Code No. 7017

For Scheme-I Candidates only

Second Year – March 2015

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. ഈ വേളകളിൽ ചോദ്യങ്ങൾക്ക് ഉത്തരം എഴുതാനോ, മറ്റുള്ളവരുമായി ആശയവിനിമയം നടത്താനോ പാടില്ല.
- ഉത്തരങ്ങൾ എഴുതുന്നതിന് മുമ്പ് ചോദ്യങ്ങൾ ശ്രദ്ധാപൂർവ്വം വായിക്കണം.
- എല്ലാ ചോദ്യങ്ങൾക്കും ഉത്തരം എഴുതണം.
- ഒരു ചോദ്യനമ്പർ ഉത്തരമെഴുതാൻ തെരഞ്ഞെടുത്തു കഴിഞ്ഞാൽ ഉപചോദ്യങ്ങളും അതേ ചോദ്യനമ്പരിൽ 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.

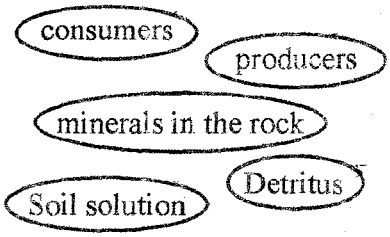
PART – A
BOTANY

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

Cool-off time : 10 Minutes

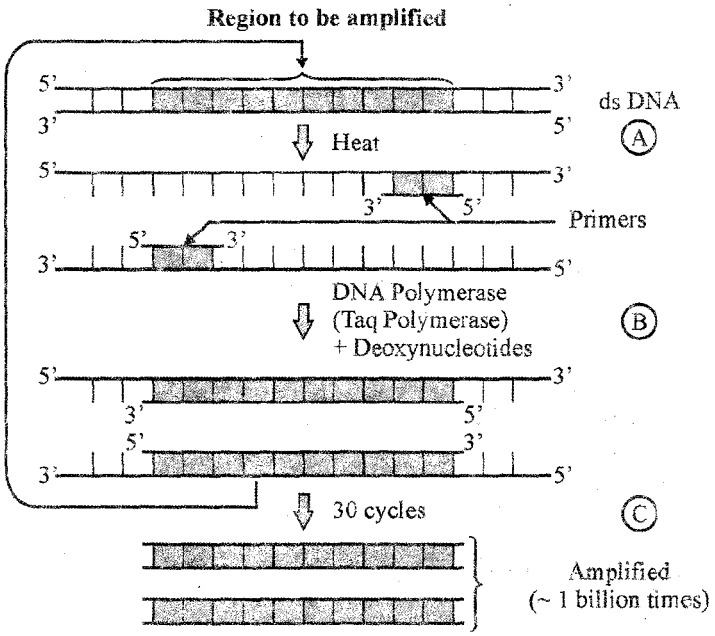
1. Multiple Choice Question :
   Development of fruit without fertilization and are seedless known as
   (a) Polyembryony
   (b) Apomixix
   (c) Parthenocarpy
   (d) Parthenogenesis **(Score : 1)**

2. Given below are the components related to simplified model of mineral cycling in a terrestrial ecosystem. Construct a flow chart.
   [Hint : weathering of rock]



(Scores : 2)

3. Figure representing the reactions associated with Polymer Chain Reaction (PCR). Name the steps A, B, C in the process.



(Scores : 2)

4. Match the Column A with B :

A		B	
(1)	Bulbil	(a)	Bulbophyllum
(2)	Offset	(b)	Sponge
(3)	Gemmules	(c)	Water hyacinth
(4)	Leaf buds	(d)	Agave

(Scores : ½ + ½ + ½ + ½ = 2)

5. In a debate one of the speaker reported like this.

"Continuous inbreeding leads to inbreeding depression." If so define the following :

(a) Outcross

(b) Cross breeding **(Scores : 1 + 1 = 2)**

6. Recombinant DNA technology can be accomplished only if we have the following key tools i.e., Restriction enzymes, Polymerase enzyme, Ligases and Vectors.

State the functions of

(a) Ligases

(b) Restriction enzymes **(Scores : 1 + 1 = 2)**

7. 250 kg cow produces 200 g of protein / day. In the same period 250 g of Methylophilus methylotrophus produce 25 tonnes of protein. Then what is single cell protein ? **(Score : 1)**

8. Primary succession on rocks is known as Xerosere. Answer the following related with Xerosere.

(a) Name the pioneer community.

(b) Organic acids have important roles in this succession. Justify. **(Scores : 1 + 1 = 2)**

9. Genetically Modified Organism (GMO) is always a debatable topic among scientists, academicians and public. State any four usefulness of GMOs. **(Scores : ½ × 4 = 2)**

10. An aquatic ecosystem having luxurious growth of cyanobacteria (Algal bloom) leads to eutrophication.

(a) What kind of pollutants cause algal bloom to colonize the aquatic ecosystem ?

(b) What are the consequences of eutrophication ? **(Scores : 1 + 1 = 2)**

11. Biotechnology in agriculture will lead to pest resistant plants, which could decrease the amount of pesticides used. For example Bt cotton. Expand the letter 'B' and 't'.

(Score : ½ + ½ = 1)

12. In 1997, an American company got patent rights on Basmati rice through the U.S. Patent and Trademark Office. Variety of Basmati had actually been derived from Indian farmer's varieties. If so, what is Biopiracy ? **(Score : 1)**

13. Sucker fish and shark live in close association, is a classic example of commensalism. What is commensalism ? **(Score : 1)**

14. Desert plants like Opuntia are able to grow in extreme conditions. Suggest any two adaptations of this plant. **(Score : ½ + ½ = 1)**

15. (a) Reeja a science student observed the structure of mature embryosac comprising antipodals, central cells and egg apparatus. Explain each one of them.

(Scores : 1 + 2 + 1 = 4)

OR

(b) Three different flowers are given to you in the practical class.

(i) Maize

(ii) Vallisneria

(iii) Rose

You are asked to group them based on pollinating agents. Describe the adaptations of each flower related with the agents of pollination.

(Scores : 1 + 1 + 1 + 1 = 4)

16. With regard to population growth rate, when responses are limiting the plot is logistic. Verhulst – Pearl Logistic growth is represented by the equation $\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$ what are

(a) r

(b) K **(Scores : 1 + 1 = 2)**

17. During the past century, the temperature of the earth has increased by 0.6 °C, most of it during the last few decades. Rise in temperature causes deleterious changes in the environment, thus leading to increased melting of polar ice caps as well as other places like Himalayan snow caps. Suggest any two control measures that will reduce global warming ? **(Scores : 1 + 1 = 2)**

PART – B
ZOOLOGY

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

Cool-off time : 10 Minutes

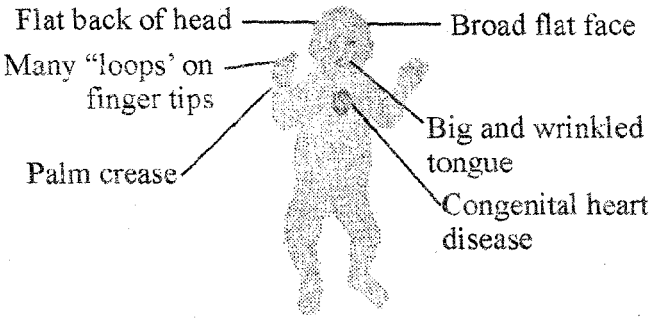
1. Foetal sex can be determined by a test based on the chromosomal pattern from the amniotic fluid.

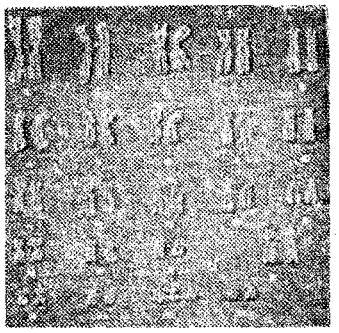
   (a) What is this test ?

   (b) Revealing of sex determination through this test is banned. Is this ban necessary ? Comment.

   (c) Invitro fertilization followed by embryo transfer is known as _____.

(Scores : 2)

2. 



   (a) Identify the syndrome from the diagram, and write the genotype.

   (b) It occurs in both sexes (male and female) ? Write the reason. **(Scores : 2)**

3. Fill in the blanks :

   (a) _____ is a metabolic disorder that occurs due to the lack of an enzyme, that converts phenylalanine to tyrosine.

   (b) _____ is a disease caused by the substitution of Glutamic acid by valine at 6^{th} position.

Val — His — Leu — Thr — Pro — Glu — Glu Hb A

1 2 3 4 5 6 7

Val — His — Leu — Thr — Pro — Val — Glu ?

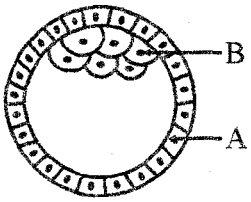
(Score : 1)

4. (1) In which part of the human reproductive system the following events occur ?

(a) Fertilisation

(b) Implantation

(2) Diagram of a human blastocyst is given below. Identify A & B.

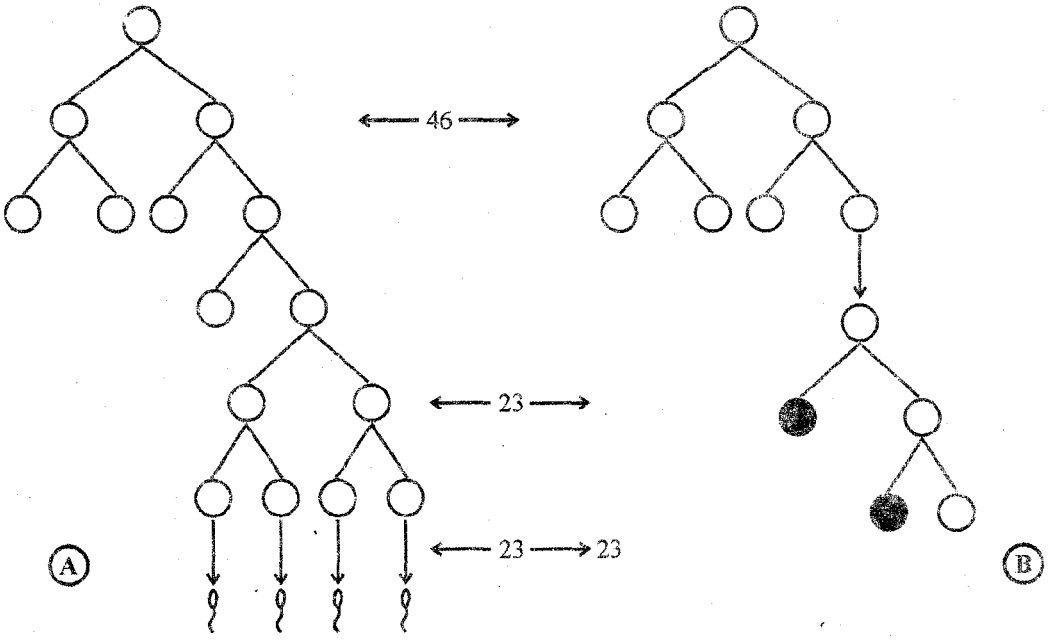


(Scores : 2)

5. Explain transcription. A transcription unit in DNA is defined primarily by three regions. Write the names of any two regions. **(Scores : 2)**

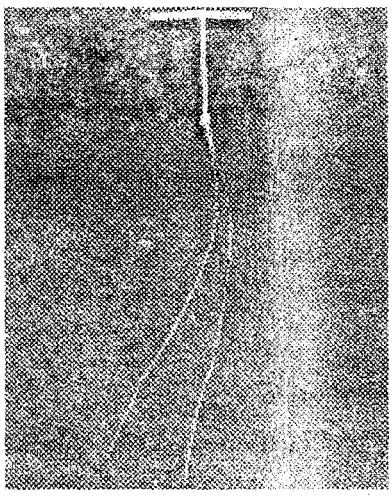
6. It is evident that, it is the genetic make up of the sperm that determine the sex of the child in human beings. Substantiate. **(Scores : 2)**

7. Schematic representation of gametogenesis is given below. Identify A. Write one difference between A & B.



(Score : 1)

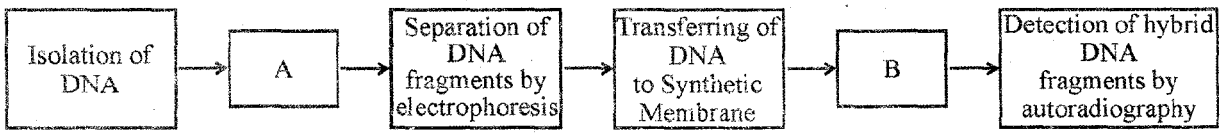
8. Identify the diagram and write how it acts ?



(Score : 1)

9. (a) The steps in DNA finger printing are given below. Complete the flow chart (A & B).

(b) Mention the applications of DNA finger printing.



(Scores : 3)

10. Mother's milk is considered essential for new born infants.

(a) Name the fluid secreted by mother from breast during the initial days of lactation.

(b) What type of immunity it provides ? **(Score : 1)**

11. Cancer is one of the most dreaded diseases of human beings, and is a major cause of death all over the globe.

(a) What are the causes of cancer ?

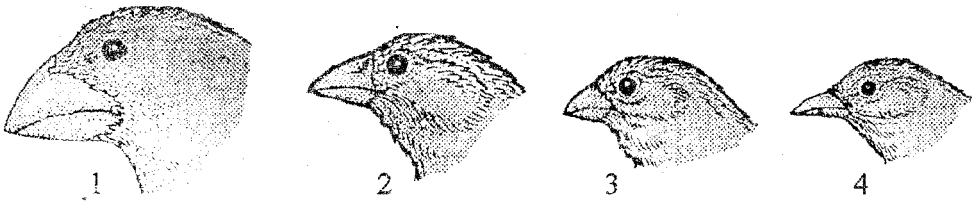
(b) What are the methods for detection of cancer ?

(c) What are the types of treatment for cancer ? **(Scores : 3)**

12. Match the following :

(a)	Natural selection	(1)	Convergent evolution
(b)	Inheritance of acquired characters	(2)	Genetic drift
(c)	Analogous structures	(3)	Charles Darwin
(d)	Gene flow by chance	(4)	Lamarkism

(Scores : 2)

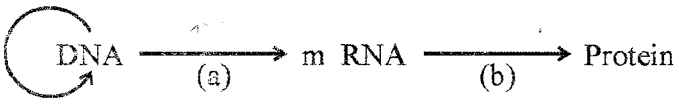
13. 

The above shown pictures are beaks of a particular type of bird seen in an island during Darwin's journey.

(a) Identify the bird and name the island.

(b) Write the significance of this process in evolution. **(Scores : 2)**

14. The flow of genetic information is shown below. Name the process of (a) and (b).



(Score : 1)

15. Microbes can also be used as a source of energy. Substantiate with suitable examples.

(Scores : 2)

16. We have a moral responsibility to take good care of earth's biodiversity and pass it on in good order to next generation.

(a) Define Biodiversity

(b) Write causes for biodiversity losses

(c) Name two types of biodiversity conservation. **(Scores : 3)**