3. Match the terms given in the three columns of the table correctly :

Pathogen	Group	Disease
Haemophilus Influenzae	Protozoa	Ringworm
Plasmodium Vivax	Fungus	Pneumonia
Wuchereria Bancrofli	Bacteria	Malaria
Trichophyton	Flatworm	Filariasis

(Scores : 2)

4. Diagrammatic representation of the pedigree analysis of the inheritance of sickle cell anaemia is shown below :



(a) ıne the type of inheritance shown in the figure.

(b` rite the genotype of A and B.

(Hint : Disease is controlled by a pair of alleles Hb^A and Hb^S)

Represent pedigree analysis of an X-linked recessive inheritance diagrammatically.

(Scores : 3)

5 3OD of some water samples are given below :

A. Sample 1 – 200 mg/L

B. Sample 2 – 80 mg/L

C. Sample 3 – 300 mg/L

D. Sample 4 – 25 mg/L

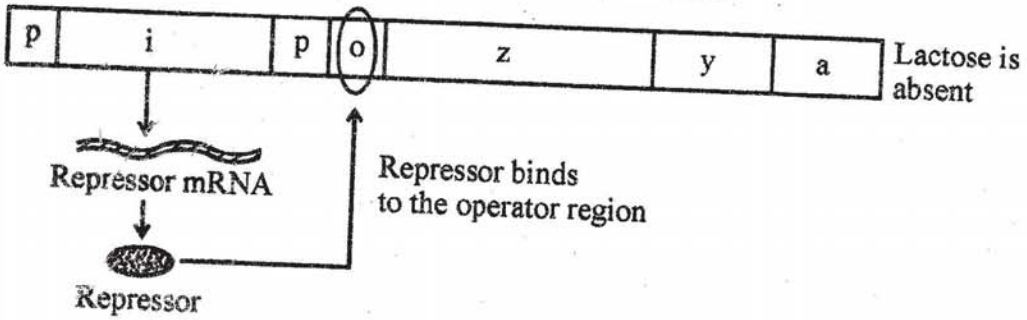
(a) Which of the above water sample is most polluted ?

(b) What is meant by flocs ? What is its role in sewage treatment ? **(Scores : 2)**

6. "If proper care and attention is not given by adults, adolescents may become addicted to drugs/alcohol." What is your opinion about this statement ? Substantiate your answer.

(Scores : 2)

7. Observe the following diagram and answer the questions :



(a) Diagrammatically represent the changes take place when lactose is added to the medium.

(b) What is the role of z, y and a genes in this metabolic pathway ? **(Scores : 3)**

8. Some techniques commonly used for infertility treatment are given below. Read them carefully and answer the questions

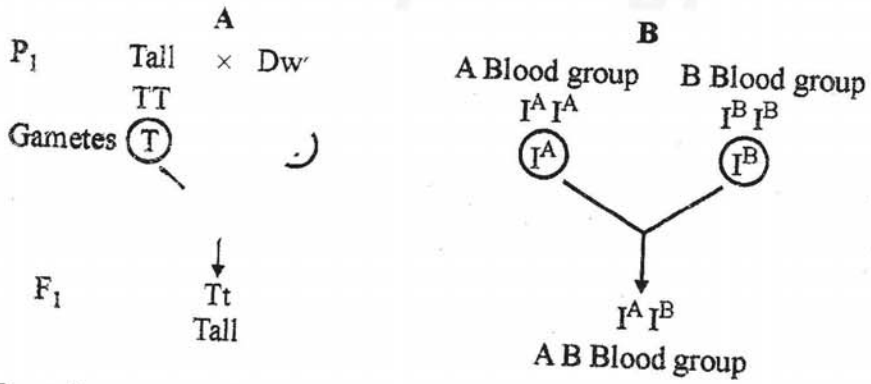
ZIFT, GIFT, ICSI, IUI, IVF

(a) Which of the above technique is used for the collection of sperm from the husband or a healthy donor and artificially introduced into the vagina or uterus of the female ?

(b) Distinguish between ZIFT and GIFT.

(c) Write the common term used to denote the techniques given above. **(Scores : 3)**

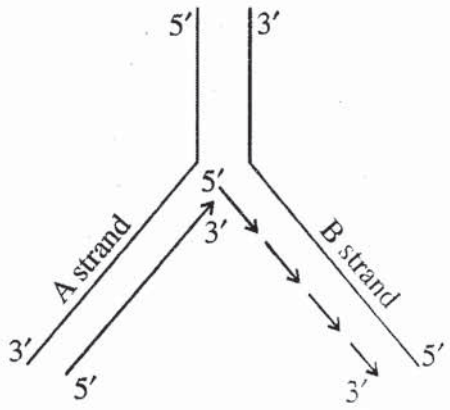
9. Observe the inheritance shown in A and B :



(a) Name the type of inheritance shown in A and B.

(b) What is the difference between the two types of inheritance ? **(Scores : 2)**

10. Observe the diagram and answer the questions :

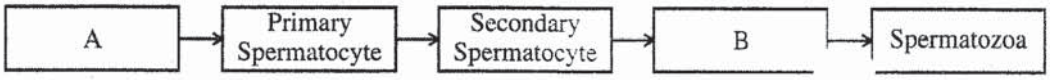


(a) What is the difference in the replication processes in A strand and B strand ?

(b) What is the role of DNA ligase in the replication process in B strand ?

(c) What is meant by Replication fork ? **(Scores : 3)**

11. Complete the flow chart showing spermatogenesis by filling A and B and answer the questions :



(a) What is the chromosome number of primary spermatocyte

(b) What is the significance of reduction division in spermatc :sis ? **(Scores : 2)**

12. Four groups of organs are given below :

Read them carefully and answer the questions :

A. Thorns of bougainvilla and Tendrils of cucurbita

B. Eyes of octopus and mammals

C. Flippers of penguin and dolphin

D. Forelimbs of cheetah and man

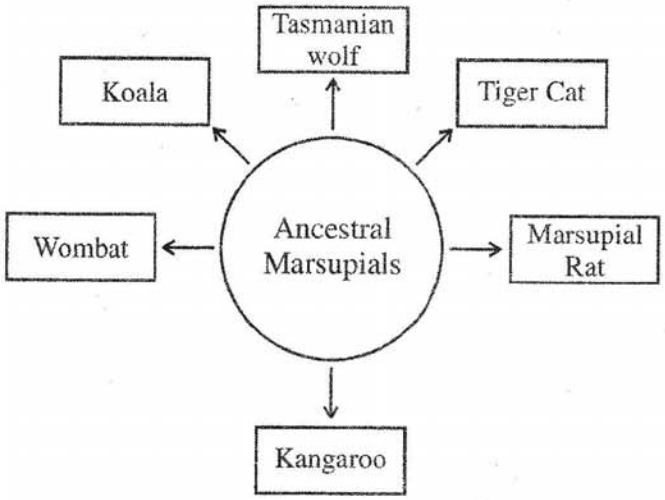
(a) Categorise the four groups of organs as homologous organs and analogous organs.

(b) Based on each group of organs differentiate convergent evolution and divergent evolution.

(c) Illustrate homologous and analogous organs as evidences for evolution. **(Scores : 4)**

OR

Observe the diagrammatic representation and answer the questions :



(a) Explain the phenomenon shown in the figure.

(b) How can it be considered as an evidence of evolution ?

(c) Write any other example for this phenomenon. Explain. **(Scores : 4)**
