SERIES: SIMPH18 **Q Code: 1/3**

ROLL NO:								

Candidate must write code on the title page of answer book

1. Please check this question paper contains 10 printed pages
2. Code number given in the right hand side of the question paper should be written on the title page of the answer book by the candidate.
3. Please check that this question paper contains 33 of questions
4. Please write down the serial number of question papers before attempting it
5. Fifteen minutes are allotted to read this question paper during this time student will read the question papers and will not write any answer during this time

PRE BOARD EXAMINATION 2021

BIOLOGY(CLASS XII)

Time Allowed: 3.00Hrs. Maximum Marks: 70

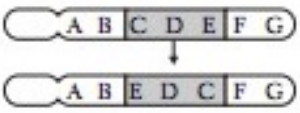
GENERAL INSTRUCTIONS:

1. All questions are compulsory.
2. The question paper has four sections: Section A, Section B, Section C and Section D. There are 33 questions in the question paper.
3. Section–A has 14 questions of 1 mark each and 2 case-based questions. Section–B has 9 questions of 2 marks each. Section–C has 5 questions of 3 marks each and Section–D has 3 questions of 5 marks each.
4. There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
5. Wherever necessary, neat and properly labeled diagrams should be drawn.

SECTION A

1. If the cells of nucellus in the angiosperm ovule contain 24 chromosomes, what will be the number of chromosomes in the endosperm of a self-pollinated flower?
2. What is the role of aleurone layer?
3. The following graph of relative concentrations of the four hormones present in the blood plasma of a woman during her menstrual cycle. Identify the hormones.
4. Why can't a woman get pregnant again during pregnancy?
5. Name the disease which mainly affects mucous membrane of urinogenital tract in maleswith the symptoms including burning feeling on passing urine, after a yellow discharge occurs, that is a accompanied by fever, headache and feeling of illness.
6. How many types of gametes will be produced by individuals of AABbcc genotype ?

7. Which chromosomal mutation is being shown in the diagram?



8. Which bacteria has a role in removing clots from our blood vessels?
9. Two enzymes responsible for restricting the growth of bacteriophages in Escherichia coli were isolated. One was methylase and other was restriction endonuclease. What was the significance of methylase?
10. A population of 100 individuals has a doubling time of 25 years. What size will this population be in 100 years?
11. Assertion: Heterochromatin is transcripationallyinactive.
    Reason: Heterochromatin is densely packed.

    a. The assertion is a true statement but the reason is false.

    b. Both assertion and reason are true and the reason is the correct explanation of the assertion.

    c. Both assertion and reason are true but the reason is not the correct explanation of the assertion.

    d. Both assertion and reason are false.

OR

Assertion: The lampbrush chromosomes are known as diplotene chromosomes bivalents.

Reason: During diplotene, the number of loops is maximum.

a. The assertion is a true statement but the reason is false.

b. Both assertion and reason are true and the reason is the correct explana tion of the assertion.

c. Both assertion and reason are true but the reason is not the correct explanation of the assertion.

d. Both assertion and reason are false.

12. Assertion : Interferons are effective against viruses.
    Reason : Proteins which can be synthesised only by genetic engineering are effective against viruses.

    a. The assertion is a true statement but the reason is false.

    b. Both assertion and reason are true and the reason is the correct explana tion of the assertion.

    c. Both assertion and reason are true but the reason is not the correct explanation

of the assertion.

d. Both assertion and reason are false.

13. Assertion : Hybridoma cells are shifted to a medium deficient in nutrient which cannot be synthesised by myeloma cells.

Reason : This medium allows selection of hybridoma cells.

a. The assertion is a true statement but the reason is false.

b. Both assertion and reason are true and the reason is the correct explana tion of the assertion.

c. Both assertion and reason are true but the reason is not the correct explanation of the assertion.

d. Both assertion and reason are false.

14. Assertion : Role of biological productivity in human welfare programme was carried out under IBP.
Reason : IBP stands for International Biological program.

a. The assertion is a true statement but the reason is false.

b. Both assertion and reason are true and the reason is the correct explana tion of the assertion.

c. Both assertion and reason are true but the reason is not the correct explanation of the assertion.

d. Both assertion and reason are false.

15. Read the following and answer any four questions from 15(i) to 15(v) given below:

Pollen-pistil interaction is the group of events that occur from the time of pollen deposition over the stigma to the time of pollen tube entry into ovule. It is a dynamic process which has checks at several places for promotion or inhibition of pollen growth. Pollen-pistil interaction is a safety measure to ensure that illegitimate crossings do not occur. Compatibility and incompatibility of the pollen-pistil is determined by special proteins. The compatible pollens are able to absorb water and nutrients from the surface of the stigma. They germinate and produce pollen tubes. Pollen tubes grow into the style. Their growth and path through the style are also determined by specific chemicals.

i) Which of the following parts of gynoecium determines the compatible nature of pollen?

(a) Stigma

(b) Style

(c) Ovary

(d) Thalamus

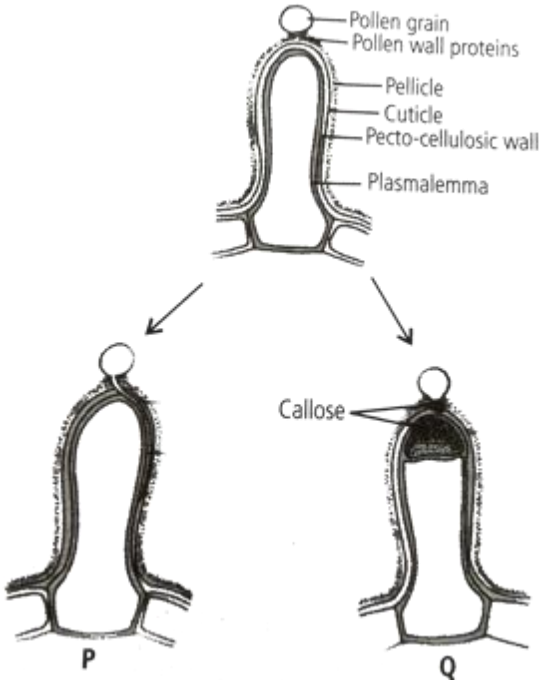
(ii) In Trifolium, which type of self-incompatibility is found?

(a) Gametophytic self-incompatibility (GSI)

(b) Sporophytic self-incompatibility (SSI)
(c) Both GSI and SSI
(d) None of these
(iii) Select the incorrect statement.
(a) In Asteraceae, incompatibility is due to the genotype of the sporophytic stigmatic tissues.
(b) In members of Brassicaceae, incompatibility is due to the genotype of the pollen.
(c) Nature has imposed self-incompatibility to avoid highly homozygous individuals which have a very low survival value.
(d) None of these
(iv) Which of the following are examples of self incompatibility?
(a) Tobacco

(b) Potato

(c) Crucifers
(d) All of these
(v) Given figures show the pollen-stigma interaction, where pollen wall proteins are released onto the pellicle of stigmatic papillae, where recognition reaction occurs.



Which of the following statements drawn from given figures is incorrect?
(a) P indicates compatible reaction in which the pollen tube penetrates the cuticle and grows down the papilla.
(b) Development of callose plug between the plasma membrane and pectocellulosic layer of Stigmatic papillae results in the incompatibility reaction in Q.
(c) A callose plug which appears at the tip of pollen in Q, is dissolved by callase enzyme secreted by stigma resulting in compatibility reaction.

(d) Deposition of callose can be employed as a reliable bioassay to detect compatibility or incompatibility reactions of pollen and stigma.

16. Read the following and answer any four questions from 16(i) to 16(v) given below: :
Response of communities to environment:

(i) Some organisms maintain homeostasis by physiological or behavioural means (regulate).

(ii)The internal environment in majority of animals and nearly all plants change with the change of external environment (conform).

(iii) Some organisms leave their habitats temporarily during unfavourable conditions and return back when conditions become favourable (migrate).

(iv) Some organisms suspend their metabolic activities to avoid stress by timely escaping. e.g. hibernation and aestivation.

i. According to Shelford's Law of Tolerance, the organisms wide environmental factor tolerance limit show

a) Narrow distribution with low population size

b) Wide distribution with high population size

c) Narrow distribution with high population size

d) Wide distribution with low population size

ii. The key elements that determine differences in environmental conditions of different habitats include

(a) temperature
(b) light
(c) soil
(d) all of these.

iii. Xerocoles are _____.

(a) Animals adapted to live in the tundra

(b) Animals adapted to live in deserts

(c) Animals adapted to live in the deep sea

(d) Animals adapted to a nocturnal lifestyle

iv. Xerophytes generally do not possess _____

(a) A thick cuticle

(b) Spongy Parenchyma

(c) Specialized mechanical tissue

(d) Well developed conducting tissue

v. Assertion : Living organisms are regarded as open systems.

Reason: Energy of living organisms can be lost or gained from external

Environment

a. Both assertion and reason are true, and reason is the correct explanation of assertion.

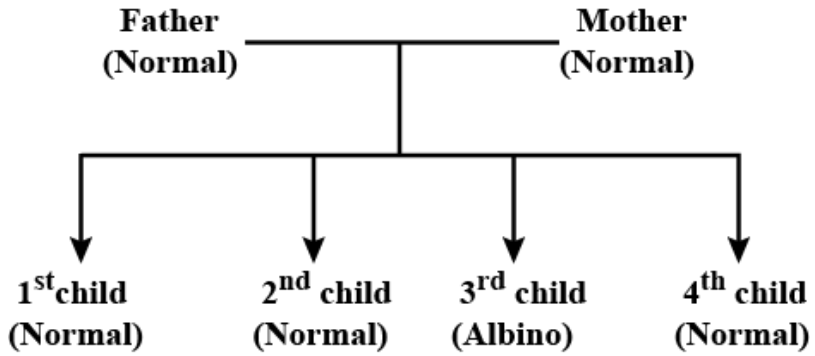
b. Both assertion and reason are true, but reason is not the correct explanation of assertion.

c. Assertion is true but reason is false.

d. Both assertion and reason are false.

Section B

17. If you squeeze a seed of orange, you might observe many embryos of different sizes. How is it possible? Explain.
18. What is gynaecomastia ? What is its cause during neonatal period and during puberty?
19. Refer to the following family tree:



If A= normal allele a= albino allele, then what are the genotypes of these parents?

20. Imagine an error occurring during DNA replication in a cell, so that where there is supposed to be a T in one of the genes there is instead a G. What effect will this probably have on the cell?

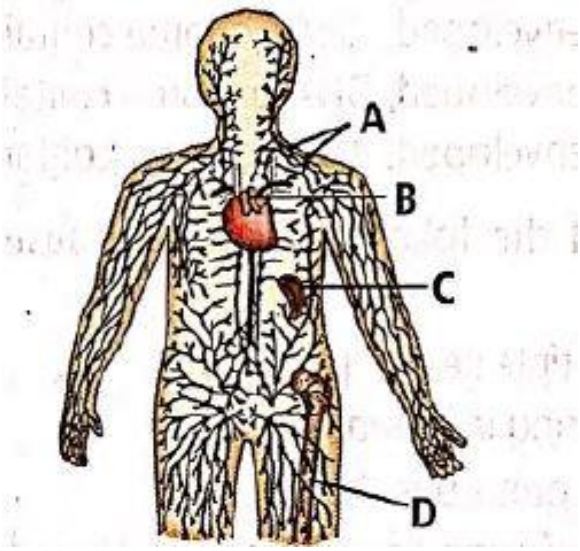
OR

When the gene product is required in large amounts, so transformed bacteria with the plasmid inside the bacteria are cultured on a large scale in an industrial fermenter which then synthesises its protein. This product is extracted from the fermenter for commercial use.

a) Why is the used medium drained out from one side while the fresh medium is added from the other?

b) List some optimum conditions for achieving the desired product in a bioreactor.

21. The following diagram shows the human lymphatic system. Identify the labelled sequences A, B, C and D.



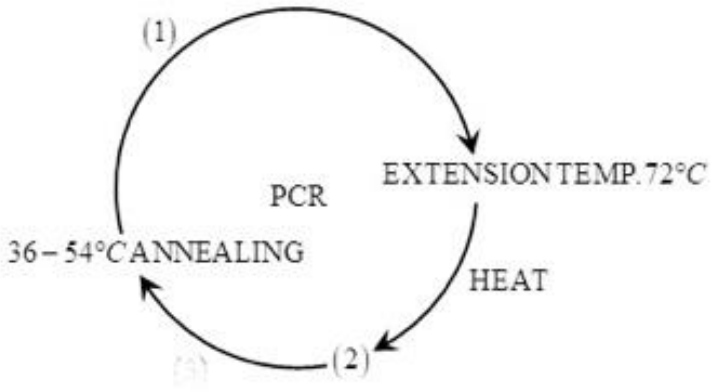
22. Name the blank spaces a, b, c and d from the table given below:

Type of Microbe	Scientific name	Product	Medical application
(*i*) Fungus	*a*	Cyclosporin	*b*
(*ii*) *c*	*Monascus* purpureus	Statin	*d*

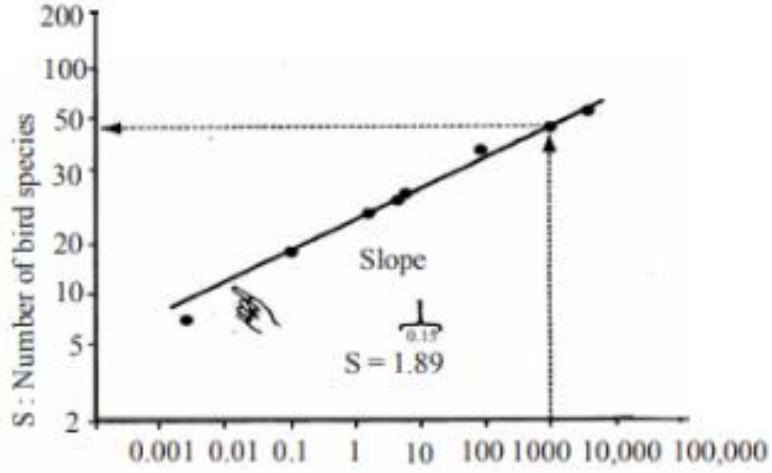
23. Summarise the process by which the sequence of DNA bases in Human GenomeProject was determined using the method developed by Frederick Sanger. Name a free-living non-pathogenic nematode whose DNA has been sequenced.

OR

Name the factors or steps indicated with numbers 1 and 2.

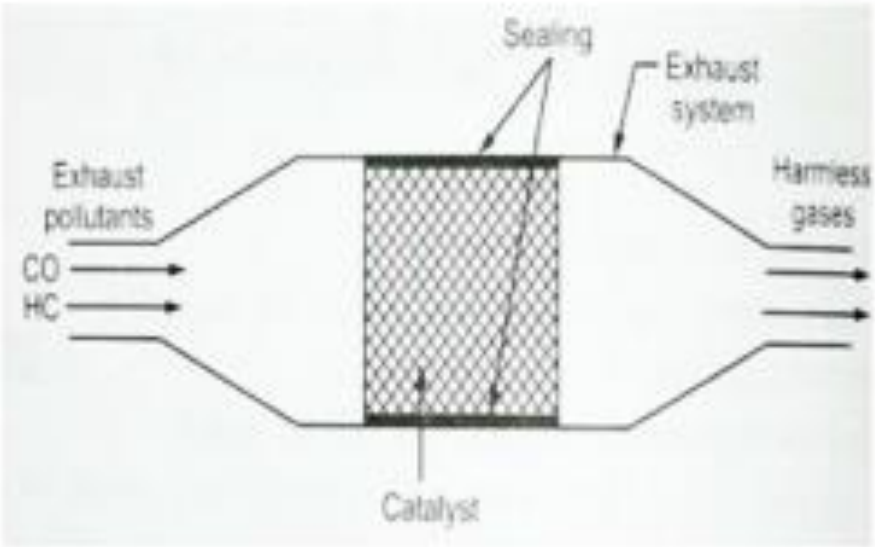


24. What are the four factors define population growth?
25. Using the figure, determine the percentage of bird species that will be lost if the island's inhabitable land area is reduced from 100,000 km2 to 1 km.



SECTION C

26. Observe the diagram and answer the following



a. Name the metals used as the catalytic converter.

b. Which gases are released after the exhaust hydrocarbon is passed through the catalytic converter?

c. Name the poisonous gas missing in exhaust pollutant of an automobile in the above diagram?

27. Justify giving three reasons, how the type of interaction (b) is important in an ecological context.
28. a. Name the infection in which the patient is advised anti-retroviral drug. Also, name the causative organism.

    b. How do vaccines prevent subsequent microbial infections?

    c. Many microbial pathogens enter the guts of humans along with the food. Name the psychological barrier that protects the human body from such pathogens.

29. Why does the lac operon shut down sometime after the addition of lactose in the medium where E.coli was growing? Why low-level expression of the lac operon is always required?
30. (a) One of the codons on mRNA is AUG. Draw the structure of tRNA adapter molecule for this codon.

    (b) Name the RNA polymerase that transcribes tRNA in eukaryotes.

    (c) What is unique about the amino acid this tRNA binds with?

OR

In an experiment, DNA is treated with a compound which tends to place itself amongst the stacks of nitrogenous base pairs. As a result of this, the distance between two consecutive base increases. from 0.34nm to 0.44 nm calculate the length of DNA double helix (which has 2×109 bp) in the presence of saturating amount of this compound.

Section D

31. Embryo sacs of some apomictic species appear normal but contain diploid cells. Suggest a suitable explanation for the condition.

OR

Give a schematic representation of oogenesis in humans. Mention the number of chromosomes at each stage. Correlate the life assesses of the individual with the stages of the process.

32. True-breeding pea plants showing contrasting character for flower position were cross-bred.
    (a) Mention the position of flowers in F1 generation.

    (b) Work out the cross up to F2 generation.

    (c) Compute the relative fraction of various genotypes in the F2 generation?

OR

There is a paternity dispute for a child'. Which technique can solve the problem? Discuss the principle involved.

33. Orchid flower, Ophrys co-evolves to maintain resembelance of its petal to female bee. Explain how and why does it do so?

OR

How is the "sixth episode of extinction" of species on earth, now currently in progress, different from the five earlier episodes? What is it due to? Explain the various causes that have brought about this difference.