

Reg. No. :

Code No. 8017

Name :

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.

നിർദ്ദേശങ്ങൾ :

- നിർദ്ദിഷ്ട സമയത്തിന് പുറമെ ബോട്ടണിയ്ക്കും സുവോളജിക്കും 10 മിനിറ്റ് വീതം 'കൂൾ ഓഫ് ടൈം' ഉണ്ടായിരിക്കും. കൂടാതെ ബോട്ടണി പരീക്ഷയ്ക്കുശേഷം സുവോളജി പരീക്ഷ തുടങ്ങുന്നതിനുമുമ്പ് '5 മിനിറ്റ്' തയ്യാറെടുപ്പുകൾ നടത്തുന്നതിനായി നൽകുന്നതാണ് 'പ്രിപ്പറേറ്ററി ടൈം'. ഈ ചോദ്യങ്ങൾക്ക് ഉത്തരം എഴുതാനോ, മറ്റുള്ളവരുമായി സംസാരിക്കാനോ പാടില്ല.
- ഉത്തരങ്ങൾ എഴുതുന്നതിനിടയിൽ മറ്റ് ചോദ്യങ്ങൾ ശ്രദ്ധാപൂർവ്വം വായിക്കണം.
- എല്ലാ ചോദ്യങ്ങൾക്കും ഉത്തരം എഴുതണം.
- ഒരു ചോദ്യനമ്പർ ഉത്തരമെഴുതാൻ തെരഞ്ഞെടുത്തു കഴിഞ്ഞാൽ ഉപചോദ്യങ്ങളും അതേ ചോദ്യനമ്പറിൽ നിന്ന് തന്നെ തെരഞ്ഞെടുക്കേണ്ടതാണ്.
- കണക്ക് കൂട്ടലുകൾ, ചിത്രങ്ങൾ, ഗ്രാഫുകൾ എന്നിവ ഉത്തരപേപ്പറിൽ തന്നെ ഉണ്ടായിരിക്കണം.
- ചോദ്യങ്ങൾ മലയാളത്തിലും നൽകിയിട്ടുണ്ട്.
- ആവശ്യമുള്ള സ്ഥലത്ത് സമവാക്യങ്ങൾ കൊടുക്കണം.
- പ്രോഗ്രാമുകൾ ചെയ്യാനാകാത്ത കാൽക്കുലേറ്ററുകൾ ഒഴികെയുള്ള ഒരു ഇലക്ട്രോണിക് ഉപകരണവും പരീക്ഷാഹാളിൽ ഉപയോഗിക്കുവാൻ പാടില്ല.

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 : $\frac{1}{2} + \frac{1}{2} = 1$)

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 : $\frac{1}{2} + \frac{1}{2} = 1$)

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 second

(a)

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

(Score : $\frac{1}{2}$)

(b)

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

(Score : $\frac{1}{2}$)

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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 : $\frac{1}{2}$)
- (b) Briefly explain the apparatus. (Scores : $1\frac{1}{2}$)

6. Observe the equation.

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

(a) Which type of growth curve does it represent ?

(Score : 1/2)

(b) What do the following notations represent :

(a) N

(b) r

(c) K

(Scores : 1 1/2)

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

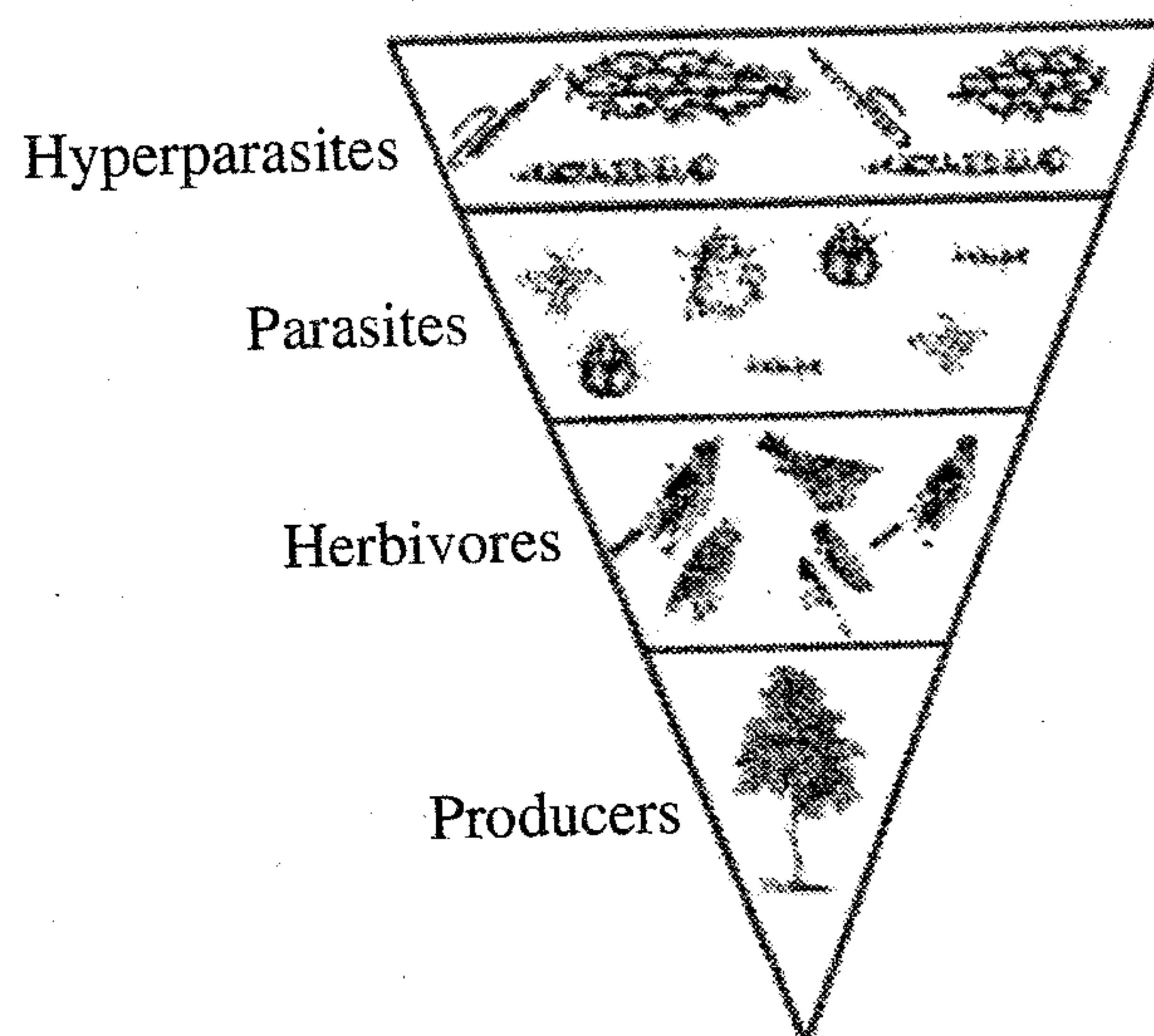
(a) What is your suggestion to prevent this infestation ?

(Score : 1/2)

(b) Briefly explain the process.

(Scores : 1 1/2)

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 :



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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.

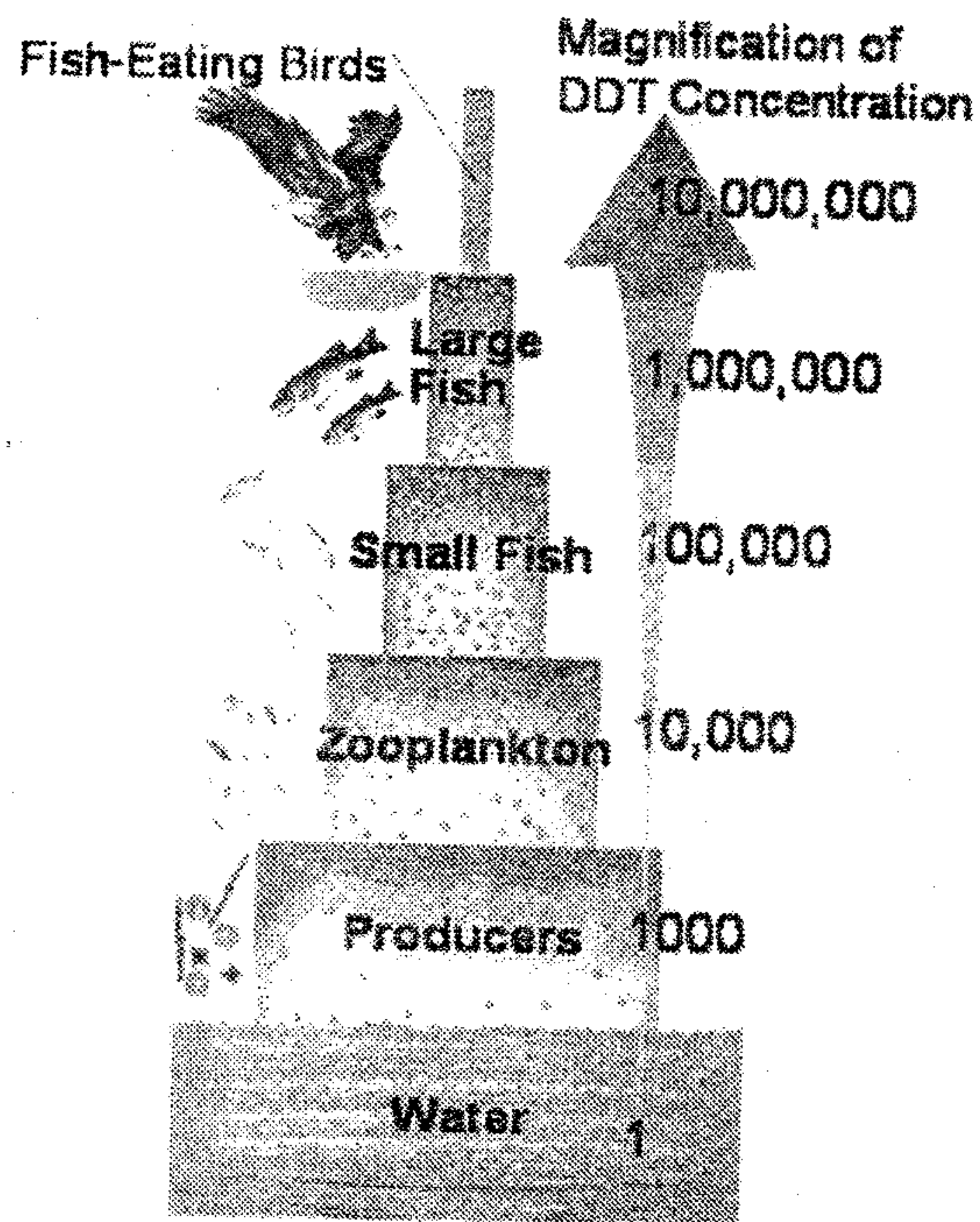
(Scores : 2)

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 :



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- (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)

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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,

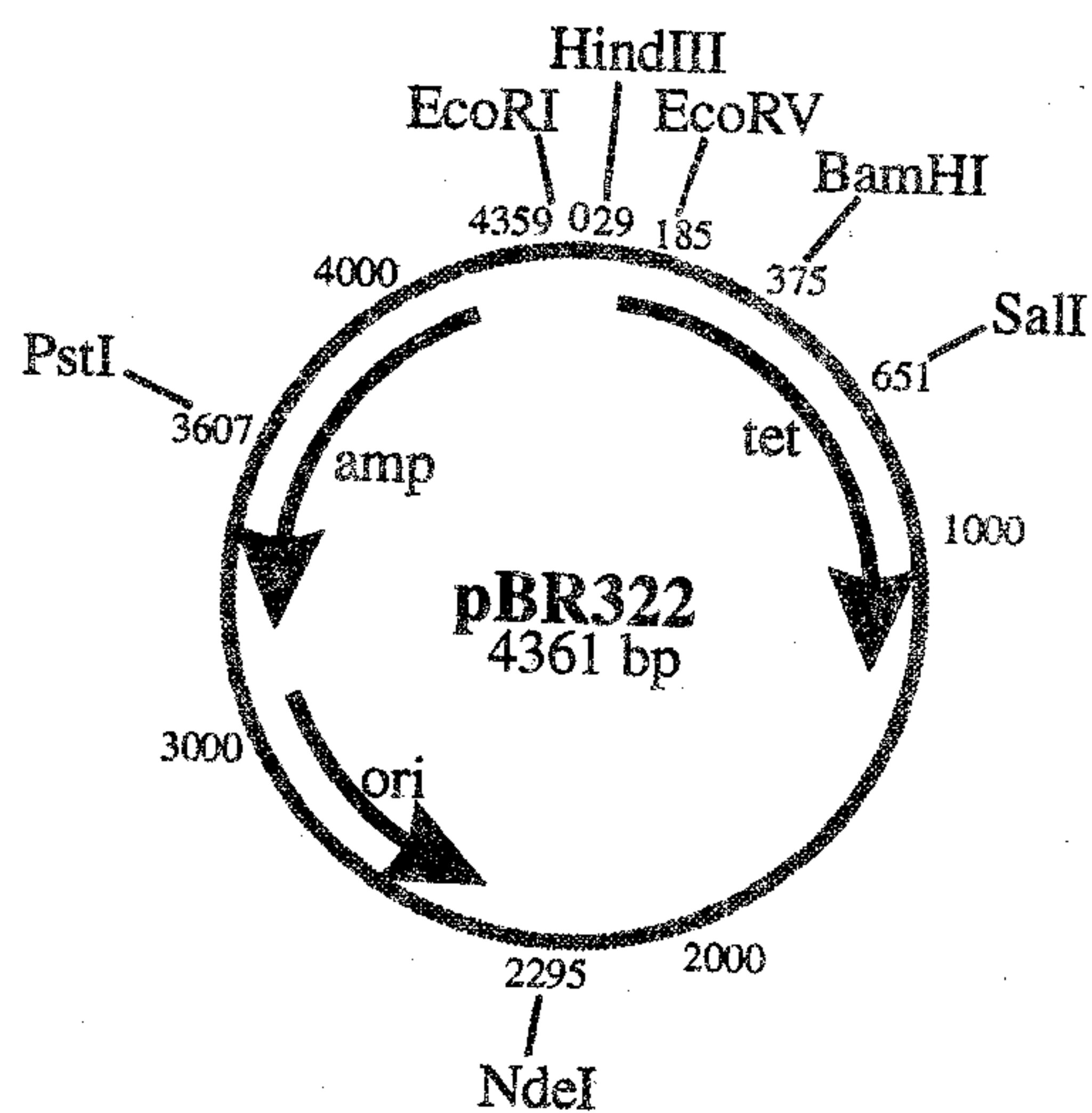
- (a) What is global warming ? (Score : 1)
- (b) Explain the reasons and give suggestions to control global warming ? (Scores : 3)

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 :



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- a) Ori
- b) 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

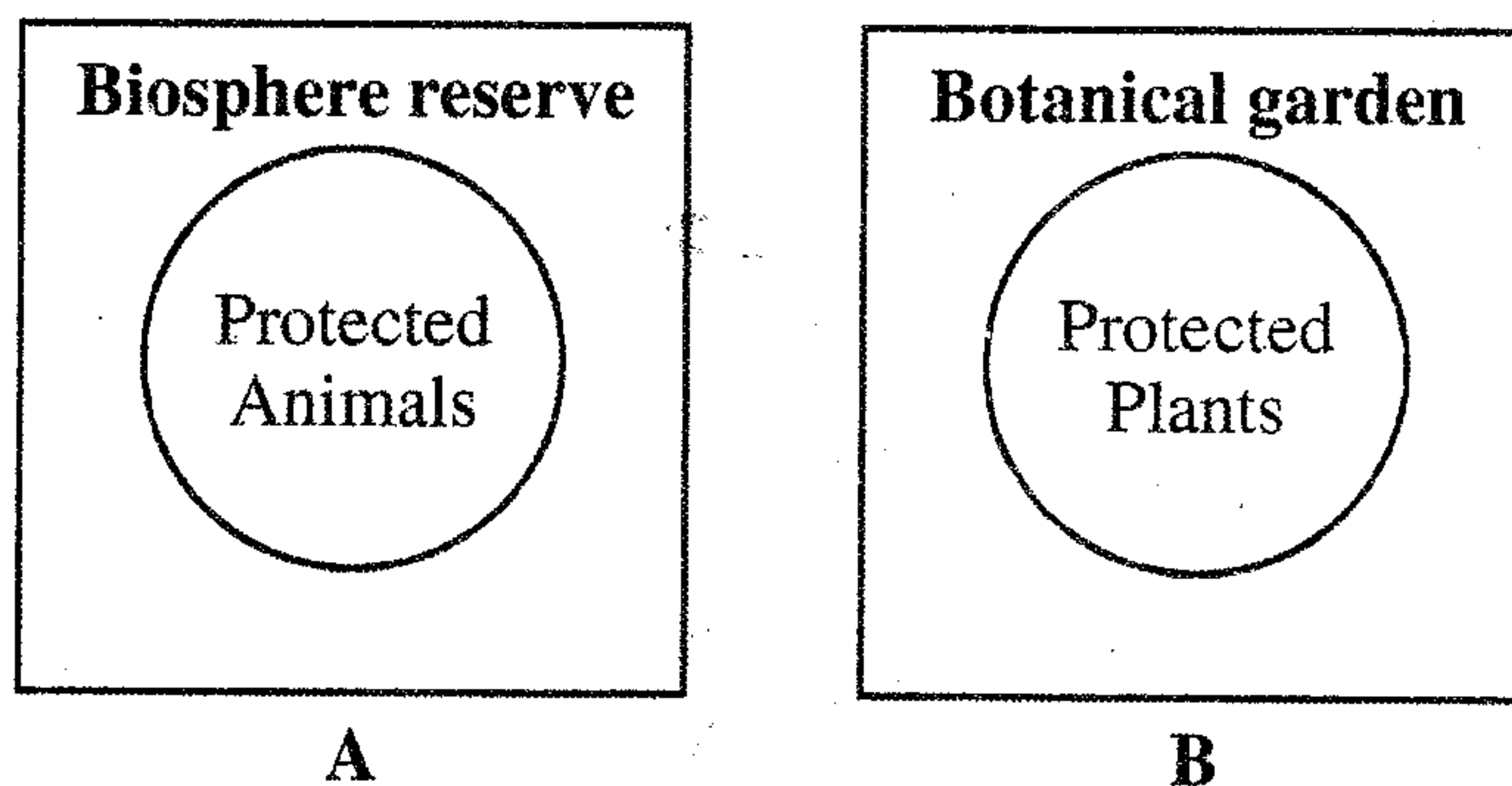
Cool-off time : 10 Minutes

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) 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 ?

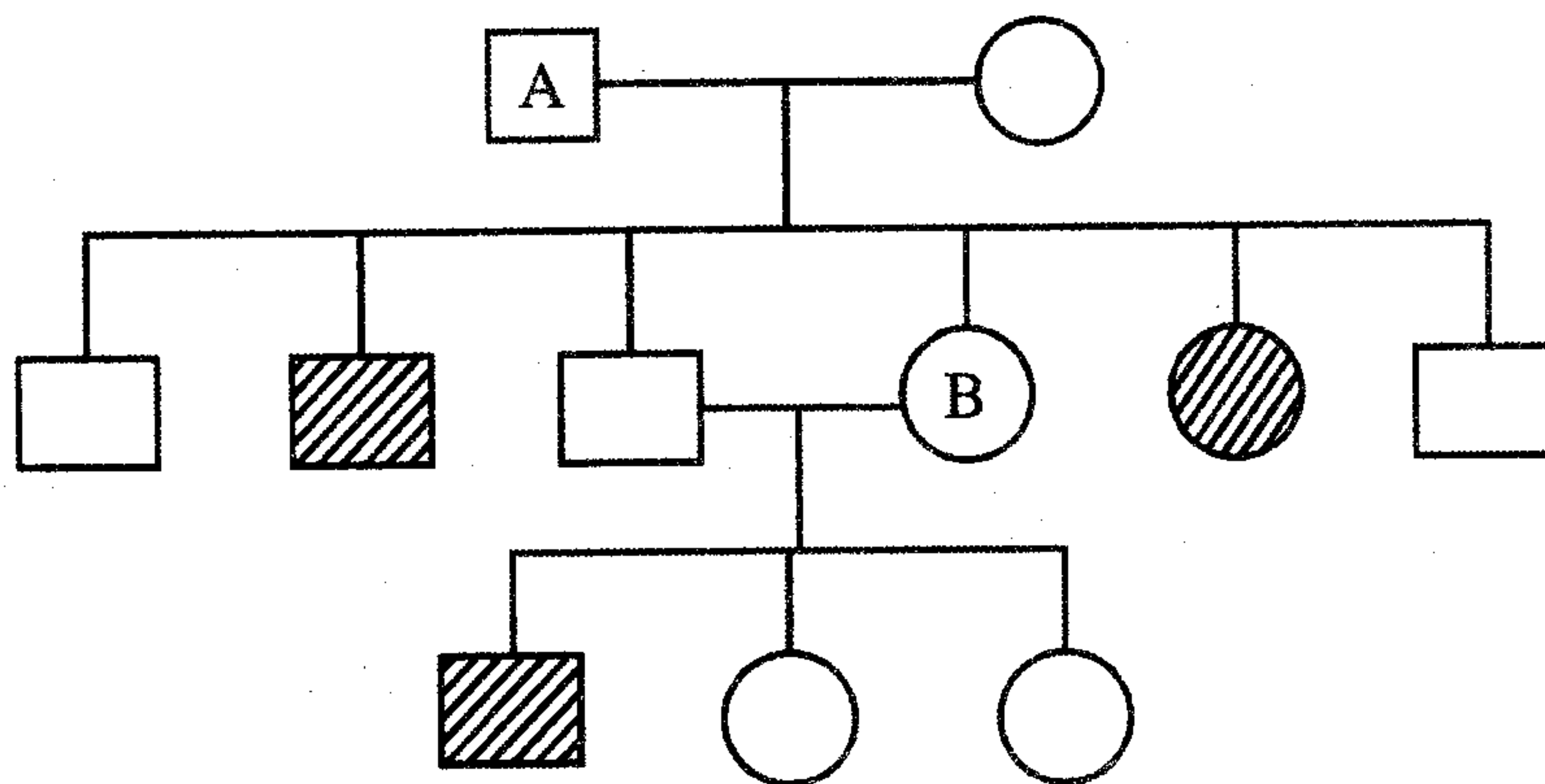
(Scores : 3)

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) Name the type of inheritance shown in the figure.
 (b) Write 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. BOD 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

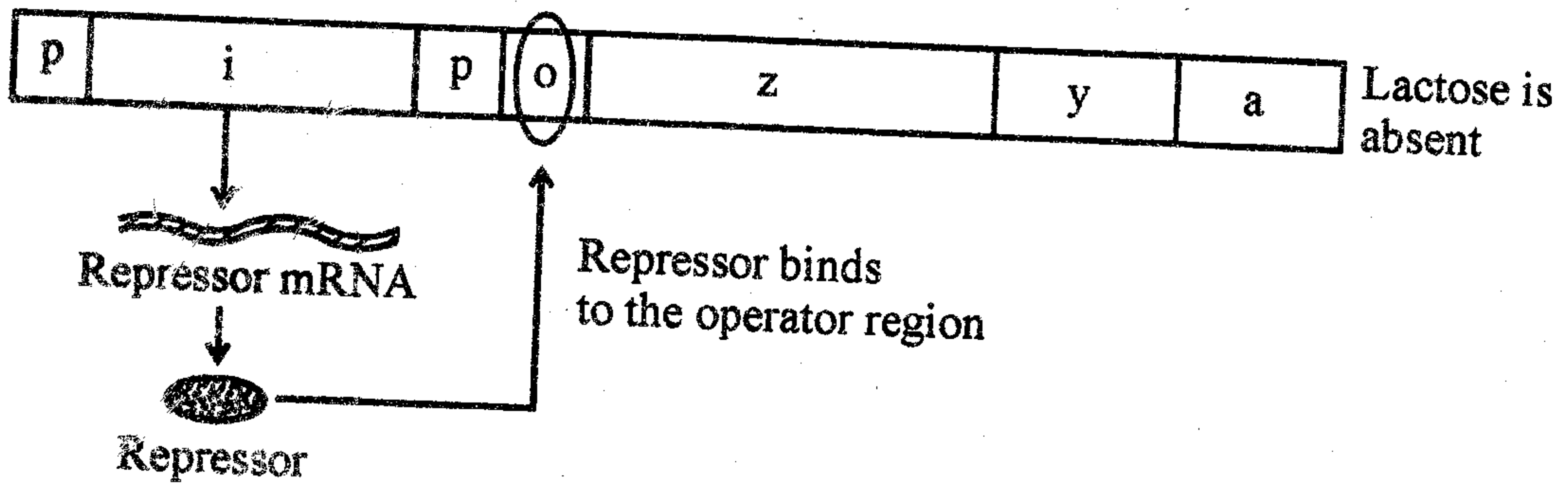
- (a) Which of the above water sample is most polluted ?
 (b) What is meant by flocs ? What is its role in sewage treatment ?

(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 :



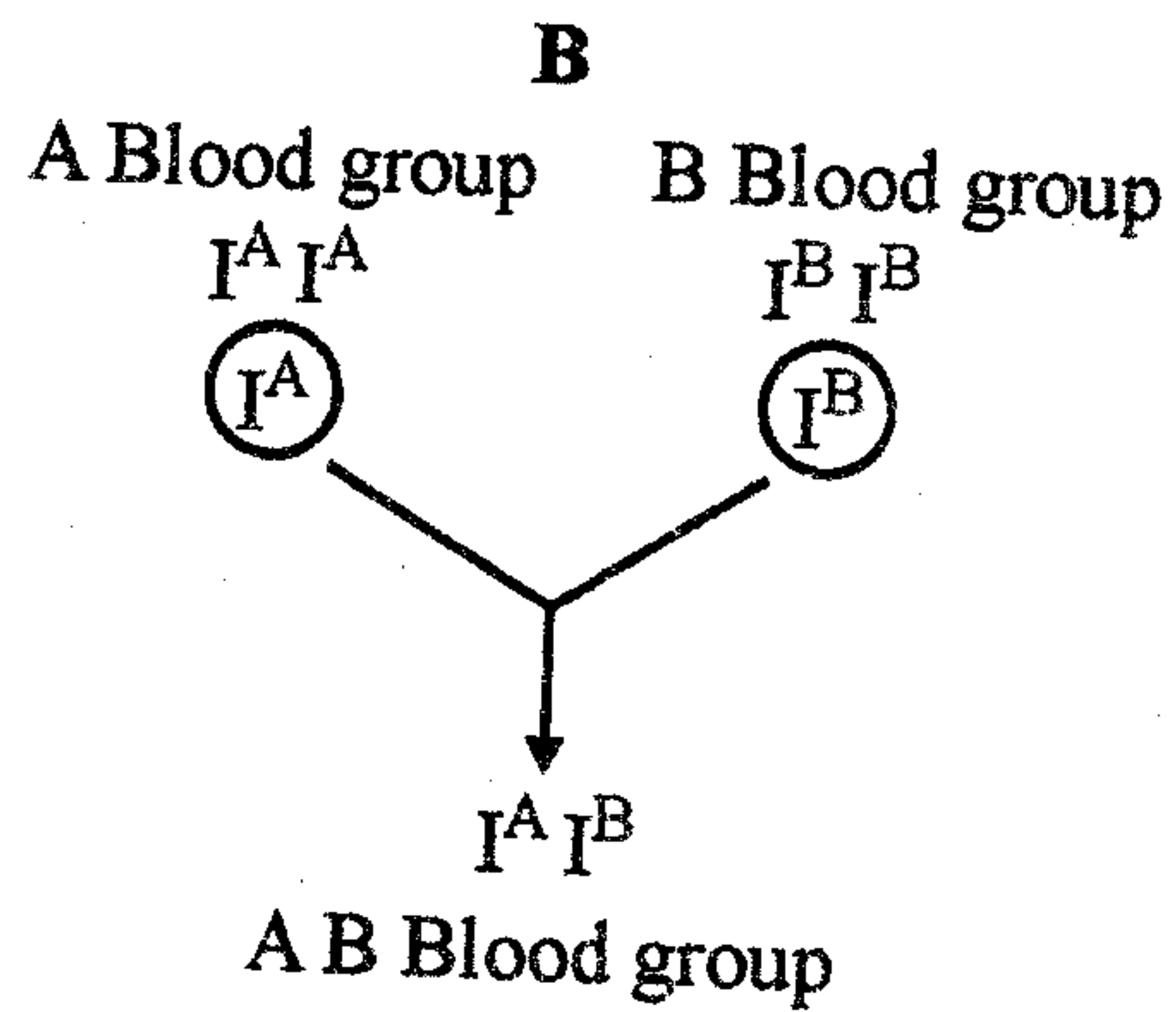
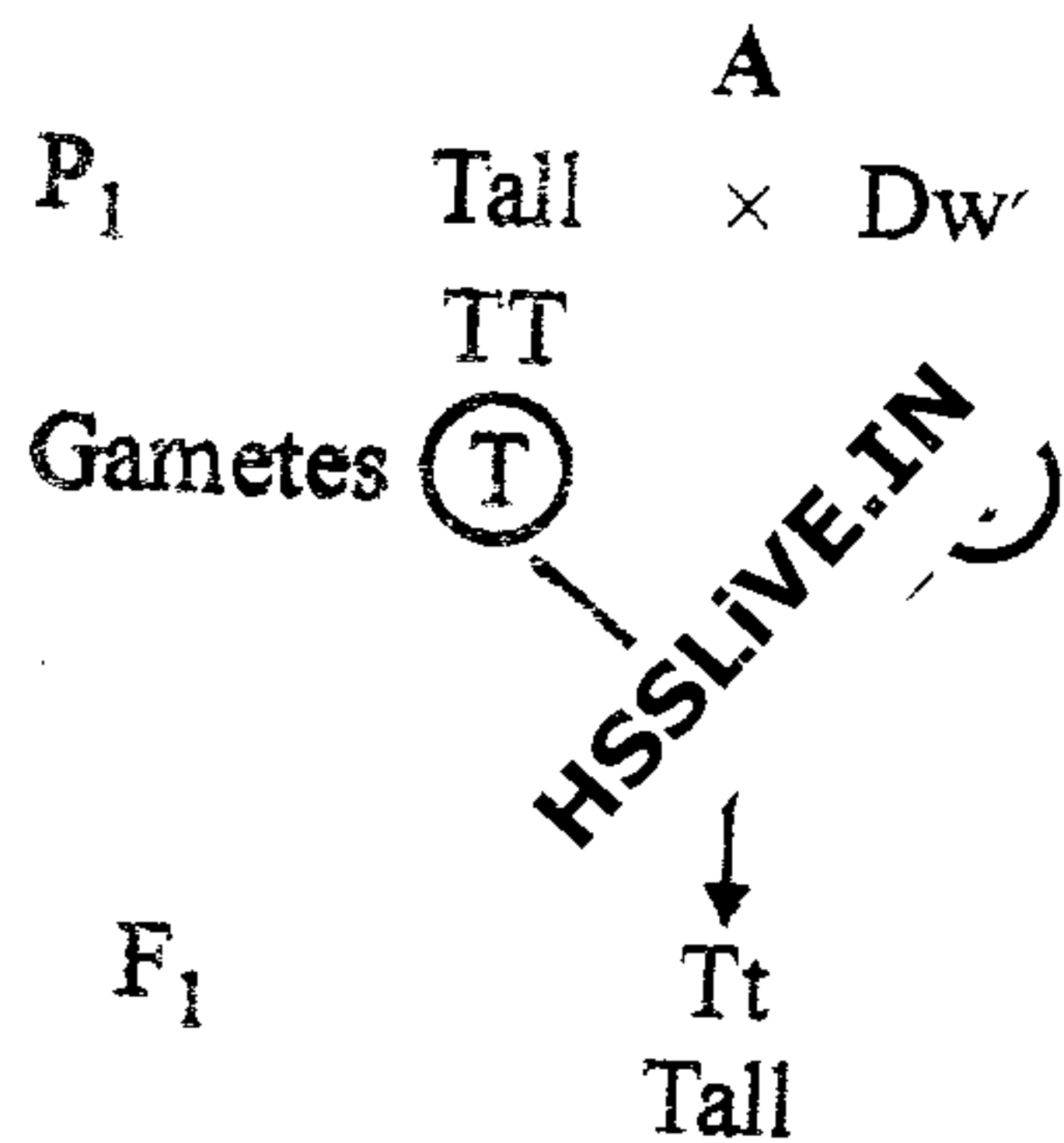
- (a) Diagrammatically represent the changes take place when lactose is added to the medium.
- (b) What is the role of z, y and a genes in this metabolic pathway ? (Scores : 3)

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

ZIFT, GIFT, ICSI, IUI, IVF

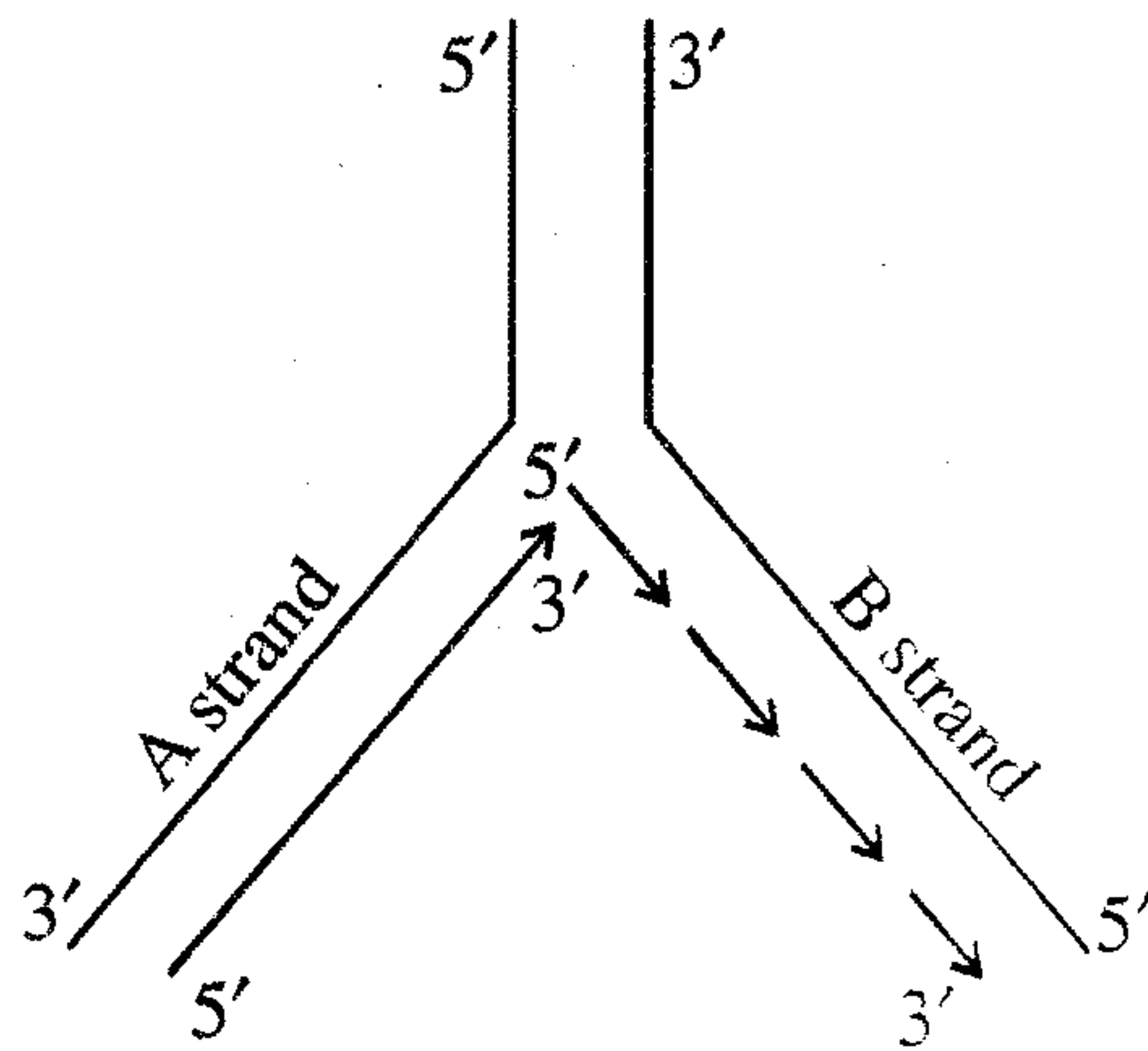
- (a) Which of the above technique is used for the collection of sperm from the husband or a healthy donor and artificially introduced into the vagina or uterus of the female ?
- (b) Distinguish between ZIFT and GIFT.
- (c) Write the common term used to denote the techniques given above. (Scores : 3)

9. Observe the inheritance shown in A :



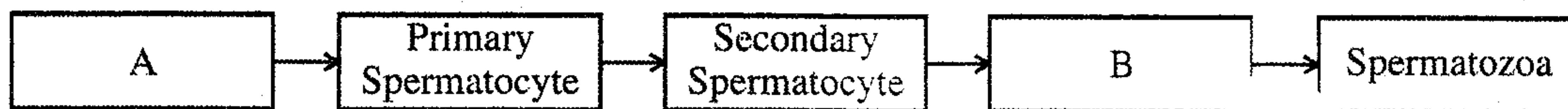
- (a) Name the type of inheritance shown in A and B.
- (b) What is the difference between the two types of inheritance ? (Scores : 2)

10. Observe the diagram and answer the questions :



- What is the difference in the replication processes in A strand and B strand ?
- What is the role of DNA ligase in the replication process in B strand ?
- What is meant by Replication fork ? (Scores : 3)

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



- What is the chromosome number of primary spermatocyte
- What is the significance of reduction division in spermatogenesis ? (Scores : 2)

12. Four groups of organs are given below :

Read them carefully and answer the questions :

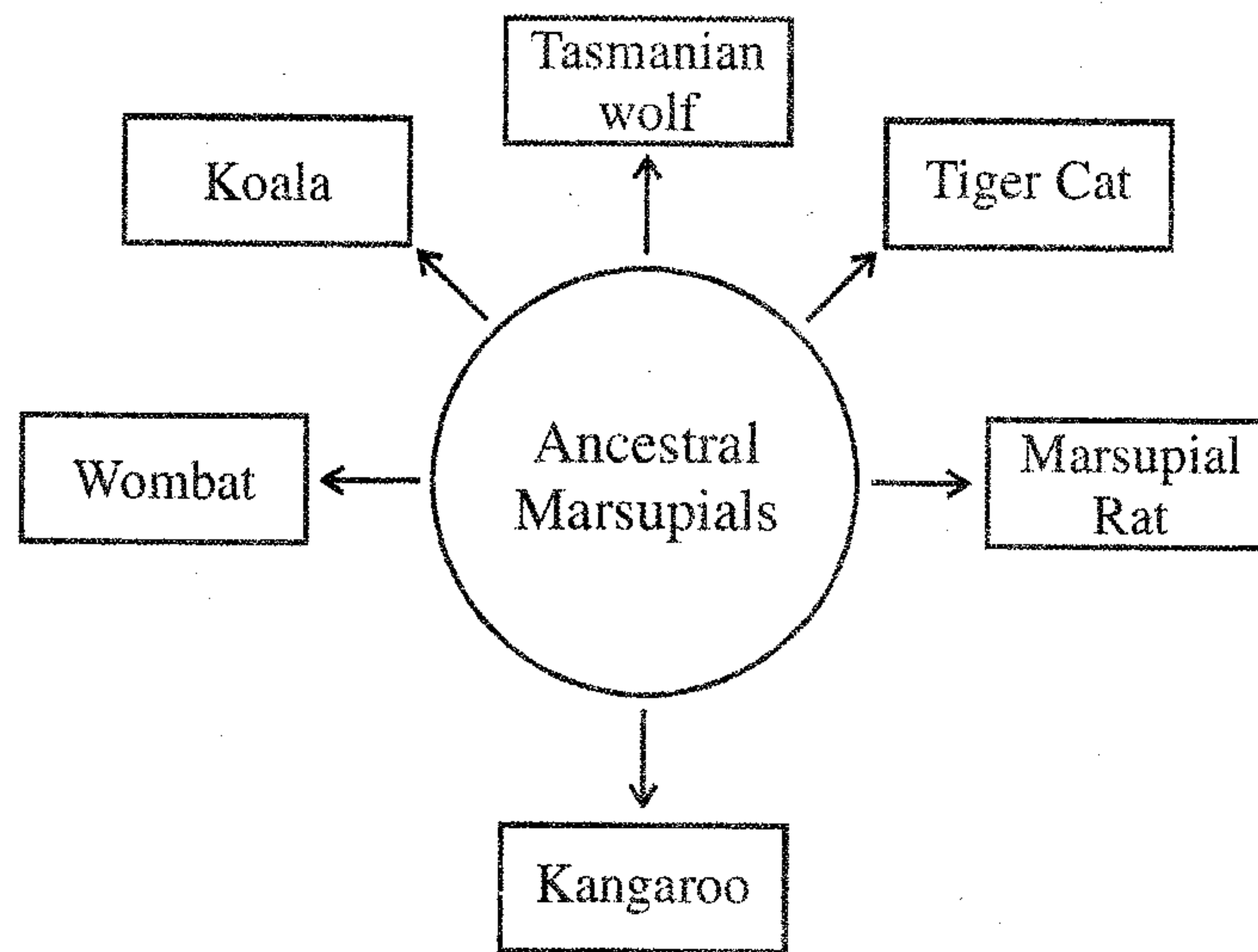
- Thorns of bougainvillea and Tendrils of cucurbita
- Eyes of octopus and mammals
- Flippers of penguin and dolphin
- Forelimbs of cheetah and man

- Categorise the four groups of organs as homologous organs and analogous organs.
- 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.

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(Scores : 4)

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