

**FIRST PRE-BOARD EXAMINATION (2019- 2020)**  
**CLASS: XII**

**Subject: BIOLOGY**

**Date: 05-12- 2019**

Time allowed: 3 Hours

Maximum Marks: 70

**General Instructions**

- 1) There are a total 27 questions and five sections A, B, C, D and E in the question paper. **All** questions are **compulsory**.
- 2) Section A contains 1 to 5 multiple choice questions of 1 mark each, Section B contains 6-12, short answer type I questions of 2 marks each. Section C is of 13 to 21, short answer type II questions of 3 marks each. Section D contains 22 to 24, case-based short answer type questions of 3 marks and Section E contains 25 to 27, long answer type questions of 5 marks each.
- 3) There is no overall choice. However, an internal choice has been provided in two one mark questions, one question of 2 marks, two question of 3 marks and in all questions of 5 marks. Attempt only one of the choices in such questions.
- 4) Wherever necessary, the diagrams drawn should be with proper labeling.
- 5) Marks are indicated against each question.
- 6) Please check that this question paper contains **9** printed pages only.

**SECTION- A**

1. Several hormones like hCG, hPL, estrogen, progesterone are produced by

- |                   |              |
|-------------------|--------------|
| a) Ovary          | b) placenta  |
| c) Fallopian tube | d) pituitary |

OR

Secretion from which one of the following is rich in fructose, calcium and some enzymes?

- |                          |                   |   |
|--------------------------|-------------------|---|
| a) Male accessory glands | b) Liver          |   |
| c) Pancreas              | d) Salivary gland | 1 |

2. Which of the following symbols are used for representing chromosomes of birds?
- |          |          |  |
|----------|----------|--|
| a) ZZ-ZW | b) XX-XY |  |
| c) XO-XX | d) ZZ-WW |  |

OR

The frequency of crossing over occurring between two genes located on the same chromosome depends on

- |                               |  |   |
|-------------------------------|--|---|
| a) length of the chromosome   |  |   |
| b) position of the centromere |  |   |
| c) activities of two genes    |  |   |
| d) distance between two genes |  | 1 |
3. Which one is the most primitive ancestor of man?
- |                        |                            |   |
|------------------------|----------------------------|---|
| a) <i>Homo habilis</i> | b) <i>Australopithecus</i> |   |
| c) <i>Ramapithecus</i> | d) <i>Neanderthales</i>    | 1 |

4. Breeding of crops with high levels of minerals, vitamins and proteins is called
- |                          |                     |   |
|--------------------------|---------------------|---|
| a) Somatic hybridization | b) biofortification |   |
| c) Biomagnification      | d) micropropagation | 1 |

5. If 20J of energy is trapped at producer level, then how much energy will be available to peacock as food in the following chain?

Plant → Mice → Snake → Peacock

- |          |            |   |
|----------|------------|---|
| a) 0.02J | b) 0.002J  |   |
| c) 0.2J  | d) 0.0002J | 1 |

### SECTION - B

6. a) In a developing embryo, analyse the consequences if cell divisions are not followed by cell differentiation.

b) Mention the reason for difference in ploidy of zygote and primary endosperm nucleus in an angiosperm.

OR

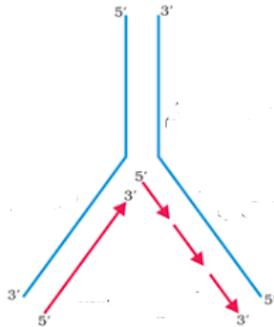
Banana is a parthenocarpic fruit whereas oranges show polyembryony. How are they different from each other with respect to seeds? 2

7. Briefly explain IVF and ET. What are the conditions in which these methods are advised? 2

8. a) In MOET technology, two 'mothers' are needed to produce one calf. Justify.

b) In animal husbandry, if two closely related animals are mated for a few generations, it results in loss of fertility and vigour. Why is it so? 2

9.



Why do you see two different types of replicating strands given in the given DNA replication fork? Explain. Name these strands. 2

10. a) It is generally observed that the children who had suffered from chicken-pox in their childhood may not contract same disease in their adulthood. Explain giving reason the basis of such an immunity in an individual. Name this kind of immunity.

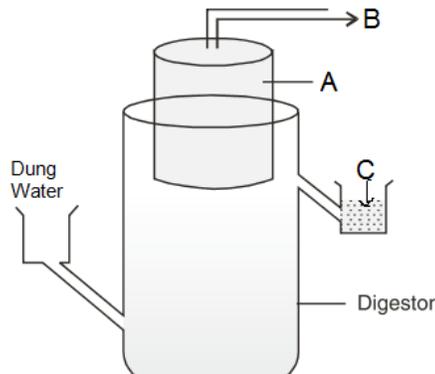
b) What are interferons? Mention their role. 2

11. Explain the work carried out by Cohen and Boyer that contributed immensely in biotechnology. 2

12. Egrets are often seen along with grazing cattle. How do you refer this interaction? Give a reason for this association. 2

SECTION-C

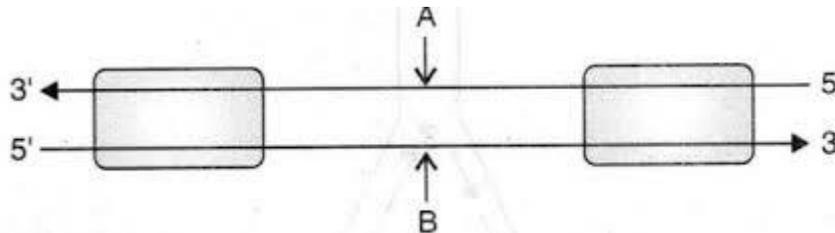
13. Given below is a figure of a biogas plant.



- a) Identify A and justify its floating nature.
- b) Identify the products B and C and discuss their significance. 3

14. a) What did Meselson and Stahl observe when
- i) they cultured E.coli in a medium containing  $^{15}\text{NH}_4\text{Cl}$  for a few generations and centrifuged the content?
  - ii) they transferred one such bacterium to the normal medium of  $\text{NH}_4\text{Cl}$  and cultured for 2 generations?
- b) What did Meselson and Stahl conclude from this experiment? Explain with the help of diagrams.

OR



- a) Identify strands 'A' and 'B' in the diagram of transcription unit given above and write the basis on which you identified them.
- b) state functions of Sigma factor and Rho factor in the transcription process in a bacterium.

3

15. Draw a labelled diagram of human blastocyst. How does it get implanted in the uterus?

3

16. (a) Identify A,B,C and D in the table given below.

Crop	Variety	Resistance to disease
Wheat	A	Leaf and strip rust
B	<i>Pusa shubhra</i>	Black rot
Cowpea	<i>Pusa Komal</i>	C
Brassica	<i>Karan Rai</i>	D

b) How has mutation breeding helped in improving the production of mung bean crop? 3

17. Explain the events that follow up to the fertilization when the sperms come in contact with the ovum in the fallopian tube of a human female. 3

18.a) "Sweet potato tubers and potato tubers are result of convergent evolution". Justify the statement.

b) What is founder effect?

c) What is 'fitness of an individual' according to Darwin? 3

19.a) Draw a diagram of an enlarged view of T.S. of microsporangium of an angiosperm.

b) Explain the following giving reasons:

i) Pollen grains are well preserved as fossils.

ii) Pollen tablets are in use by people these days. 3

20. a) A particular species of wild cat is endangered. In order to save them from extinction, which is desirable approach *in situ* or *ex situ*? Justify your answer and explain the difference between the two approaches.

b) In an experiment, the slope of regression (Z) is 0.2 and in another experiment the value obtained is 1.2. Explain the two situations in respect of species area relationships. 3

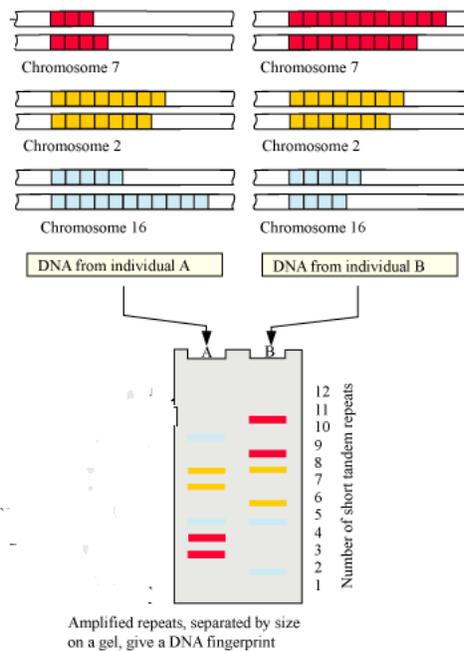
21. Plasmid is a boon to biotechnology. Justify this statement quoting the production of human insulin as an example. 3

SECTION - D

22. A student on a school trip started sneezing and wheezing soon after reaching the hill station for no explained reasons. But, on return to plains, the symptoms disappeared.
- What is such a response called? How does body produce it?
  - Name the type of antibody and the chemicals responsible for such a response in the boy.
  - Mention the name of any two drugs that could be given to the boy for immediate relief from such a response.

3

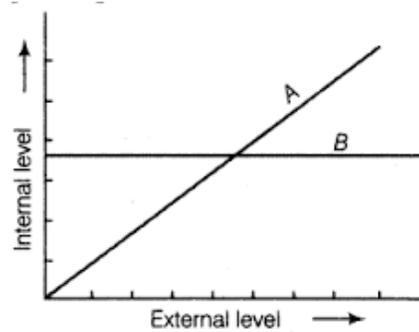
23. Two blood samples A and B picked up from the crime scene were handed over to the forensic department for genetic fingerprinting. Following results were observed.



Describe the technique how genetic fingerprinting is carried out. How will it be confirmed from the above results that the samples belonged to two different individuals?

3

24. The following graph represent the organismic response to certain environmental conditions (eg. Temperature):



- Which one of these, A or B depicts conformers?
- What does the other line depicts? Define it.
- How do these organisms differ from each other with reference to homeostasis?
- Mention the category to which humans belong. How do our body respond during winters?

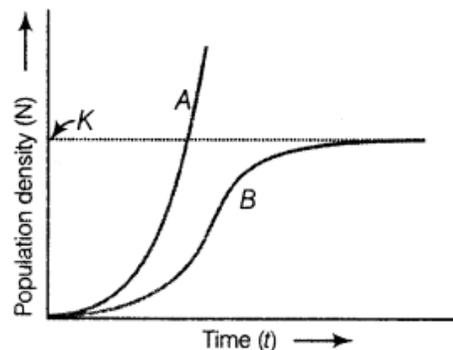
3

#### SECTION E

25. "Indiscriminate human activities have strengthened the greenhouse effect resulting in Global Warming." Give the relative contribution of various Green House Gases in the form of a pie chart and explain the fate of the energy of sunlight reaching the earth's surface contributing towards Global Warming.

OR

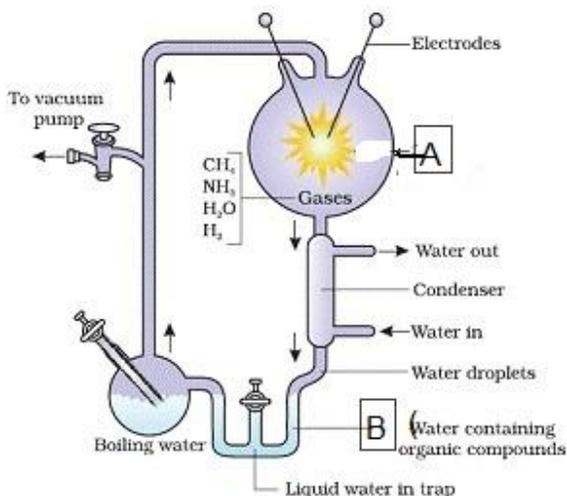
- Different animals respond changes in their surroundings in different ways. Taking one example of each, explain 'some animals undergo aestivation while some other hibernate'. How do fungi respond to adverse climatic conditions?
- Study the graph given alongside and answer the following questions:



- Identify curve 'B' and write the equation for it.

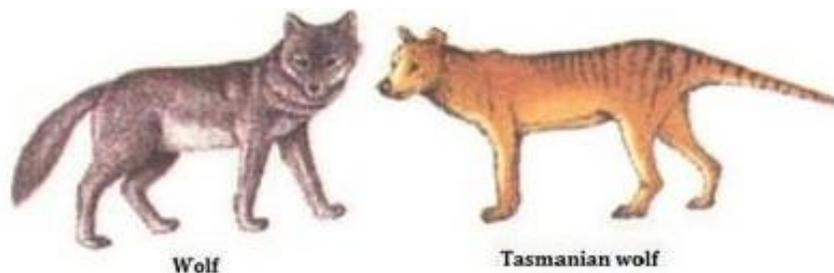
ii) Which curve would depict the population of a species of deer if there are no predators in the habitat? Why is it so? 5

26.a) Given below is a diagrammatic representation of the experimental set up used by S.L. Miller for his experiment:



- i) Write the conditions set for the reaction in the flask 'A'.
- ii) State the type of organic molecule he collected in the water at 'B'.
- iii) Write the conclusion he arrived at.

b) Refer to the figure below and answer the questions that follow:



- i) Recognise and explain the process by which Tasmanian wolf evolved.
- ii) Give one example of an animal that has evolved along with Tasmanian wolf. Name the process that result in evolution of wolf and Tasmanian wolf.

OR

- a) Four children with four different blood groups are born to parents where the mother has blood group 'A' and father has blood group 'B'. Work out the cross to show the genotype of the parents and all four children.
- b) Explain the contribution of Alfred Sturtevant in 'chromosome mapping'.

27. a) Explain how to find whether an *E.coli* bacterium has transformed or not when a recombinant DNA bearing ampicillin resistance gene is transferred into it.
- b) What does the ampicillin resistant gene act as in the above case?
  - c) i) In pBR322, foreign DNA has to be introduced into tet<sup>R</sup> region. From the restriction enzymes given below, which one should be used and why?

*PvuI, EcoRI, BamHI*

- ii) Give reason, why other two cannot be used?

OR

- a) Gene therapy is an attempt to correct a genetic defect by providing a normal gene into the individual. By this the normal function can be restored. Alternate method would be to provide the gene product known as enzyme replacement therapy, which would also restore function. Which in your opinion is a better option? Give reason for your answer.
- b) Explain the events that occur in the host cell on introduction of nematode-resistant gene into the tobacco plant by using *Agrobacterium* vectors.