

**SAMPLE QUESTION PAPER-I**  
**XII - BIOLOGY**

**Time : 3 Hours**

**Max. Marks : 70**

**GENERAL INSTRUCTIONS :**

- (i) *All questions are compulsory.*
- (ii) *The question paper consists of four sections A, B, C and D. Section-A contains 8 questions of 1 mark each, Section B is of 10 questions of 2 marks each, Section C has 9 questions of 3 marks each whereas Section D is of 3 questions of 5 marks each.*
- (iii) *There is no overall choice. However, an internal choice has been provided in one question of 2 marks, one question of 3 marks and all the three questions of 5 marks weightage. A student has to attempt only one of the alternatives in such questions.*
- (iv) *Wherever necessary, the diagrams drawn should be neat and properly labelled.*

**SECTION - A**

- 1. Why do internodal segments of sugarcane fail to propagate vegetatively even when they are in contact with damp soil? 1
- 2. Mention any two probable reasons for rapid rise of population in our country from about 350 million at the time of independence to about 1 billion by the year 2000. 1
- 3. The gene  $I$  that controls the ABO blood grouping in human beings has three alleles  $I^A$ ,  $I^B$  and  $i$ .  
(a) How many different genotypes are likely to be present in the human population?  
(b) Also, how many phenotypes are possibly present? 1
- 4. State any one reason to explain why RNA viruses mutate and evolve faster than other viruses. 1
- 5. Mention any two measures for prevention and control of alcohol and drug abuse among adolescents. 1
- 6. What would be the impact on the environment around a thermal power plant if its electrostatic precipitator stops functioning? Give a reason. 1
- 7. Why is thermoregulation more effectively achieved in larger animals than in smaller ones? 1
- 8. A plasmid and a DNA sequence in a cell need to be cut for producing recombinant DNA. Name the enzyme which acts as molecular scissors to cut the DNA segments. 1

**SECTION B**

- 9. Even though each pollen grain has two male gametes, why are at least 10 pollen grains and not 5 pollen grains required to fertilise 10 ovules present in a particular carpel? 2
- 10. When a red flowered Antirrhinum plant was crossed with a white flowered Antirrhinum plant, the  $F_1$  - offspring had pink flowers. Mention (a) the genotype of  $F_1$  plant and (b) the reason why it did not bear the parental red or white flower colours? 2

11. Draw schematically a single polynucleotide strand (with at least three nucleotides). Provide labels and directions. 2

OR

Choose and rearrange any four of the following groups of plants in an ascending evolutionary scale.

Cycads; Gnetales; Monocotyledons; Rhynia-like plants; Chlorophyta ancestors; Dicotyledons; and Seed ferns. 2

12. Fill in the blanks in the different columns of the table given below: 2

Disease	Causal organism	Medium of Transfer	Symptoms
Filariasis	<i>Wuchereria</i>	a	Lymphatic vessels of lower limbs affected
b	<i>Trichophyton</i>	Using towels of infected person	Dry, scaly lesions on body
Common cold	c	Droplets from Sneezing of infected persons	Affect nose, and respiratory passage, sore throat
Ascariasis	<i>Ascaris</i>	Through contaminated water, vegetables and fruits	d

13. In which parts of the body of the hosts do the following events in the life cycle of *Plasmodium* take place? Name both, the body part and the host. 2

- (a) Fertilization
- (b) Development of gametocytes
- (c) Release of sporozoites
- (d) Asexual reproduction

14. A person injured in a road accident and requiring an urgent immune response was brought to a doctor. 2

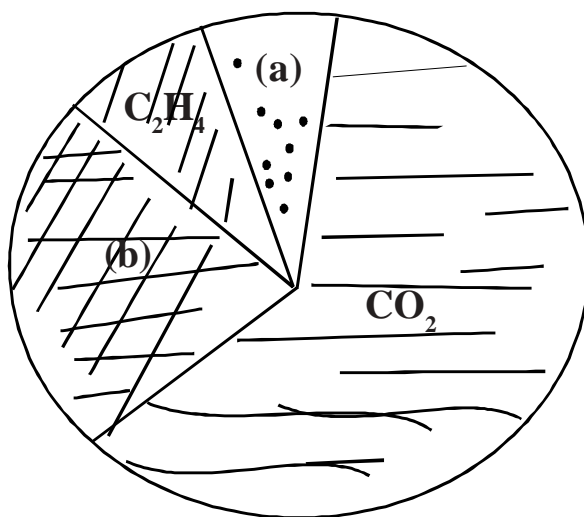
- (a) What did the doctor immediately do?
- (b) What kind of an immunity was he providing to the patient?
- (c) Define this kind of immunity.

15. Why does a beekeeper keep beehives in crop fields during the flowering periods? State any two advantages. 2

16. List any four advantages of genetically modified crop plants over their wild/domesticated relatives. 2

17. Which one out of the eurythermal or stenothermal species is likely to survive increased global temperatures? Give one reason for your answer. 2

18. The figure given below shows relative contributions of various green-house gases to the total global warming.  
(i) Name the gases (a) and (b)



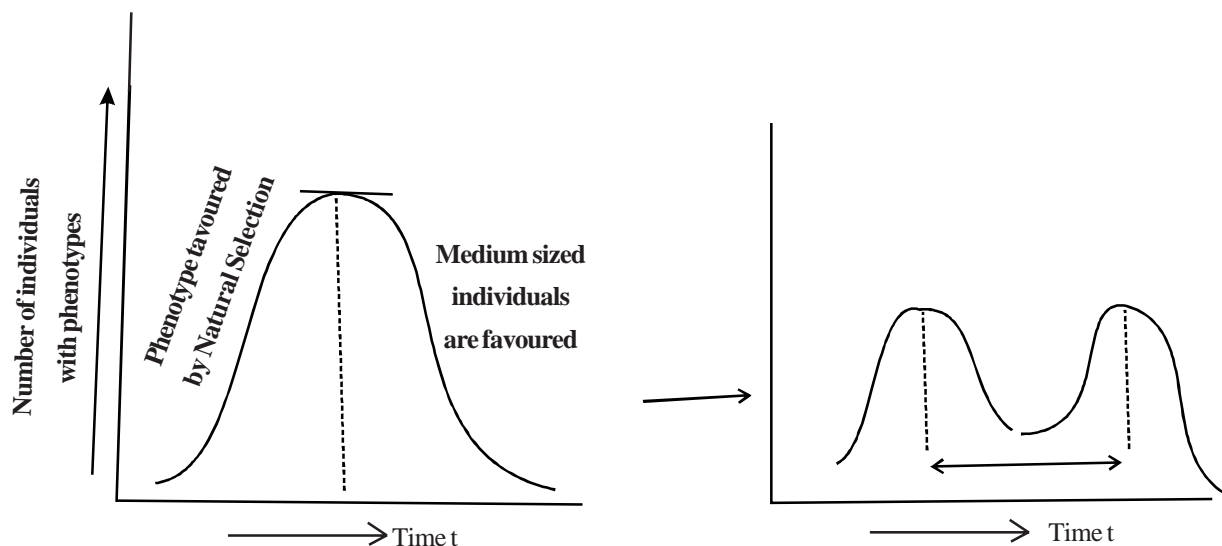
- (ii) Explain how increase in green-house gases in earth's atmosphere leads to melting of ice caps.

2

### SECTION - C

19. Explain why ecological succession will be faster in a forest devastated by fire than on a bare rock? Also compare succession in case of an abandoned land after floods with that on a bare rock? 3
20. What is the cause of adenosine deaminase deficiency in a person? Why is it that even after infusion of genetically engineered lymphocytes into the patient suffering from deaminase deficiency, the cure is not permanent? 3
21. A policeman finds a very small piece of body tissue from the site of a crime and takes it to the forensic department.  
(A) By which technique will they amplify the DNA collected from the tissue sample?  
(B) Mention in a sequence, the 3 steps involved in each cycle of this technique;  
(C) What is the role of thermostable DNA polymerase in this technique? 3
22. In case of Bt cotton, how does the toxic insecticide protein produced by the bacterium kill the insect pest but not the cell of *Bacillus thuringiensis* where the toxic protein is generated? 3
23. You have been deputed by your school principal to train local villagers in the use of biogas plant. With the help of a labelled sketch explain the various parts of the biogas plant. 3

24. Study the figures (a) and (b) given below and answer the questions given after the graphs



- Under the influence of which type of Natural Selection would graph (a) become like graph (b)?
- What could be the likely reasons of new variations arising in the population?
- Who suggested Natural Selection as a mechanism of evolution?

**OR**

Illustrate schematically the process of initiation, elongation and termination during transcription of a gene in a bacterium.

- How did Louis Pasteur successfully demolish the popular theory of spontaneous generation?  
What were his conclusions? 3
- If a true breeding homonzygous pea plant with green pod and axial flower as dominant characters is crossed with a recessive homonzygous pea plant with yellow seeds and terminal flowers, then what would be the: 3
  - genotypes of the two parents;
  - phenotype and genotype of the  $F_1$  offspring;
  - phenotypic distribution ratio in  $F_2$  population?
- With the help of labelled diagrams, depict the stages of a microspore maturing into a pollen grain. 3

### SECTION -D

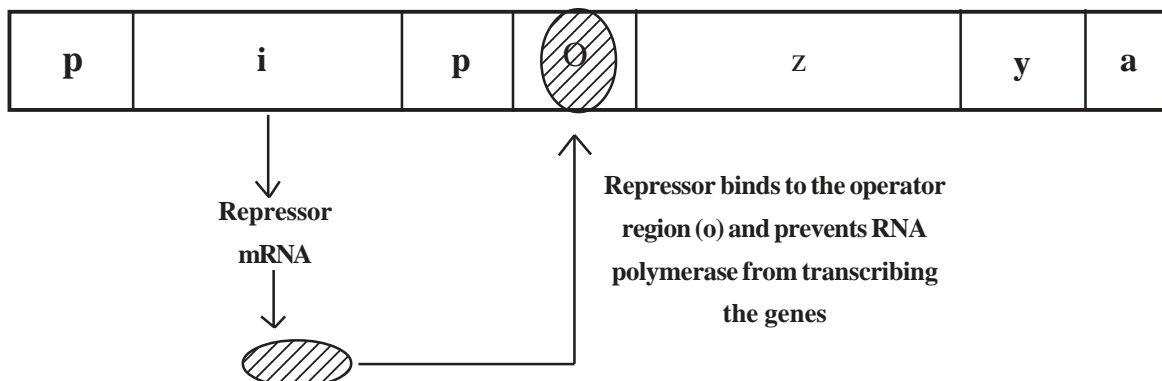
- Draw a longitudinal sectional view of a typical anatropous ovule to show the site where double-fertilization takes place. Label any four major parts of the ovule. 3
  - How do the male gametes that are present in the pollen grains reach the site mentioned by you in part (a) to cause double fertilization?

**OR**

- (a) When and where does spermatogenesis in a human male begin to take place? 1
- (b) With the help of schematic labelled diagrams trace the development of mature spermatozoa in a human male. 2
- (c) Describe the structure of a human sperm. 2

29. (a) Describe the experiment conducted by Alfred Hershey and Martha Chase for identification of genetic material.  
(b) Why is it considered pathbreaking in the field of Molecular Biology?

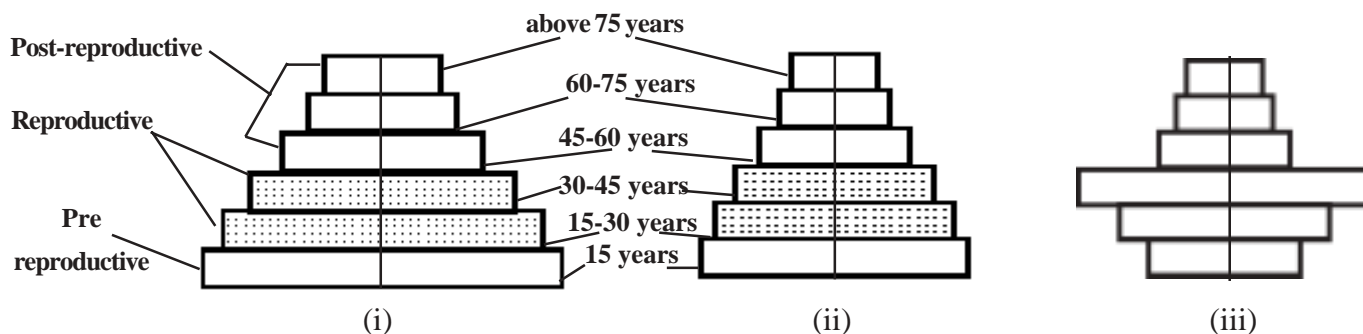
OR



Look at the figure above depicting lac operon of *E.coli*

- (a) What could be the series of events when an inducer is present in the medium in which *E.coli* is growing?  
(b) Name the Inducer. 5

30. Study the 3 representative figures of age pyramid relating to human population given below and answer the following question:



- (a) Mention the names given to the 3 kinds of age profiles (i), (ii), and (iii).  
(b) Which one of them is ideal for a population and why?  
(c) How do such age-profile studies help policy makers get concerned about our growing population and prepare for future planning. (say for example : for the year 2022.) 5

(Hint: The age profile you would name as stable was prepared on the data available on January 2007)

OR

- 30 (a) Write an equation for Verhulst Pearl logistic Growth Where
- |   |   |                                    |   |
|---|---|------------------------------------|---|
| N | = | Population density at a time t     |   |
| r | = | Intrinsic rate of natural increase |   |
|   |   | and                                |   |
| K | = | Carrying Capacity                  | 1 |
- (b) Draw a graph for a population whose population density has reached the carrying capacity. 2
- (c) Why is this logistic growth model considered a more realistic one for most animal populations? 1
- (d) Draw a growth curve where resources are not limiting to growth of a population. 1