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+1*(3)	1+1*(5)	**4(10)**	
3.		Reproductive Health	–	1(2)	–	–	**1(2)**	
4.	Unit-VII	Principles of Inheritance and Variation	4(7)	–	1(3)	1+1*(5)	**6(15)**	**18**
5.		Molecular Basis of Inheritance	1(1)	1(2)	–	–	**2(3)**	
6.	Unit-VIII	Human Health and Diseases	1(1)	1+1*(2)	1(3)	–	**3(6)**	**14**
7.		Microbes in Human Welfare	1(1)	1(2)	–	1+1*(5)	**3(8)**	
8.	Unit-IX	Biotechnology : Principles and Processes	2+1*(2)	2(4)	–	–	**4(6)**	**12**
9.		Biotechnology and Its Applications	1(1)	1(2)	1(3)	–	**3(6)**	
10.	Unit-X	Organisms and Populations	1(4)	2+1*(4)	1(3)	–	**4(11)**	**12**
11.		Biodiversity and Conservation	1(1)	–	–	–	**1(1)**	
		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. Why integuments of an ovule harden and the water content is highly reduced, as the seed matures?

2. Pollen grains are well preserved as fossils. Give reason.

3. Name the hormones influencing follicular development of corpus luteum.

4. What is the function of vagina?

5. British geneticist R.C. Punnett developed a graphical representation of a genetic cross called "Punnett Square". Mention the possible result this representation predicts of the genetic cross carried.

6. Name the pattern of inheritance where F_1 phenotype :
(i) resembles only one of the two parents.
(ii) does not resemble either of the two parents and is in between the two.

7. How does a degenerate code differ from an unambiguous one?

8. State the possibility of a permanent cure of ADA deficiency.

9. Which chemical is used in vectorless gene transfer?

10. Malaria, typhoid, pneumonia and amoebiasis are some of the human infectious diseases. Which one of these are transmitted through mechanical carriers?

11. **Assertion :** Persons with Klinefelter's syndrome are sterile males.
Reason : Klinefelter's syndrome is due to monosomy (2n – 1).
(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 :** Use of chitinase enzyme is necessary for isolation of DNA from yeast cells but not in case of *Spirogyra*.

Reason : Fungal cell wall is made up of fungal cellulose or chitin.

(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 : All expression vectors are cloning vectors and *vice versa.*

Reason : Expression vectors have at least the regulatory sequences *i.e.*, promoters, operators, ribosomal binding sites, etc., having optimum function in the chosen control but not origin of replication.

(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 :** Rennet and fruit extract of *Withania somnifera* have antagonistic functions.

Reason : Rennet is obtained from calf's liver and is used for curdling of milk.

(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 :** Endangered organisms are being cryopreserved.

Reason : The cryopreserved material is revived through special technique when required.

(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:**

Haemophilia is a gene related human disorder. A hemophilic man marries carrier woman. One of their offspring used to bleed continuously even from minor cut. Double recessive gene of haemophilia is fatal. Hemophilic individual does not have natural phenomenon of blood clotting due to absence of clotting factor VIII. There is no permanent cure of this disease.

(i) Genotype of father and carrier mother respectively are

(a) X^hY, X^hX (b) X^hY, X^hX^h (c) XY^h, X^hX (d) X^hY^h, X^hX

(ii) What percentage of offsprings would not survive?

(a) 50% (b) 75% (c) 25% (d) 100%

(iii) If carrier woman and haemophilic man married then what phenotypes in progenies would be obtained?

(a) 2 carrier daughter, 1 normal son and 1 haemophilic son
(b) 1 carrier daughter, 1 normal daughter and 2 haemophilic sons
(c) 1 carrier daughter, 1 haemophilic daughter, 1 normal son and 1 haemophilic son
(d) 2 normal daughters and 2 haemophilic sons

(iv) Which statement is correct for haemophilia?

(a) It is an autosomal disorder. (b) It shows criss cross inheritance.

(c) Single allele produces its effect in both sexes. (d) All of these.

(v) **Assertion :** Females with genotype X^hX can survive.

Reason : Allele for normal blood clotting is present on second X-chromosome.

(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:

Predation

In nature, predation is a way of transferring the energy to higher trophic levels fixed by plants, such as tiger feeds on deer. A predator is an organism that eats another organism which is called prey. Predators checks prey population to avoid ecosystem instability. In absence of natural predator, certain exotic species when introduced into a geographical area become invasive *e.g.*, in the early 1920's, the introduction of prickly pear cactus into Australia caused havoc by spreading rapidly into millions of hectares of rangeland, which were finally brought under control by introducing its predator, a cactus-feeding moth. It is a kind of biological control. Predators also help in maintaining species diversity in a community by reducing the intensity of competition among competing prey species. In some cases, prey have evolved various defenses against predation e.g. some species of insects and frogs show camouflage to its nature to avoid being detected easily by the predator.

(i) In Australia, Prickly pear cactus was brought in control by

(a) over exploitation (b) competition

(c) predation (d) none of these.

(ii) The number of prey and predator population in an ecosystem

(a) is interdependent on each other (b) is independent of each other

(c) increases with time (d) decreases with time.

(iii) What will happen in a long run if the number of prey increases in an ecosystem?

(a) The number of predator will be decrease (b) Ecosystem imbalance occur

(c) There will be food shortage for predator. (d) Both (a) and (b)

(iv) In a field experiment, when all the starfish were removed from an enclosed intertidal area, more than 10 species of invertebrates became extinct within a year, because of _____.

(a) intervarietal competition (b) interspecific competition

(c) intergeneric competition (d) all of these

(v) **Assertion :** Predation is very important in nature.

Reason : Predator acts as 'conduits' for energy transfer across trophic levels.

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

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

(c) Assertion is true but reason is false.

(d) Both assertion and reason are false.

SECTION - B

17. Explain how do copper releasing IUDs act as effective contraceptives in human female.

18. Differentiate between the leading strand and the lagging strand of DNA.

19. Your advice is sought to improve the nitrogen content of the soil to be used for cultivation of a non-leguminous terrestrial crop.

(i) Recommend two microbes that can enrich the soil with nitrogen.

(ii) Why do leguminous crops not require such enrichment of the soil?

20. Why exonuclease is not used for production of a recombinant DNA molecule?

21. In the experiment of cloning a gene, what would be the effect of a plasmid without a selectable marker?

22. Give one application of each of the following:

(i) PCR

(ii) ELISA

23. Name the plant source of the drug popularly called 'smack'. How does it affect the body of the abuser?

OR

Differentiate between active and passive immunity.

24. Explain "birth rate" in a population by taking a suitable example.

OR

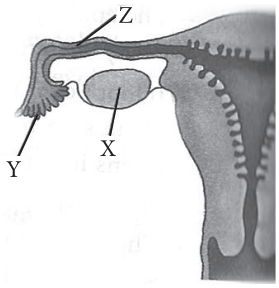
Write the two characteristics which only a population shows but an individual cannot.

25. Explain the principle of carrying capacity by using population Verhulst-Pearl logistic growth curve.

SECTION - C

26. A pea plant with purple flowers was crossed with white flowers producing 50 plants with only purple flowers. On selfing, these plants produced 482 plants with purple flowers and 162 with white flowers. What genetic mechanism accounts for these results? Explain.

27.



The diagram above shows a part of the human female reproductive system.

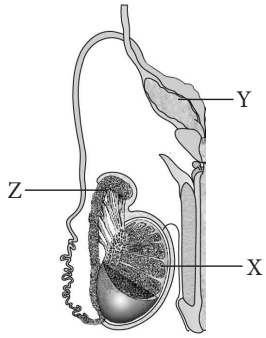
(i) Name the gamete cells that would be present in 'X' if taken from a newborn baby.

(ii) Name 'Y' and write its function.

(iii) Name 'Z' and write the events that take place here.

OR

The given diagram shows human male reproductive system (one side only).



(i) Identify 'X' and write its location in the body.

(ii) Name the accessory gland 'Y' and its secretion.

(iii) Name and state the function of 'Z'

28. Mention any two human diseases caused by roundworms. Name their causative agents and their mode of transmission into the human body.

29. **(a)** What happens when *Meloidogyne incognita* consumes cells with RNAi gene?

(b) How dsRNA enters into an eukaryotic cell to cause RNA interference?

30. How do organisms cope with stressful external environmental conditions which are localised or of short duration?

SECTION - D

31. **(a)** Write the specific location and the functions of the following cells in human males :

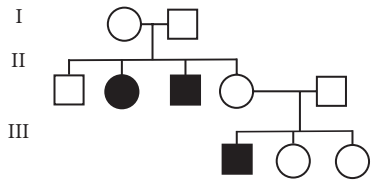
(i) Leydig's cells (ii) Sertoli cells (iii) Primary spermatocyte

(b) Explain the role of any two accessory glands in human male reproductive system.

OR

Explain the ovarian and uterine events that occur during a menstrual cycle in a human female under the influence of pituitary and ovarian hormones respectively.

32. Study the given pedigree chart and answer the question that follow.



(a) Is the trait recessive or dominant ?

(b) Is the trait sex-linked or autosomal ?

(c) Give the genotypes of the parents in generation I and of their third and fourth child in generation II.

OR

(a) How does a chromosomal disorder differ from a Mendelian disorder?

(b) Name any two chromosomal aberration associated disorders.

(c) List the characteristics of the disorders mentioned above that help in their diagnosis.

33. (a) (i) Why do farmers prefer biofertilisers to chemical fertilisers these days? Explain.

(ii) How do *Anabaena* and mycorrhiza act as biofertilisers?

(b) Why is a little curd added to milk to set it into curd? Explain.

OR

(a) (i) Why are the fruit juices bought from market clearer as compared to those made at home?

(ii) Name the bioactive molecules produced by *Trichoderma polysporum* and *Monascus purpureus*.

(b) Distinguish between the roles of flocs and anaerobic sludge digesters in sewage treatments.