

## SECTION - E

Q.31. A group of Biotechnologist were working on creating transgenic cows to produce milk with medicinal properties. But there were adverse side-effects on the cows due to this procedure. Their life span get shorten, become prone to diseases and die very early.

Now, answer the following questions:

- What do you mean by transgenic animals?
- What are the medicinal properties of cow milk?
- Which is the first transgenic cow?

Or

Given below is the list of some of the important products of DNA recombinant technology. Write application of each of the recombinant product.

Recombinant Product	Applications
1. Blood Clotting Factors VIII and IX	
2. Tissue Plasminogen Activator	
3. Chorionic Gonadotropin	
4. Erythropoietin	
5. Interferon ( $\alpha$ , $\beta$ and $\gamma$ )	

Q.32. (a) Construct a complete transcription unit with promoter and terminator on the basis of the hypothetical template strand given below :

ATGCATGCATAC  
↑

- Write the RNA strand transcribed from the above transcription unit along with its polarity.
- Differentiate between replication and transcription.

Or

Vaibhav is a student of XII class, on his vacations he went to his hometown where he saw some farmers who were spraying agrochemical in their fields. He requested the farmers to stop spraying these chemicals and explained them the side effects of such agrochemicals.

Now, answer the following questions :

- What are these chemicals?
  - What did Vaibhav explained to the farmers?
  - Why biofertilizers are preferred to chemical fertilizers?
- Q.33. What is oogenesis? Give a brief account of oogenesis.

Or

What is polyembryony? Describe the different types of polyembryony.

## SAMPLE QUESTION PAPER - 8

### CLASS - 12

### BIOLOGY

Maximum Marks : 70

Time Allowed : 3 hours

General Instructions : Same as in Sample Question Paper - 1

### SECTION - A

Q.1. A bacterial cell was transformed with a recombinant DNA that was generated using a human gene.

However, the transformed cells did not produce the desired protein. Reason could be :

- Human gene may have intron which bacteria cannot process
- Amino acid codon for humans and bacteria are different
- Human protein is formed but degraded by bacteria
- All of these

Q.2. Which was the last human chromosome to be completely sequenced?

- Chromosome 1
- Chromosome 11
- Chromosome 21
- Chromosome X

Q.3. Match the items in column I with those in Column II and select the correct option.

Column - I	Column - II
A. Sea weeds	1. Gel electrophoresis
B. Staining of DNA	2. Source of Agarose
C. Separation of DNA fragments	3. Isolation of DNA from the gel
D. Elution	4. Ethidium bromide

- A - 2, B - 4, C - 1, D - 3
- A - 4, B - 1, C - 2, D - 3
- A - 2, B - 1, C - 4, D - 3
- A - 2, B - 4, C - 3, D - 1

Q.4. Darwin's finches are an excellent example of

- Seasonal migration
- Brood parasitism

- Adaptive radiation
- Connecting links

Q.5. Hepatitis-B is transmitted through

- sneezing
- female *Anopheles*
- coughing
- blood transfusion

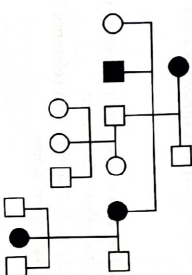
Q.6. A toxic substance responsible for the chills and fever recurring every three to four days in malarial fever is :

- interferon
- haemozoin
- hirudin
- colostrum

Q.7. A biologist studied the population of rats in a barn. He found that the average natality was 130, average mortality 120, immigration 20 and emigration 30. The net increase in the rat population mentioned above is

- 20
- 10
- 05
- Zero

Q.8. Study the pedigree chart of a family showing the inheritance of myotonic dystrophy.



- The trait under study is
- dominant X-linked
  - recessive X-linked
  - autosomal dominant
  - recessive Y-linked.



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Note : Solution of this paper will be available on 15th November 2023.



Q.9. The logistic population growth is expressed by the equation :

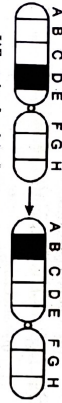
$$\frac{dN}{dt} = (b - d) \times N$$

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

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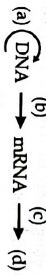
Q.10. Given below is the representation of a kind of chromosomal mutation.



What is the kind of mutation represented ?

- Deletion
  - Duplication
  - Inversion
  - Reciprocal translocation
- Q.11. Trophic levels in ecosystem are formed by
- only bacteria
  - only plants
  - only herbivores
  - organisms linked in food chain

Q.12. Complete the flow chart on central dogma.

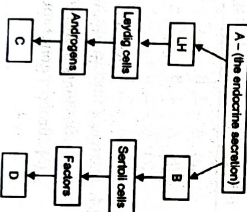


- (a)-replication; (b)-protein (c)-Transduction
- (a)-Transcription; (b)-Transduction, (c) Transcription, (d)-Replication

### SECTION - B

Q.17. If a father and son are both defective in red-green colour vision, is it likely that the son inherited the trait from his father ? Comment.

Q.18. Identify A, B, C and D with reference to gameto-genesis in humans in the flowchart given below.



- (a)-Replication, (b)-Protein, (c)-Translation
- (a)-Transcription, (b)-Protein, (c)-Replication, (d) Translation

Question No. 13 to 16 consist of two statements-Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below :

- Both A and R are true and R is the correct explanation of A.
- Both A and R are true and R is not the correct explanation of A.
- A is true but R is false.
- A is false but R is true.

Q.13. Assertion : Triple fusion results in vegetative fertilization of angiosperms.

Reason : It combine one male gamete with two synergids.

Q.14. Assertion : The progenies of a test cross can be easily analysed to predict the genotype of the test organism.

Reason : In a typical test cross, an organism showing a recessive phenotype is crossed with a recessive parent instead of self-crossing.

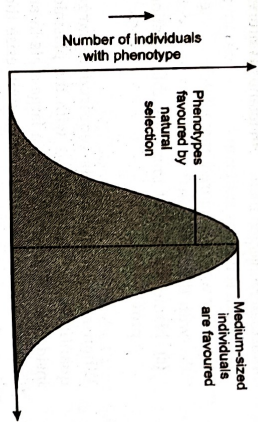
Q.15. Assertion : When DNA from two different sources are cut by the same restriction enzyme, the resultant fragments have different kinds of 'sticky ends'.

Reason : These can be joined end-to-end using DNA ligases.

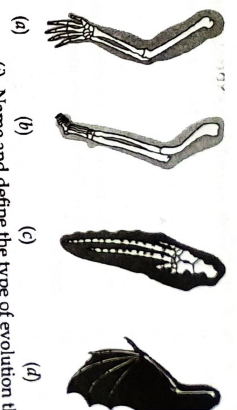
Q.16. Assertion : Ecological equivalence possesses similar type of adaptations.

Reason : Ecological niche is the total interaction of a species with environment.

Q.19. Explain the three different ways the natural selection can affect the frequency of a heritable trait in a population shown in the graph given below.



Q.20. Evidence that evolution of life forms has indeed taken place on the Earth, have come from many quarters. There are evidences from comparative anatomy and morphology too. They show similarities and differences among organisms of today and those that existed in the past. Such similarities can be interpreted to understand whether common ancestry was shared or not. The forelimbs of whale, bat, cheetah and human share similarities in the pattern of bones of forelimbs, but perform different functions in these animals.



- Name and define the type of evolution these organs exhibit.
- What are such organs called ? What do they indicate about ancestry ?

Q.21. Name the a, b, c and d in the table given below.

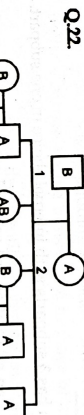
Type of Microbe	Name	Commercial Product
Fungi	a	Penicillin
Bacterium	Acetobacter aceti	b
Yeast	c	Aspergillus niger
	d	Citric acid
		Ethanol

Or

Arrange the following in the decreasing order (most important first) of their importance, for the welfare of human society. Give reasons for your answer.

Bogas, Citric acid, Penicillin and Curd

### SECTION - C



Study the pedigree chart given above, showing the inheritance pattern of blood groups in a family and answer the following questions :

- Give the possible genotypes of the individual 1 and individual-2.
- Which antigen or antigens will be present on the plasma membranes of the RBCs of individuals 5 and 9 ?
- Give the genotypes of the individuals 3 and 4.

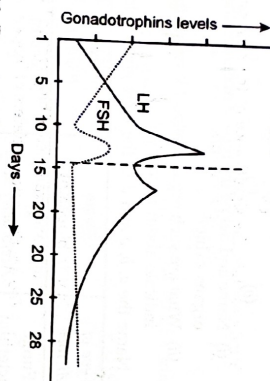
Q.24.

- A DNA segment has a total of 1000 nucleotides, out of which 240 of them are adenine containing nucleotides. How many pyrimidine bases this DNA segment possesses ?
- Draw a diagrammatic sketch of a portion of DNA segment to support your answer.



Q.25. (a) Study the graph carefully and correlate the follicular growth that take place according to hormonal levels on

- (i) 1-5 days
  - (ii) 12-14 days
  - (iii) 25-28 days (if the ovum is not fertilized)
- (b) Specify source(s) of the hormones mentioned in the graph.



Q.26. Darwin, after his observation of finches in Galapagos Islands, concluded that all the finches evolved from the original seed-eating features to become insectivorous and vegetarian finches with different eating habits by altering their beaks. Answer the following questions based on the above information :

- (i) What do you learn from this situation ?
- (ii) What would have happened if all the finches had the same eating habits ?

#### SECTION - D

Question No. 29 and 30 are case-based questions. Each Question has 3 subparts with internal choice in one subpart.

Q.29.



The picture given above shows a commelinia plant, bearing two types of bisexual flowers,

(iii) What is this type of evolution called ? What has this resulted in ?

Q.27. Following a road accident four injured persons were brought to a nearby clinic. The doctor immediately injected them with tetanus antitoxin.

- (a) What is tetanus antitoxin ?
- (b) Why were the injured immediately injected with this antitoxin ?
- (c) Name the kind of immunity this injection provided.

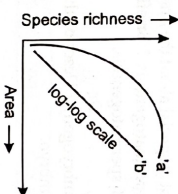
Or

When a gene product is required in large quantities, the transformants with the plasmid inside the cell are cultured in a large scale in an industrial fermenter, which then synthesise the desired protein.

This product is extracted from the fermenter for commercial use.

- (a) Why is the used medium drained out from one side while the fresh medium is added from the other ? Explain. What name is given to this method ?
  - (b) List any four optimum conditions for achieving the desired product in a bioreactor.
  - (c) What term is given to the processes that the product extracted is subjected to ?
- Q.28. 'In-situ' conservation can help endangered / threatened species. Justify the statement.

Q.30. The following graph shows the species-area relationship. Answer the following questions as directed.



- (a) Name the naturalist who studied the kind of relationship shown in the graph. Write the observations made by him.

#### SECTION - E

Q.31. A circumstance in which indigenous knowledge of nature, derived from indigenous peoples, is used by other for benefit, without permission or with little to no compensation to acknowledge indigenous people themselves.

Developed countries misuse the genetic resources of developing countries and the traditional knowledge of indigenous peoples in the name of patents on innovation derived from those genetic resources.

Now answer the following questions.

- (a) What is biopiracy ?

(b) Write the situations are discovered by the ecologists when the value of 'Z' (slope of the line) lies between

- (i) 0.1 and 0.2
- (ii) 0.6 and 1.2

What does 'Z' stand for ?

- (c) When would the slope of the line 'b' become steeper ?

Or

Briefly explain the significance of the regression in a species-area relationship.

- (b) What is biopiracy ?

- (c) Give any two examples of biopiracy in India.
- (d) Who are the major sufferers of biopiracy ?

Or

Following is the list of few transgenic organisms write their useful applications.

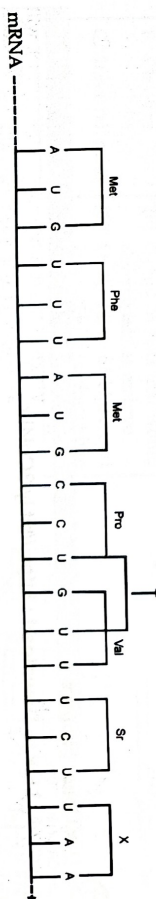
Transgenic Organisms	Useful applications
1. Bt-Cotton	
2. Flavr Savr Tomato	
3. Golden rice	
4. Cattles (cow, sheep)	
5. Pig	

Q.32. Recently a high profile case, regarding paternity dispute involving a highly reputed Ex. chief minister and a young budding advocate, who claimed to be the son of the former, was decided in favour of the advocate, on the basis of the findings of a certain scientific technique.

- Answer the following questions based on the above informations.
- (i) Name the scientific technique used in the case.
- (ii) What is the basis of this technique ?
- (iii) Mention one application of this technique.

Or

A hypothetical mRNA is shown below. Read the sequence of nucleotides in it and the sequence of amino acids in the polypeptide translated by it.





Answer the following questions based on the above :

- (a) Write the sequence of nucleotides in the template strand of DNA, along with its polarity, from which this mRNA has been transcribed.
- (b) If the three nucleotides shown by the arrow in the above figure are deleted, what will be the sequence of amino acids in the new polypeptide translated ?

- (c) What is the significance of the last codon X in the mRNA shown. Name two other codons of the same category.
- (d) What is special about the first codon, AUG? What is spermatogenesis? Briefly describe the process of spermatogenesis.

What is Embryogeny? Describe the development of dicot embryo.

Or



## SAMPLE QUESTION PAPER - 9

CLASS - 12

BIOLOGY

Maximum Marks : 70

Time Allowed : 3 hours

General Instructions : Same as in Sample Question Paper - 1

### SECTION - A

Q.1. Which condition of gynaecium (pistil) is shown below :



- (a) (i) multicarpellary apocarpous,  
(ii) multicarpellary syncarpous
- (b) (i) multicarpellary syncarpous,  
(ii) multicarpellary apocarpous
- (c) (i) bicarpellary apocarpous  
(ii) bicarpellary syncarpous
- (d) (i) bicarpellary syncarpous  
(ii) bicarpellary apocarpous

Q.2. Match the following and choose the correct options.

Column I	Column II
A. Trophoblast	(i) Embedding of blastocyst in the endometrium
B. Cleavage	(ii) Group of cells that would differentiate as embryo
C. Inner cell mass	(iii) Outer layer of blastocyst attached to the endometrium
D. Implantation	(iv) Mitotic division of zygote

Options :

- (a) A-(i), B-(i), C-(iii), D-(iv)  
(b) A-(iii), B-(iv), C-(ii), D-(i)  
(c) A-(iii), B-(i), C-(ii), D-(iv)  
(d) A-(i), B-(iv), C-(iii), D-(i)

Q.3. An IUD recommended to promote the cervix hostility to the sperms is :

- (a) Copper-T (b) Multiload-375  
(c) LNG-20 (d) Cu7

Q.4. A colour blind man marries a woman with normal sight who has no history of colour blindness in her family. What is the probability of their grandson becoming colour blind ?

- (a) 0.5 (b) 1  
(c) Nil (d) 0.25

Q.5. In the presence of allolactose, the lac repressor in the operon of *E.coli*.

- (a) binds to the operator  
(b) binds to the promoter  
(c) cannot bind to the operator  
(d) binds to the regulator

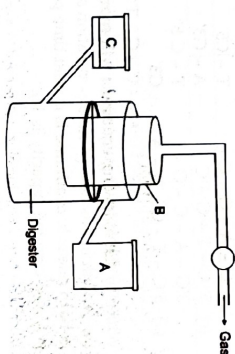
Q.6. Alec Jeffreys developed the DNA fingerprinting technique. The probe he used was :

- (a) ribozyme (b) sex chromosomes  
(c) SNP (d) VNTR

Q.7. Identify the disease which is not a sexually transmitted diseases ?

- (a) Gonorrhoea (b) Syphilis  
(c) Amoebiasis (d) Chlamydia

Q.8. The diagram given below represents a typical biogas plant. Select the correct option for A, B and C, respectively.



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Note : Solution of this paper will be available on 15th November 2023.