

SPECTRA SAMPLE PAPER 2025-26
SPECTRA CLASSES
Class XIIth (BIOLOGY)

Maximum Marks: 70

Time Allowed: 3 hours

Section-A (1 Marks each)

1. Match the IUD of Column I with a suitable example in Column II.

Column I

- A. Non-medicated
- B. Copper releasing
- C. Hormone releasing

Choose the correct option.

- (a) A-3, B-2, C-1
- (c) A-1, B-3, C-2

Column II

- 1. Lippes loop
- 2. Multiload-375
- 3. LNG-20

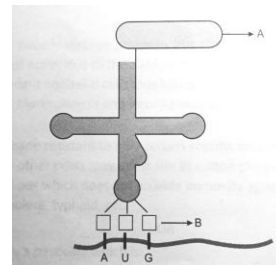
- (b) A-1, B-2, C-3
- (d) A-2, B-1, C-3

2. A specialised procedure to form an embryo in the laboratory in which sperm is directly, injected into the ovum is

- (a) IUT
- (b) IUI
- (c) ICSI
- (d) ZIFT

3. AUG on the mRNA will result in the activation of which of the following RNA having the correct combination of amino acids?

	Site A	Site B
(a)	UAC	Methionine
(b)	Methionine	UAC
(c)	Methionine	AUG
(d)	AUG	Methionine



4. Homologous organs show

- (a) natural selection
- (b) divergent evolution
- (c) parallel evolution
- (d) convergent evolution

5. Which of the following are the reason(s) for rheumatoid arthritis? Choose the correct option.

- (i) The ability to differentiate pathogens or foreign molecules from self cells increases.
- (ii) Body attacks self cells
- (iii) More antibodies are produced in the body
- (iv) The ability to differentiate pathogens or foreign molecules from self cells is lost

- (a) (i) and (ii)
- (b) (ii) and (iv)
- (c) (iii) and (iv)
- (d) (i) and (iii)

6. Lysozyme that is present in perspiration, saliva and tears, destroys

- (a) certain types of bacteria
- (b) all viruses
- (c) most virus-infected cells
- (d) certain fungi

7. Bacteria present in rumen of a cattle digest cellulose to produce

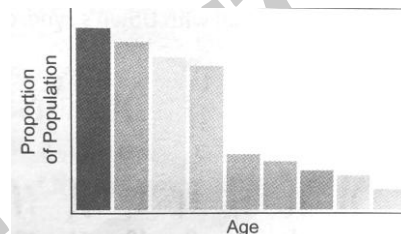
- (a) polysaccharides (b) sucrose
(c) ethanol (d) methane

8. Which of these is not correctly matched?

- (a) Gene gun-biostic gun (b) Plasmids-extrachromosomal DNA
(c) DNA ligase-biological scissors (d) Bacteriophages-viruses

9. For a population that is stable in size, the following age distribution indicates that

- (a) The population's birth and death rates are both high.
(b) The population's birth and death rates are both low.
(c) The population's birth rate is low but its death rate is high.
(d) The population's birth rate is high but its death rate is low.



10. Consider the following four conditions (1-4) and select a correct pair of them as adaptation to the environment in desert lizards.

Conditions:

- 1. Burrowing in soil to escape high temperature.**
- 2. Losing heat rapidly from the body during high temperature.**
- 3. Bask in sun when temperature is low.**
- 4. Insulating body due to thick fatty dermis.**

- (a) 3,4 (c) 2,4 (b) 1,3 (d) 1,2

11. Identify the possible link "A" in the following food chain.

Plant → insect → frog → "A" → eagle

- (a) rabbit (b) wolf (c) cobra (d) parrot

12. Species-Area relationship is represented on a log scale as

- (a) hyperbola (b) rectangular hyperbola (c) linear (d) inverted

Question No. 13 to 16 consist of two statements-Assertion (A) and Reason (R).

Answer these questions selecting the appropriate option given below:

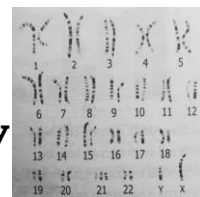
- (a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true and R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

13. Assertion (A): A pollen grains can withstand harsh conditions.

Reason (R) The exine of pollen grains is made up of sporopollenin which is resistant to high temperatures, strong acids or alkali as well as enzymatic degradation

14. Given below is a karyotype of an individual with Down's syndrome.

Assertion (A): Down's syndrome is caused due to absence of either X or Y sex chromosome.



Reason (R): Such individuals show mental retardation and broad head with characteristic features.

15. Assertion (A): Human insulin is produced in *E. coli*.

Reason (R) In mammals, insulin is synthesised as a pro-hormone which contains an extra stretch of protein.

16. Assertion (A): Net primary productivity is gross primary productivity minus respiration.

Reason (R) : Secondary productivity is produced by heterotrophs.

Section-B (2 Marks each)

17. After implantation interdigitation of maternal and foetal tissues takes place. This forms a structural and functional unit between the developing embryo and the maternal body. identify the tissues involved and justify their role.

OR

Differentiate between major structural changes in the human ovary during the follicular and luteal phase of the menstrual cycle.

18. Two children, one with blood group 'AB' and other with blood group 'O' are born to parents, where the father has blood group 'A' and the mother has blood group 'B'. Work out a cross to show how it is possible?

19. It is often observed that the chances of a person suffering from measles in his or her lifetime are low if he or she has suffered from the disease in their early childhood. Justify the statement.

OR

Name the type of immunity the mother provides the newborn baby. How does it happen?

20. In peas, tallness is dominant over dwarfness, and the red colour of flowers is dominant over the white colour. When a tall plant bearing red flowers was pollinated by a dwarf plant bearing white flowers, the different phenotypic groups were obtained in the progeny in numbers mentioned against them.

Tall, Red 138
= 128

Tall, White 132

Dwarf, Red =136

Dwarf, White

Mention the genotypes of the two parents and of the types of four offspring.

OR

Two independent, monohybrid crosses were carried out involving a tall pea plant with a dwarf pea plant. In the first cross, the offspring population had an equal number of tall and dwarf plants, whereas in the second cross it was different.

Work out the crosses, and explain giving reasons for the difference in the offspring populations

21. (a) How many primary producers do you think would be needed to support six tertiary consumers in a grassland ecosystem?
(b) Draw a grassland pyramid to substantiate your answer.

Section-C (3 Marks each)

22. When and where do tapetum and synergids develop in flowering plants? Mention their functions.

23. Draw a labelled diagram of the embryonic stage that gets implanted in the human uterus. State the functions of the two parts labelled.

24. Answer the following questions based on Meselson and Stahl's experiment:
(a) Write the name of the chemical substance used as a source of nitrogen in the experiment by them.
(b) Why did the scientists synthesise the light and the heavy DNA molecules in the organism used in the experiment?
(c) How did the scientists make it possible to distinguish the heavy DNA molecule from the light DNA molecule? Explain.
(d) Write the conclusion the scientists arrived at after completing the experiment.

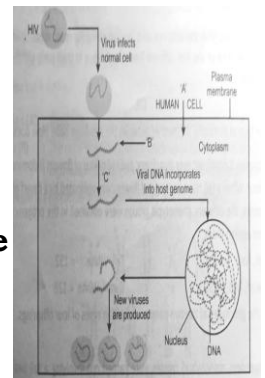
25. $p^2+2pq+q^2 = 1$. Explain this algebraic equation on the basis of Hardy Weinberg's principle.

26. Study the diagram showing the entry of HIV into the human body and the processes that are followed:

- (a) Name the human cell 'A' HIV enters into.
(b) Mention the genetic material 'B' HIV releases into the cell.
(c) Identify enzyme 'C'.

27. Name any two natural cloning vectors. Give reasons that make them act as cloning vectors. Write the two characteristics the engineered vectors are made to possess.

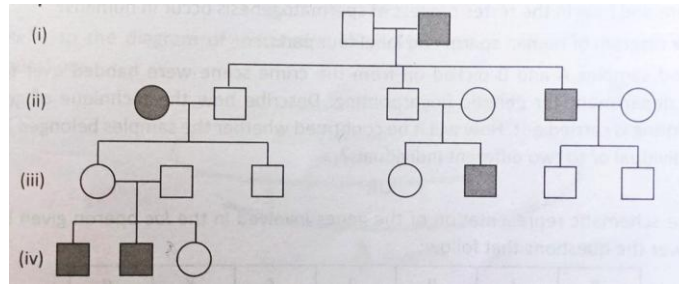
28. Explain any three ways other than zoological parks, botanical gardens and wildlife safaries, by which threatened species of plants and animals are being conserved 'ex-situ'.



Section-D (4 Marks each)

Q. No. 29 and 30 are case based questions. Each question has subparts with internal choice in one sub-part.

29.

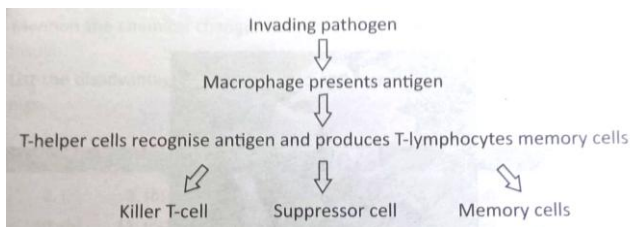


- (a) Observe the pedigree chart given and identify the type of inheritance exhibited.
(b) What will be the genotype of individuals in generation (i) and (iv)?

OR

- (b) If both the parents are carrier in the given pedigree chart, what are the chances of a child being affected?
(c) Give an example of a disease in human beings which shows such a pattern of inheritance.

30. Given below is the flow chart for cell-mediated immune response.



Answer the following questions on the basis of the flow chart:

- a) Name any two types of cells which act as "Cellular Barriers" to provide Innate Immunity in humans.
b) Thymus of a new born child was degenerating right from birth due to a genetic disorder. Predict its two Impacts on the health of the child.
c) How do cytokine barriers provide innate immunity in humans?

OR

Which immune response does vaccination affect?

Section-D (5 Marks each)

31. Describe the events that occur after fertilisation of an ovum till implantation in human female.

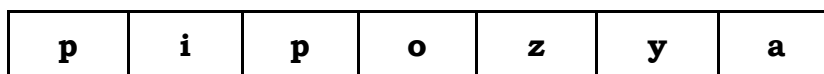
OR

- (a) Where and how in the testes process of spermatogenesis occur in humans?
(b) Draw diagram of human sperm and label four parts.

32. Two blood samples A and B picked up from the crime scene were handed over to the forensic department for genetic fingerprinting. Describe how the technique of genetic fingerprinting is carried out. How will it be confirmed whether the samples belonged to the same individual or to two different individuals?

OR

Study the schematic representation of the genes involved in the lac operon given below and answer the questions that follow:



- (a) Identify and name the regulatory gene in this operon. Explain its role in 'switching off' the operon.
- (b) Why is lac operon's regulation referred to as negative regulation?
- (c) Name the inducer molecule and the products of the genes 'z' and 'y' of the operon. Write the functions of these gene products.

33. Given below is the figure of two types of cotton bolls: one destroyed by bollworms and the other is fully matured one.

Answer the following questions on the basis of given figure:

- (a) What is Bt cotton?
- (b) Bt toxins are released as inactive crystals in the bacterial body. What happens to it in the cotton bollworm body that it kills the bollworm?



- (c) List the type of cry genes that provide resistance to corn plants and cotton plants respectively against lepidopterans.
- (d) Why does the Bt toxin not kill the bacterium that produces it but kills the insect that ingests it?

OR

Refer to the diagram of maturation of proinsulin into insulin to answer the following questions.

- (a) How are two short polypeptide chains of insulin linked together?
- (b) State the role of C-peptide in human insulin.
- (c) Mention the chemical change that proinsulin undergoes, to be able to act as mature insulin.
- (d) List the disadvantages of insulin obtained from the pancreas of slaughtered cow and pigs.

