

Class XII | Session 2026-27
Subject - Biology
Sample Question Paper - Set 3

General Instructions:

1. All questions are compulsory.
2. The question paper has five sections and 33 questions. All questions are compulsory.
3. Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E 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. In nature, inbreeding, and outbreeding of plants are regulated by: [1]
 - a) Maturation and hybridization
 - b) Intraspecific and interspecific incompatibility
 - c) Parthenogenesis
 - d) Duration of pollen and ovule formation
2. A common biocontrol agent for the control of plant diseases is: [1]
 - a) Baculo virus
 - b) Bacillus thuringiensis
 - c) Trichoderma
 - d) Glomus
3. If + sign is assigned to beneficial interaction - sign to detrimental and 0 sign to neutral interaction., then the population interaction represented by + - refers to : [1]
 - a) Commensalism
 - b) Mutualism
 - c) Parasitism
 - d) Amensalism
4. Which one of the following is used during **RNA i** process, to silence the desired gene? [1]
 - a) DNA polymerase
 - b) dsDNA
 - c) rDNA
 - d) dsRNA
5. Human settlement often leads to habitat loss which leads to fragmentation, forming smaller patches of habitats. [1]
Select the statements that describe how a small patch differs from a large patch of the same habitat.
 - i. Invasive species will never be seen here.
 - ii. Population of large animals decreases.
 - iii. Biodiversity decreases.

iv. Competition from surrounding habitats increases.

a) (ii) and (iv) only

b) (i) and (iii) only

c) (ii), (iii) and (iv) only

d) (i), (ii) and (iii) only

6. The change in mammalian sperm which prepares it to fertilize the ovum is termed:

[1]

a) Preparation

b) Maturation

c) Capacitation

d) Metamorphosis

7. Which is used for preparation of bread:

[1]

a) *Aspergillus*

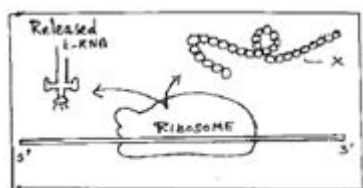
b) *S. cerevisiae*

c) *Lactobacillus*

d) *Streptobacillus*

8. What does X represent in the following diagram:

[1]



a) Released secondary protein

b) Released 3D protein molecule

c) Released tertiary protein

d) Released polypeptide chain

9. A haploid plant produces male or female gametes by:

[1]

a) Binary fission

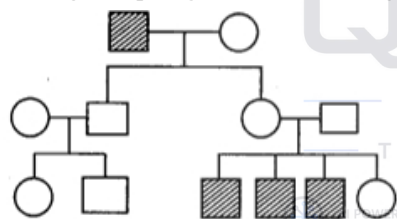
b) Mitosis

c) Amitosis

d) Meiosis

10. In the given pedigree the shaded figures denote individuals expressing a specific trait:

[1]



Which of the following is the most probable mode of inheritance of this trait?

a) Codominant relationship of a single pair of alleles

b) Simple Mendelian Recessive

c) X-linked recessive transmission

d) X-linked dominant transmission

11. The Human Genome Project (HGP) was initiated in:

[1]

a) 1994

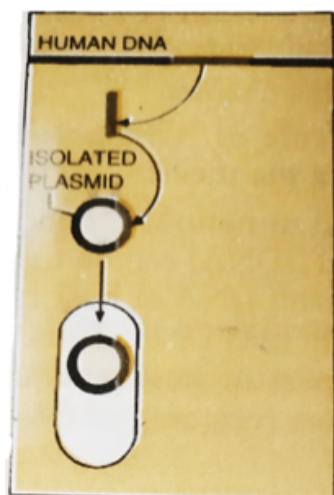
b) 1988

c) 1990

d) 1992

12. Arrange the following steps that are shown in the figure:

[1]



1. The plasmid is taken up into a bacterial cell which makes protein directed by human DNA
2. DNA segment incorporated into the bacterial plasmid
3. The segment of DNA removed from human cell
4. In Genetic engineering (Recombinant DNA technology)

a) $1 \rightarrow 4 \rightarrow 3 \rightarrow 2$

b) $1 \rightarrow 2 \rightarrow 3 \rightarrow 4$

c) $4 \rightarrow 3 \rightarrow 2 \rightarrow 1$

d) $2 \rightarrow 3 \rightarrow 4 \rightarrow 1$

13. **Assertion (A):** Pure lines are called true breed.

[1]

Reason (R): True breeds are used for crossbreeding.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

14. **Assertion (A):** Organic compounds first evolved in earth required for origin of life were protein and nucleic acid.

[1]

Reason (R): All life forms were in water environment only.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

15. **Assertion (A):** Ribosomes attached to endoplasmic reticulum release proteins into lumen of ER.

[1]

Reason (R): Such proteins are used for formation of hydrolytic enzymes or are modified.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

16. **Assertion (A):** Virus-infected cells produce interferons.

[1]

Reason (R): Interferons can cause inflammation of virus-infected cells.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

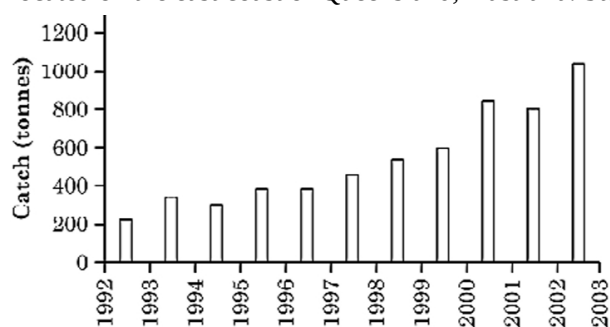
c) A is true but R is false.

d) A is false but R is true.

Section B

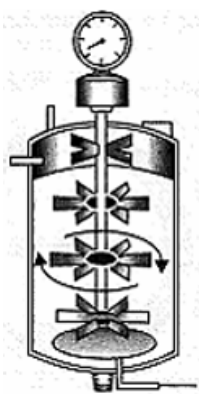
17. Can we use slurry of human excreta instead of cowdung slurry to produce biogas in a typical biogas plant? Support your answer giving reasons. [2]

18. The histogram given below representing the data for annual shark harvest in the great barrier reef/coral reef located on the east coast of Queensland, Australia. Study the histogram and answer the questions that follow. [2]

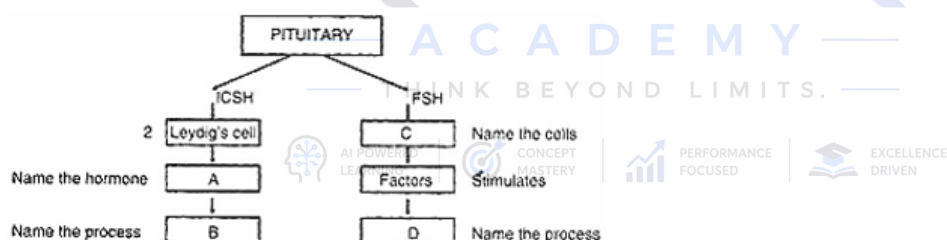


Source : Fijisharkdiving.blogspot.com

- a. Write your interpretation of the data given.
b. Write the impact on the biodiversity of the area that you can interpret on the basis of given data.
19. Name the type of bioreactor shown. Write the purpose for which it is used. [2]



20. Given below is an incomplete chart showing the influence of hormones on gametogenesis in males. Observe the chart carefully and fill in the blanks A, B, C and D. [2]



21. What do you understand by the phenomenon photonasty? [2]

OR

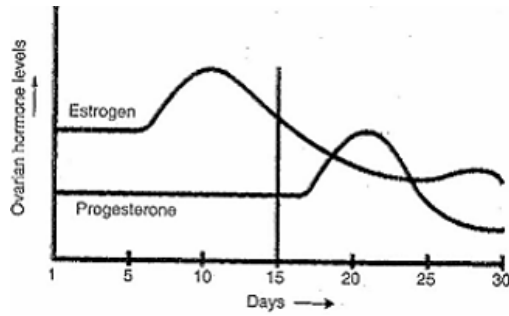
Define ectoparasite and endoparasite and give suitable examples.

Section C

22. After a rainy day Rahul found many dragon flies flying over stagnant water. He thinks these flies come to drink water. Is Rahul's explanation correct? Give your views. [3]

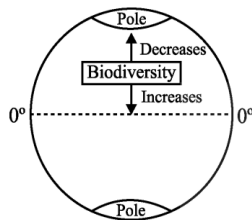
23. i. Read the graph given above and correlate the uterine events that take place according to the hormonal levels on:
a. 6-15 days
b. 16-25 days
c. 26-28 days [3]

ii. Specify the sources of the hormones mentioned in the graph.



24. In a monohybrid cross of plants with red and white flowered plants, Mendel got only red flowered plants. On self-pollinating these F_1 plants got both red and white flowered plants in 3:1 ratio. Explain the basis of using RR and rr symbols to represent the genotype of plants of parental generation. [3]

25. Study the diagram of the earth given below. [3]



i. Give the name of the pattern of biodiversity therein.

ii. Suggest any two reasons for this type of occurrence.

26. Describe the structure of pollen grain and the process of its germination. [3]

OR

Are parthenocarpy and apomixis different phenomena? Discuss their benefits.

27. Discuss the relationship between the detritus food chain and grazing food chain in a terrestrial ecosystem. [3]

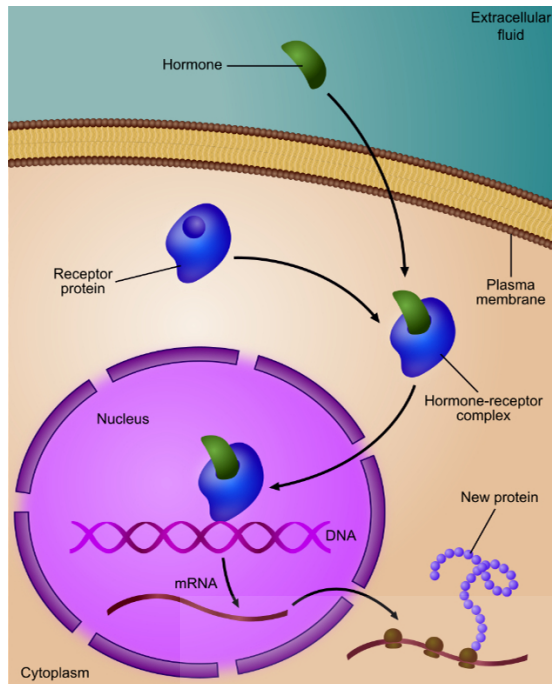
28. What are test tube babies? [3]

Section D

29. Read the following text carefully and answer the questions that follow: [4]

Gene regulation is the mechanism of switching off and switching on of the genes depending upon the requirement of cells and the state of development. Gene regulation is of two types: negative and positive. In negative gene regulation, the genes continue expressing their effect till their activity is suppressed. Positive gene regulation is the one in which the genes remain non-expressed unless and until they are induced to do it. Operon model is a co-ordinated group of genes such as structural gene, operator gene, promoter gene, regulator gene

which function together and regulate a metabolic pathway as a unit, e.g., lac operon, trp operon, ara operon, etc.



- Regulation of gene expression occurs at which the level? (1)
- What is complementary to an mRNA molecule transcribed from the lac operon contains nucleotide sequences? (1)
- Describes the control of transcription of the genes involved in the breakdown of lactose in *Escherichia coli*? (2)

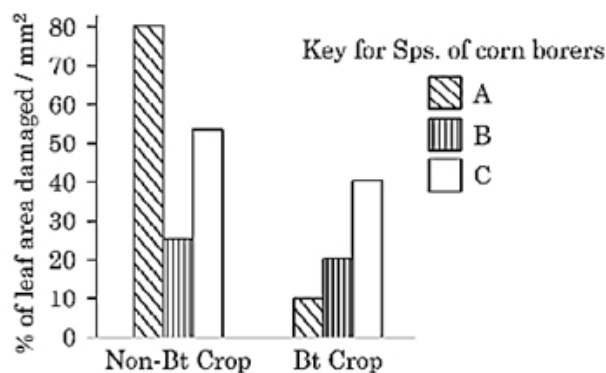
OR

What is the function of catabolic activator protein in lac operon? (2)

30. **Read the following text carefully and answer the questions that follow:**

[4]

To save the crop plant from the attack of various insect pests the biotechnologists have developed many pest resistant plants. One such example is Bt plant. In this plant 'cry' genes were introduced which produces cryproteins in the plant that has toxic effect on the pest (corn borer). Thus saves the corn plant from the attack of the corn borer. An experimental field study was conducted by the scientists to see the efficacy of the Bt corn plant against the attack of corn borers. Three different species of corn borers namely 'A', 'B', 'C' were collected and were independently fed on non Bt corn plants and Bt corn plants separately for the same period. The extent of the damage caused to the leaf area of the plant was observed and noted down. With the help of the observations and data collected the following bar graph was plotted. Study the graph and answer the questions that follow.



- Identify the species of the corn borer that was most successfully controlled by Bt corn plant. Give appropriate reason for your inference. (1)

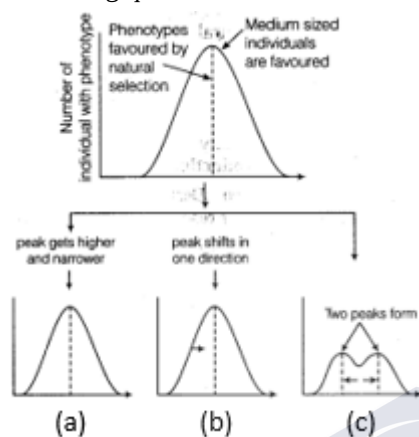
- ii. Identify the species of the corn borers which shows least impact of toxin produced by Bt genes. (1)
- iii. What would be your advise as a Scientist, to the farmers for growing this particular Bt corn variety in the area which is infested by species **B** of corn borers? (2)

OR

Name one Bt gene that encodes protein in corn plants to control corn borers. (2)

Section E

31. Observe the diagram given below for the operation of natural selection on different traits and answer the following questions: [5]



- i. Name A, B, and C mentioned in the above diagram.
- ii. Give one example of directional selection.
- iii. Write the name of factors affecting the Hardy-Weinberg Equilibrium.

OR

Explain divergent evolution in detail. What is the driving force behind it?

32. Gene therapy is an experimental technique that uses genes to treat or prevent disease. In the future, this technique may allow doctors to treat a disorder by inserting a gene into a patient's cells instead of using drugs or surgery. [5]

Clinical gene therapy is given to a 4 years old patient for an enzyme that is crucial for the immune system to function.

 AI POWERED LEARNING  PATIENT FOCUSED  EXCELLENCE DRIVEN	(A) Lymphocytes of the Patient.
↓	
	(B) _____
↓	
	(C) Introduction of functional ADA cDNA into Lymphocytes.
↓	
	(D) _____

Observe the therapeutical flow chart and give the answer to the following:

- i. Complete the missing steps (B) and (D)
- ii. Identify the disease to be cured.
- iii. Why the above method is not a complete solution to the problem? **OR**
- iv. Scientists have developed a method to cure this disease permanently. How?

OR

Explain the three different approaches used in the treatment of a person suffering from Adenosine Deaminase (ADA) Deficiency.

33. In your view what motivates youngsters to take to alcohol or drugs and how can this be avoided? [5]

OR

A person in your colony has recently been diagnosed with AIDS. People/residents in the colony want him to leave the colony for the fear of spread of AIDS.

- i. Write your views on the situation, giving reasons.
- ii. List the possible preventive measures that you would suggest to the residents of your locality in a meeting organised by you so that they understand the situation.
- iii. Write the symptoms and the causative agent of AIDS.



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