SAMPLE QUESTION PAPER

BLUE PRINT

Time Allowed : 3 hours **Maximum Marks :** 70

S. No.		Chapter	VSA /Case based/ AR (1 mark)	SA-I (2 marks)	SA-II (3 marks)	LA (5 marks)	Total	
1.	Unit-VI	Sexual Reproduction in Flowering Plants	2(2)	–	–	–	**2(2)**	**14**
2.		Human Reproduction	2(2)	–	1(3)	1+1*(5)	**4(10)**	
3.		Reproductive Health	–	1(2)	–	–	**1(2)**	
4.	Unit-VII	Principles of Inheritance and Variation	4+1*(7)	1+1*(2)	–	–	**5(9)**	**18**
5.		Molecular Basis of Inheritance	1(1)	–	1(3)	1+1*(5)	**3(9)**	
6.	Unit-VIII	Human Health and Diseases	–	2(4)	1(3)	1+1*(5)	**4(12)**	**14**
7.		Microbes in Human Welfare	–	1(2)	–	–	**1(2)**	
8.	Unit-IX	Biotechnology : Principles and Processes	3(3)	2(4)	–	–	**5(7)**	**12**
9.		Biotechnology and Its Applications	–	1(2)	1(3)	–	**2(5)**	
10.	Unit-X	Organisms and Populations	3(6)	1*	1+1*(3)	–	**4(9)**	**12**
11.		Biodiversity and Conservation	1(1)	1(2)	–	–	**2(3)**	
		Total	**16(22)**	**9(18)**	**5(15)**	**3(15)**	**33(70)**	

*It is a choice based question.

Subject Code : **044**

BIOLOGY

Time allowed : 3 hours ***Maximum marks : 70***

General Instructions :

(i) All questions are compulsory.

(ii) The question paper has four sections: Section A, Section B, Section C and Section D. There are 33 questions in the question paper.

(iii) Section-A has 14 questions of 1 mark each and 02 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.

(iv) 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.

(v) Wherever necessary, neat and properly labeled diagrams should be drawn.

SECTION - A

1. Apple and cashew are not called true fruits. Why?

2. Give reason why anthers of angiosperm flowers are described as dithecous.

3. What stimulates pituitary to release the hormone responsible for parturition? Name the hormone.

4. Where is acrosome present in humans? Write its function.

5. Why green plants are not found beyond a certain depth in the ocean?

6. Why do normal red blood cells become elongated sickle shaped structures in a person suffering from sickle cell anaemia?

7. Name the event during cell division cycle that results in the gain or loss of chromosome.

8. How does DNA polymorphism arise in a population?

9. Name the source organism of the DNA polymerase in PCR.

10. State what happens when an alien gene is ligated at *Pvu*I site of pBR322 plasmid.

11. **Assertion :** ABO blood group system provides a good example of incomplete dominance.
Reason : In ABO blood group system, none of the two contrasting alleles is dominant.
(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.

OR

Assertion : Mendel's seven characters are confined to only four chromosomes.
Reason : Test cross is a cross between F_1 hybrid and recessive parent.

(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.

12. **Assertion :** A bacterial cell with no restriction enzymes will be easily infected and lysed by bacteriophages.
Reason : Restriction enzymes catalyse synthesis of protective coat around bacterial cell that prevents bacteriophage attack.
(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.

13. **Assertion :** In a wildlife sanctuary, collection of timber, harvesting of minor forest products and private ownership rights are allowed.
Reason : A sanctuary is a protected area meant for the conservation of both flora and fauna where cultivation of land is permitted.
(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.

14. **Assertion :** Bell shaped age pyramid represents a stable population.
Reason : In a stable population, proportion of individuals in reproductive age group is higher than the individuals in pre-reproductive age group.
(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.

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

Mutualism

In an ecosystem, various organisms are interrelated not only in terms of energy transfer but also exhibit some mutualistic relation for their survival. Mutualism is an association between the organisms of two different species in which each gets benefitted. Mutualistic arrangements are most likely to develop between organisms with widely different living requirements. For example, an association between a fungus and photosynthesising algae in a lichen represent an intimate mutualistic relationship. Similarly, the association of fungi and the roots of higher plants in the mycorrhizae is also an example of mutualistic relationship, where the fungi help the plant in the absorption of essential nutrients from the soil while the plant in turn provides the fungi with energy-yielding carbohydrates. The plant-animal relationships are common mutualistic relationship in which plants get help in pollination and seed dispersal by animals and in return animals get pollen and nectar as pollinators and juicy and nutritious fruits as seed dispersers. In nature, plants and animals which are interrelated coevolve together. Such as different species of fig trees has tight one-to-one relationship with the pollinator species of wasp.

(i) In mutualism,
(a) both organisms get benefitted
(b) one organism gets benefitted and other is neither benefitted nor harmed
(c) one organism gets benefitted and other get harmed
(d) both organisms get harmed.

(ii) The example of mutualism does not include_____
(a) association of algae and fungi in lichen (b) association of fungi and plant root in mycorrhiza
(c) fig flower pollinated by wasp (d) cattle egrets and grazing cattles.

(iii) In a mutualistic relation of fig flower and wasp, wasp get benefits in the form of
(a) food (b) nutrition (c) egg-laying site (d) all of these.

(iv) The Mediterranean orchid *Ophrys* employs 'sexual deceit' to a species of bee is an example of
(a) mutualism (b) commensalism (c) parasitism (d) predation.

(v) **Assertion:** Lichen is a mutualistic relationship of algae and fungi
Reason: In lichen, fungal partner is dominant over algae partner.
(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.

16. Read the following and answer any four questions from 16(i) to 16(v) given below:
Some people are unable to see colours in a normal way as they fail to distinguish certain colours. This condition is called as colour blindness. Colour blindness is a sex-linked recessive disorder in which person fails to discriminate between red and green colour due to defect in either red or green cone of eye. This defect arises due to mutation in certain genes present in the X chromosome. In human population, colour blindness occurs in about 8 per cent of males and only about 0.4 per cent of females. The son of a woman who carries the gene has a 50 per cent chance of being colour blind. A daughter will not normally be colour blind, unless her mother is a carrier and her father is colour blind. There are three inheritance scenarios that can lead to a child having color blindness:
- Both parents have color blindness.
- One parent has color blindness and the other has color blindness trait
- Both parents have color blindness trait.

(i) Colour blindness is a _____.
(a) X linked trait (b) Y linked trait (c) autosome linked trait (d) both (a) and (b)

(ii) The X linked traits are usually _____.
(a) recessive (b) dominant (c) codominant (d) both (b) and (c)

(iii) The chances of appearance of colour blindness in a son of carrier mother and normal father is _____ among two sons.
(a) 100% (b) 50% (c) 75% (d) 25%

(iv) If a colourblind man marries a woman who is homozygous for normal colour vision, the probability of their son being colourblind is
(a) 0 (b) 0.5 (c) 0.75 (d) 1.

(v) Refer to the given table of the progeny obtained from two marriages (A and B).

Progeny	**Case A**	**Case B**
Colourblind son	25%	0%
Normal son	25%	50%
Colourblind daughter	25%	0%
Normal daughter	0%	0%
Carrier daughter	25%	50%

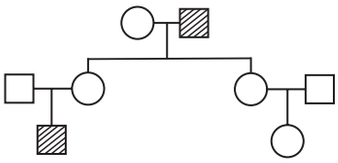
Which of the following statements are correct?
I. In case A, the parents of children are colorblind.
II. In case A, mother of children is carrier and father is colourblind.
III. In case B, mother of children is normal and father is colourblind.

IV. In case B, mother of children is carrier and father is normal.

(a) Only I and III are true.
(b) Only I and IV are true.
(c) Only II and III are true.
(d) Only II and IV are true.

SECTION - B

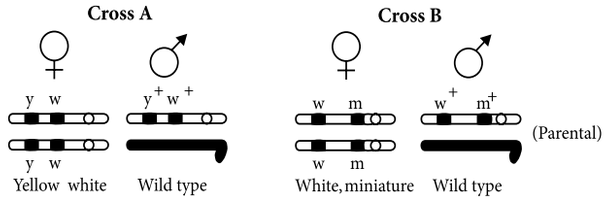
17. Why there is a statutory ban on amniocentesis? Why is this technique named so?

18. 

This is the pedigree of a family tracing the movement of the gene for haemophilia. Explain the pattern of inheritance of the disease in the family.

OR

Study the figures given below and answer the question.



Identify in which of the given crosses, the strength of linkage between the genes is higher. Give reasons in support of your answer.

19. How does a vaccine for a particular disease immunise the human body against that disease?

20. β-galactosidase enzyme is considered a better selectable marker. Justify the statement.

21. Explain the role of Ti plasmids in biotechnology.

22. Name and describe the technique that helps in separating the DNA fragments formed by the use of restriction endonuclease.

23. Write the scientific names of the causal organisms of elephantiasis and ringworm in humans. Mention the body parts affected by them.

24. How do organic farmers control pests? Give two examples.

25. Suggest two practices giving one example of each, that help to protect rare or threatened species.

OR

Why do clown fish and sea anemone pair up? What is this relationship called?

SECTION - C

26. Draw a labelled diagrammatic sectional view of a human seminiferous tubule.

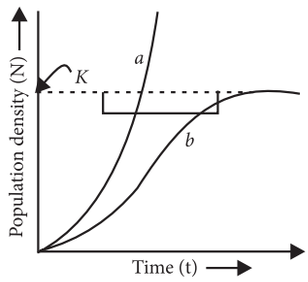
27. **(a)** In the human genome, which chromosome has the maximum number of genes and which has the fewest?

(b) Explain the methodologies involved in Human Genome Project.

28. Why are lymph nodes and bone marrows called lymphoid organs? Explain the functions of each one.

29. Name the genes responsible for making Bt cotton plants resistant to bollworm attack. How do such plant attain resistance against bollworm attacks? Explain.

30. Study the graph given below and answer the questions that follow:



(i) The curve '*b*' is described by the following equation:

$$\frac{dN}{dt} = rN\left\{\frac{K-N}{K}\right\}$$

What does '*K*' stand for in this equation? Mention its significance.

(ii) Which one of the two curves is considered a more realistic one for most of the animal populations?

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

OR

(a) Name the two growth models that represent population growth and draw the respective growth curves they represent.

(b) State the basis for the difference in the shape of these curves.

(c) Which one of the curves represent the human population growth at present? Do you think such a curve is sustainable? Give reason in support of your answer.

SECTION - D

31. **(a)** Explain the process of fertilisation of an ovum in humans. Trace the events that occur after fertilisation upto the implantation of blastocyst.

(b) Draw a labelled diagram of a human blastocyst.

OR

(a) Describe the stages of oogenesis in human females.

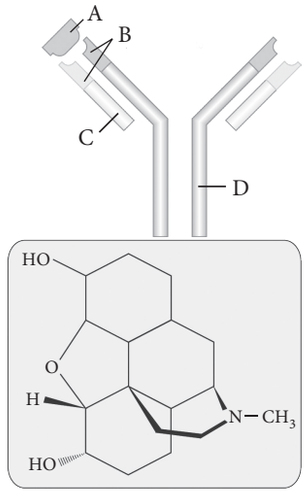
(b) Draw a labelled diagram of a human ovum released after ovulation.

32. Describe the process of transcription in prokaryotes.

OR

Describe with help of labelled diagrammatic sketches the experiments conducted by Hershey and Chase. Write the inference drawn by them.

33. Observe the given figure and answer the following questions.



(i) Identify the given image along with A, B, C and D.

(ii) Explain the structure of given molecule.

(iii) Why is the stem of this Y-shaped structure called F_C region?

OR

(a) Refer to the given structure and answer the questions based on it.

(i) Identify the drug from the given structure.

(ii) What is the source of this drug? State its effects.

(b) "Prevention is better than cure" is an apt slogan to safeguard adolescents from drug abuse. List any six steps that could be taken in this regard.