

# 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.		2(2)	–	1(3)	1+1*(5)	4(10)	
3.		–	1(2)	–	–	1(2)	
4.	Unit-VII Principles of Inheritance and Variation	2(2)	–	1+1*(3)	–	3(5)	18
5.		3+1*(6)	1+1*(2)	–	1+1*(5)	5(13)	
6.	Unit-VIII Human Health and Diseases	–	2+1*(4)	–	1+1*(5)	3(9)	14
7.		–	1(2)	1(3)	–	2(5)	
8.	Unit-IX Biotechnology : Principles and Processes	2(2)	2(4)	–	–	4(6)	12
9.		1(1)	1(2)	1(3)	–	3(6)	
10.	Unit-X Organisms and Populations	2(5)	1(2)	1(3)	–	4(10)	12
11.		Biodiversity and Conservation	2(2)	–	–	–	
	<b>Total</b>	<b>16(22)</b>	<b>9(18)</b>	<b>5(15)</b>	<b>3(15)</b>	<b>33(70)</b>	

\*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 is tender coconut considered healthy source of nutrition?
2. Mention the exact location or the site in a flowering plant where the following developments take place.
  - (i) Deposition of sporopollenin
  - (ii) Megasporogenesis
3. Write the function of luteinising hormone in human males.
4. When does a geneticist need to carry a test cross?
5. Name the respective pattern of inheritance where  $F_1$  phenotype :
  - (i) does not resemble either of the two parents and is in between the two.
  - (ii) resembles only one of the two parents.
6. Write the function of fimbriae (oviducal).
7. Name the enzyme that joins the small fragment of DNA of a lagging strand during DNA replication.
8. State the initiative taken by the Indian parliament against biopiracy.
9. Name the host cells in which microinjection technique is used to introduce an alien DNA.
10. List four causes of biodiversity loss.
11. **Assertion** : Some sequences in *mRNA* are not translated and are referred to as untranslated regions.  
**Reason** : Untranslated regions are present at both 5'-end (before start codon) and at 3'-end (after stop codon).
  - (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 :** Codon AUG of genetic code has dual function.

**Reason :** Codon AUG codes for methionine and it also acts as initiation codon.

- (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 :** Restriction enzymes recognise palindromic sequences.

**Reason :** Palindromic sequences read same in both directions of the two strands.

- (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 :** Broadly utilitarian arguments say that we should conserve biodiversity because biodiversity plays a major role in many ecosystem services that nature provides.

**Reason :** Exploration of molecular, genetic and species level diversity to obtain the products of economic importance is included under broadly utilitarian category.

- (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 :** The aquatic organisms in which the osmotic concentration and temperature of body change according to the ambient conditions of water are referred to as conformers.

**Reason :** Aquatic organisms are able to maintain homeostasis through thermoregulation and osmoregulation by physiological or behavioural means.

- (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:**

Animal show adaptations, which enable them to survive and reproduce in their habitats. Praying mantis show camouflage. It remains unnoticed till the prey comes within their striking range. Some animals show mimicry as protection against predation. The species which is imitated is called model while the animal which imitates is known as mimic.

(i) Camouflage is defined as

- (a) resemblance of one species of animals with another species
- (b) ability of animals to blend with the background
- (c) state of inactivation in ectothermic nature organisms
- (d) phenotypic adaptation which help to respond quickly to an unfavourable situation.

(ii) \_\_\_\_\_ is the resemblance of one species of animals with another species.

- (a) Warning colouration
- (b) Aestivation
- (c) Cryptic appearance
- (d) Mimicry

(iii) Which of the following statements is correct?

- (a) Mimicry allows animals to remain unnoticed from a distance.
- (b) Mimicry is advantageous to both prey as well as predator.
- (c) Monarch butterfly mimics unpalatable viceroy butterfly.
- (d) Leaf insect cannot be noticed from surrounding foliage until they show movement.



- (iv) Tenebrionid beetles becomes motionless and pebble like on sensing an approaching danger from predators. Identify the type of adaptation.
- (a) Alluring aggressive mimicry (b) Camouflage  
(c) Warning colouration (d) Echolocation

(v) **Assertion :** Cryptic appearance allows animals to remain unnoticed from a distance.

**Reason :** Cryptic appearance is advantageous to both prey and predator.

- (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:

An operon is a part of genetic material which is a coordinated group of genes such as structural gene, operator gene, regulator gene and promoter gene that function together and regulate a metabolic pathway as a unit. *E.coli* has an inducible operon system. It is a regulated unit of genetic material which is switched on in response to the presence of a chemical. Inducible operon systems is functional in catabolic pathways.

(i) Name the inducer present in this operon system.

- (a) Lactose (b) Glucose  
(c) Galactose (d) Tryptophan

(ii) Promoter gene is an operon system

- (a) controls functioning of operator gene (b) determines functioning of structural genes  
(c) is site for binding RNA polymerase (d) is connected with transcription of mRNA.

(iii) **Assertion :** Regulator gene exerts negative control over structural genes.

**Reason :** Repressor protein of regulator gene binds to operator region and stops it working.

- (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.

(iv) \_\_\_\_\_ gene functions only when it is not blocked by repressor.

- (a) Regulator (b) Operator  
(c) Promoter (d) Structural

(v) Which enzyme synthesised in inducible operon system is responsible for bringing lactose inside the cell?

- (a) Permease (b) Transacetylase  
(c)  $\beta$ -galactosidase (d) Both (a) and (c)

## SECTION - B

17. Why is ZIFT a boon to childless couples? Explain the procedure.

18. What are the criteria for a molecule to act as a genetic material?

OR

Explain aminoacylation of tRNA.

19. Principle of vaccination is based on the property of “memory” of the immune system. Taking one suitable example, justify the statement.

OR

To which category of cells do B-cells and T-cells belong? How do they differ from each other with reference to their formation and response to antigens?

20. State how has *Agrobacterium tumefaciens* been made a useful cloning vector to transfer DNA to plant cells.
21. Name the organism from where the thermostable DNA polymerase is isolated. State its role in genetic engineering.
22. How does a restriction nuclease function? Explain.
23. Name and explain the two types of immune responses in humans.
24. How does the application of the fungal genus, *Glomus*, to the agricultural farm increase the farm output?
25. Name the population growth pattern the equation  $\left\{ \frac{dN}{dt} = rN \right\}$  represents.  
What does “r” represent in the equation? Write its importance in population growth.

### SECTION - C

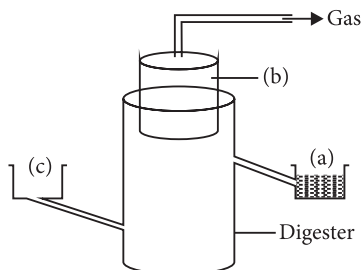
26. A plant of *Antirrhinum majus* with red flowers was crossed with another plant of the same species having white flowers. The plants of F<sub>1</sub> generation had pink flowers.
  - (i) What is this phenotypic expression called? Define it.
  - (ii) Work out the cross to show the F<sub>2</sub> generation, when F<sub>1</sub> is self pollinated.
  - (iii) What will be the ratio of the offsprings in the cross between red flowers and pink flowers?

OR

A cow with red coat is crossed with a bull having white coat. Their offspring produced in F<sub>1</sub> generation showed roan coat.

- (i) Explain the pattern of inheritance with the help of a cross.
  - (ii) Give the genotypic and phenotypic ratios of F<sub>2</sub> generation.
27. (a) What forms the corpus luteum? Name the hormones secreted by it.  
(b) At what stage of menstrual cycle is corpus luteum formed in human females? When does it regress?

28.



The diagram above is that of a typical biogas plant. Explain the sequence of events occurring in a biogas plant. Identify a, b and c.

29. Describe potential applications of genetically modified plants.
30. Explain parasitism and co-evolution with the help of one example each.

## SECTION - D

31. (a) How is 'oogenesis' markedly different from 'spermatogenesis' with respect to the growth till puberty in the humans?  
(b) Draw a sectional view of human ovary and label the different follicular stages, ovum and corpus luteum.

OR

- (a) Give a schematic representation of spermatogenesis in humans.  
(b) At which stage of life does gametogenesis begin in human male and female?  
(c) Name the organs where gametogenesis gets completed in human male and female respectively.
32. (a) Write the contributions of the following scientists in deciphering the genetic code.  
George Gamow; Hargobind Khorana; Marshall Nirenberg; Severo Ochoa  
(b) State the importance of a genetic code in protein biosynthesis.

OR

Explain the process of transcription in eukaryotes.

33. (I) (a) State what happens in the human body when malarial parasites infected RBCs burst to release the parasites in the blood.  
(b) Mention the specific sites in the host body where production of  
(i) sporozoites and  
(ii) gametocytes takes place in the life cycle of the malarial parasites.
- (II) Name the causative organism, two symptoms and mode of transmission in ascariasis.

OR

- (I) (a) What makes some viruses cause cancer in humans?  
(b) How do benign tumors turn malignant? How does the latter harm the human body?
- (II) (a) Name the source plant of heroin drug. How is it obtained from the plant?  
(b) Write the effects of heroin on the human body.

