



## INDIAN SCHOOL SOHAR

STD XII

BIOLOGY (044)

Maximum Marks:70

13-9-15

Time allowed: 3hrs

### General Instructions:

1. There are a total of 26 questions and five sections in the question paper. All questions are compulsory.
2. Section A contains question number 1 to 5, Very short answer type questions of one mark each.
3. Section B contains question number 6 to 10, Short answer type I questions of two marks each.
4. Section C contains question number 11 to 22, Short answer type II questions of three marks each.
5. Section D contains question number 23, Value based question of four marks.
6. Section E contains question number 24 to 26, Long answer type questions of five marks each.
7. There is no overall choice in the question paper, however, an internal choice is provided in one question of two marks, one question of three marks and all three questions of five marks. An examinee is to attempt any one questions out of the two given in the question paper with the same question number.

### SECTION A

1. Provide one word or one sentence information about 'plasmid' with respect to its (i) chemical nature and (ii) its duplication. 1
2. In case of an infertile couple, the male partner can inseminate normally but the mobility of sperms is below 40 percent. Judge, which kind of ART is suited in this situation to form an embryo in the laboratory, without involving a donor? 1
3. Calculate the length of the DNA of bacteriophage lambda that has 48502 base pairs. 1
4. If two genes are located far apart from each other on a chromosome, how the frequency of recombination will get affected? 1
5. Given below are pairs of disease and causative organism. Which out of these is not a matching pair and why? 1

Filariasis: Wuchereria

Ringworm: Ascaris

### SECTION B

6. The alarming population growth is leading to scarcity of basic requirements. Enumerate and justify any two population control measures to overcome this problem. 2
7. Both Down's syndrome and Turner's syndrome are examples of chromosomal disorders. Cite the differences between the two. 2
8. a) What does Hardy-Weinberg equation  $p^2 + 2pq + q^2 = 1$  convey? 2

b) Mention the type of evolution shown by the following structures:

i) Flippers of Dolphins and Penguins

ii) thorn and tendril of Bougainvillea and Cucurbita.

9. Explain pleiotropy with the help of an example. 2

**OR**

The tRNA is known as 'the adaptor molecule'. Why?

10. a) Mention the type of pollination found in the following plants: 2

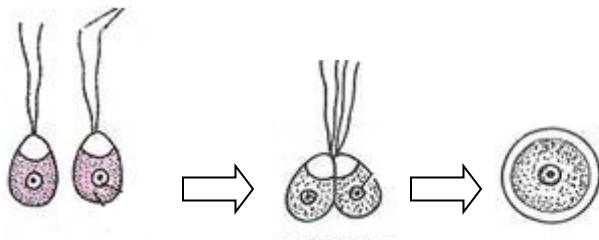
i) Mango ii) Banana

b) How are the flowers of these plants adapted for this?

**SECTION C**

11. Draw and label the enlarged view of microsporangium. State the function of its innermost layer. 3

12.



a) State the type of gametes shown in the diagram.

b) Identify the process taking place and the resultant structure.

c) Name an organism that reproduces in this manner. 3

13. Diagrammatically represent the experimental set up that proves Oparin-Haldane hypothesis. 3

14. A cross is made between different homozygous pea plants for contrasting flower positions: 3

a) Find out the position of flowers in  $F_1$  generation on the basis of genotypes.

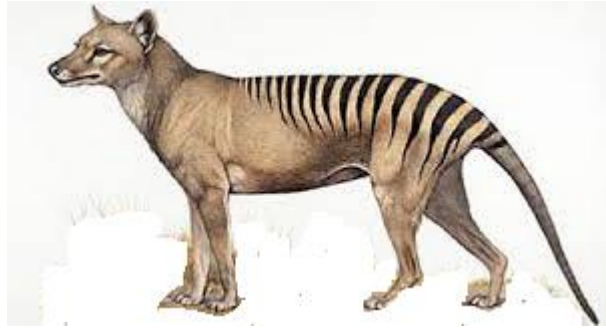
b) Work out the cross up to  $F_2$  generation.

c) Compute the relative fraction of various genotypes in the  $F_2$  generation.

15. Refer to the figure given below and answer the questions that follow:



Wolf



Tasmanian wolf

- a) Recognize and explain the process by which Tasmanian wolf evolved.
- b) Give one example of an animal that has evolved along with Tasmanian wolf.
- c) Compare and contrast the two animals shown. 3

16. Your classmate complains of headache and cough to the doctor. The doctor confirms that he is suffering from Pneumonia and not just common cold. How the doctor must have reached to such conclusion? Mention any two precautions to be followed to prevent the spread of this disease. 3

**OR**

Name the form of *Plasmodium* that gains entry into the human body. Explain the different stages of its life-cycle in the human body.

17. a) Name and explain giving reasons, the type of immunity provided to the newborn by colostrum and vaccination.

b) Name the type of antibody:

(i) present in colostrum

(ii) produced in response to allergens in human body. 3

18. (a) List the three steps involved in Polymerase chain Reaction(PCR). 3

(b) Name the source organism of Taq polymerase. Explain the specific role of this enzyme in PCR.

19. (a) Explain palindromic nucleotide sequence with the help of a suitable example. 3

(b) Why EtBr is used in gel electrophoresis in spite of it being highly carcinogenic?

20.(a ) How is the action of restriction endonucleases different from that of normal endonucleases?

(b) Write the convention used for naming such enzymes. 3

21. Given below is a schematic representation of lac operon: 3



(a) Mention the role of *z* and *y*.

(b) Name the 'inducer' for this operon and explain its role.

22. A 5' \_\_\_\_\_ 3' B 3

C 3' \_\_\_\_\_ 5' D

AB and CD represent two strands of a DNA molecule. When this molecule undergoes replication, forming a replication fork between A and C in the above figure:

i) name the template that stands for replication.

ii) using which strand as the template, will there be continuous synthesis of a complementary DNA strand?

(iii) complementary to which strand will okazaki segments get synthesized?

(iv) What are template strands and okazaki pieces?

(v) In which direction is a new strand synthesized?

### SECTION D

23. Akshay is a first year MBBS student. He noticed that his friend and class mate Tom has not done well in his first year exams and behave differently. He suspects Tom to have taken to drugs. Akshay decided to help him to give up drugs and come back to normal life. 4

a) Suggest any two ways by which Akshay can help Tom.

b) Mention possible reasons that must have made Tom to drugs

c) What values are shown by Akshay?

d) Name two diseases caused by taking drugs intravenously.

### SECTION E

24. Explain the process of protein synthesis from processed m-RNA. 5

**OR**

Which methodology is used while sequencing the total DNA from a cell? Explain it in detail.

25. a) Which human chromosome has (i) maximum number of genes, and which one has(ii) fewest genes?

b) Write the scientific importance of single nucleotide polymorphism identified in human genome.

c) What is satellite DNA in a genome? Why is it important in DNA finger printing?

d) Who first developed the technique of DNA finger printing? (5)

**OR**

a) DNA replicates semiconservatively. It was shown first in *Escherichia coli*. Explain the experiment performed by Meselson and Stahl to prove this.

b) DNA in chromosomes also replicates semi-conservatively. How did Taylor and colleagues prove it?

26. a) When and where are primary oocytes formed in a human female? 5

b) Trace the development of these oocytes till ovulation(in menstrual cycle)

c) How do gonadotropins influence this developmental process?

**OR**

a) Explain the events taking place at the time of fertilization of an ovum in a human female.

b) Trace the development of the zygote upto its implantation in the uterus.

c) Name and draw a labeled sectional view of the embryonic stage that gets implanted.

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