



KARNATAKA ICSE SCHOOLS ASSOCIATION

ISC STD. XII Preparatory Examination 2024

Subject: BIOLOGY PAPER I (THEORY)

Time Allowed: 3 Hrs

Maximum Marks : 70

Date: .01.2024

*(Candidates are allowed an **additional 15 minutes** for **only** reading the paper.
They must **NOT** start writing during this time.)*

This paper is divided into four sections – A, B, C and D.

*Answer **all** questions.*

***Section – A** consists of **one** question of **one** mark / **two** marks each.*

***Section – B** consists of **seven** questions of **two** marks each.*

***Section – C** consists of **seven** questions of **three** marks each, and*

***Section – D** consists of **three** questions of **five** marks each.*

***Internal choices have been provided in one question each in Section B,
Section C and Section D.***

The intended marks for questions or parts of questions are given in brackets [].

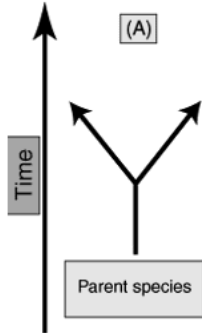
SECTION A – 20 MARKS

Question 1

Answer the following questions briefly.

- (i) State the 10% law. [1]
- (ii) A doctor examines the symptoms of a patient who has blood and mucus in his stool.
Name the causative organism of the disease this patient is suffering from? [1]
- (iii) Define BOD. [1]
- (iv) Mention the source of cocaine and its effect on the body. [1]

- (v) What type of evolution would you suggest is taking place in population A given in the diagram below? [1]



- (vi) What is the relationship between GPP and NPP? [1]
- (vii) Mention any 2 properties of genes. [1]
- (viii) Which is the major conduit of energy in the aquatic ecosystem and what is the source of energy for it? [1]
- (ix) Which one of the following is not a character of acquired immunity? [1]
- (a) Mediated by T cells and B cells.
 - (b) Nonspecific.
 - (c) Has memory
 - (d) Attained after the encounter with the pathogen.
- (x) Mention the factors that initiate the foetal ejection reflex. [1]
- (xi) **Assertion:** In the process of transcription, template strand of polarity $3' \rightarrow 5'$ plays a major role. [1]
- Reason:** DNA dependent RNA polymerase catalyzes the polymerization in only one direction, that is $5' \rightarrow 3'$.

Which one of the following is correct?

- (a) Both Assertion and Reason are true, and Reason is the correct explanation for Assertion.
- (b) Both Assertion and Reason are true, but Reason is not the correct explanation for Assertion.
- (c) Assertion is true and Reason is false.
- (d) Both Assertion and Reason are false.

(xii) **Assertion:** If the species-area relationship are analyzed among very large areas like the entire continents, the value of Z, i.e., slope of line is in the range of 0.1 to 0.2. [1]

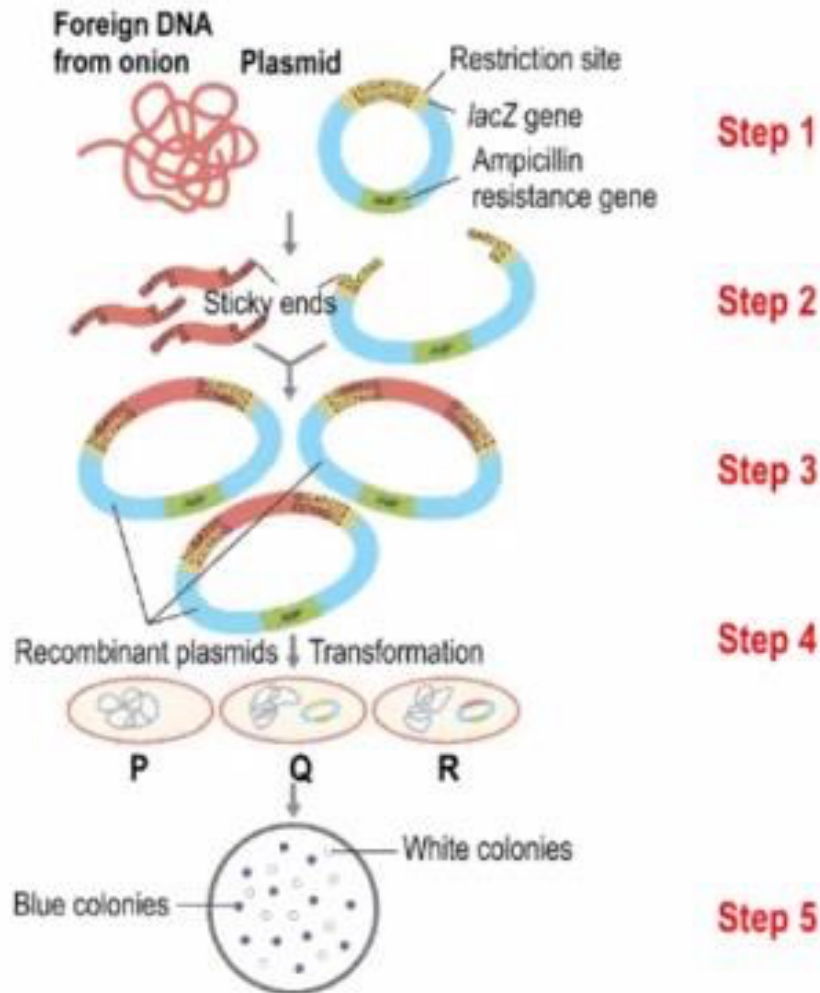
Reason: The value of Z, i.e., slope of line of species area relationship lies in the range of 0.6 to 1.2 when analysis is done among small areas.

Which one of the following is correct?

- (a) Both Assertion and Reason are true, and Reason is the correct explanation for Assertion.
- (b) Both Assertion and Reason are true, but Reason is not the correct explanation for Assertion.
- (c) Assertion is true and Reason is false.
- (d) Both Assertion and Reason are false.

(xiii) Given below is a process in rDNA technology. Lac Z gene codes for β galactosidase.

When plated in an appropriate medium the cells that code for β galactosidase gives a blue colour and the others will give a white colour. Select the correct option with respect to the given process. [1]



| Option | Nutrient medium combination that helps to select the transformed cells | | Colour of colonies formed by variant P when plated with ampicillin |
|--------|--|---------------------------|--|
| | Ampicillin in medium | Colour of colonies formed | |
| A | Present | Blue colonies | Only blue colonies |
| B | Absent | Blue colonies | Only white colonies |
| C | Present | White colonies | No colonies will be formed |
| D | Absent | White colonies | A mixture of blue and white colonies |

- (a) A
- (b) B
- (c) C
- (d) D

(xiv) Draw a pyramid of biomass of an aquatic ecosystem with 3 trophic levels. **[1]**

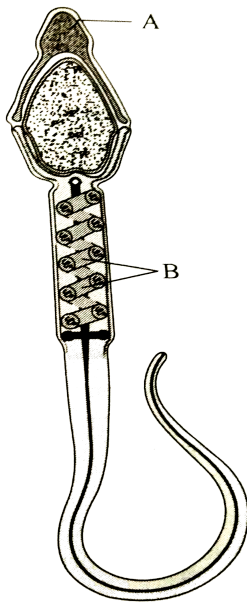
(xv) Give an example of Gauss's competitive exclusion principle. **[1]**

(xvi) Answer the following questions: **[2]**

(a) The total diversity in all aspects of biological organization is called 'biodiversity'. Name the scientist who proposed this term.

(b) Expand the abbreviation MALT.

(xvii) The figure given below shows male gamete in human. Identify and name the part that dissolves the membrane of the egg during fertilization **[1]**



(xviii) Explain the reason for each of the following:

[2]

(a) The exact genetic code cannot be guessed by looking at the sequence of the amino acids in the protein.

(b) Bt is used as a source for the 'gene of interest' to develop pest resistant plants.

SECTION B – 14 MARKS

Question 2

[2]

Comment on two natural contraceptive methods that you would suggest a newly married couple who does not wish to use artificial contraceptive methods.

Question 3

[2]

Explain the methodologies in the HGP.

Question 4

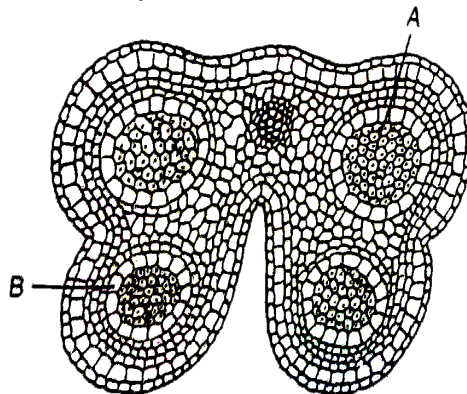
[2]

Expand and explain IPM.

Question 5

[2]

(i) Study the diagram of T S of anther given below and answer the questions that follow.

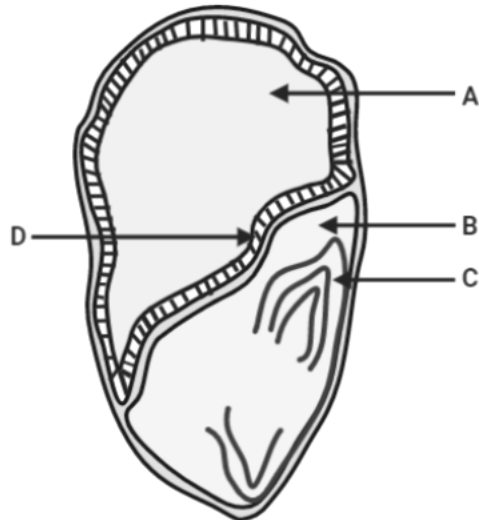


(a) Identify and name the part that provides nutrition to the developing pollen grains.

(b) Differentiate between the two parts A and B with respect to their ploidy.

OR

(ii) The diagram given below represents a monocot seed. Study it carefully and answer the questions that follow.



- (a) Identify the part labelled 'A' and mention its function.
- (b) Define the process that leads to the formation of A.

Question 6

[2]

Why and how do you make a bacterial host cell competent in rDNA technology?

Question 7

[2]

In a population of squirrels, a short tail helps from being captured by predators while moving on the ground and a long tail helps to maintain balance while moving on trees. Medium tail does not have any specific advantage.

Name and define the type of natural selection that would take place in this population.

Question 8

[2]

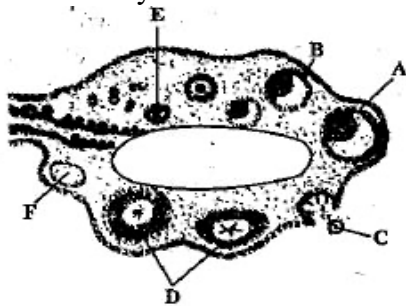
Explain 2 advanced ex situ methods of biodiversity conservation.

SECTION C – 21 MARKS

Question 9

[3]

The figure below shows the sequence of changes within the ovary that occur during the menstrual cycle.

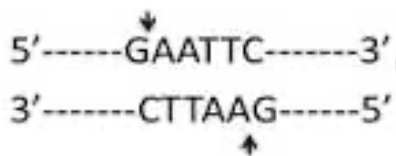


- Name the process of release of C. Name the hormone that plays an important role during this event.
- Identify A and name the hormone that regulates the maturation of A.
- Identify and write the function of D.

Question 10

[3]

Given below is the recognition site of a particular restriction enzyme

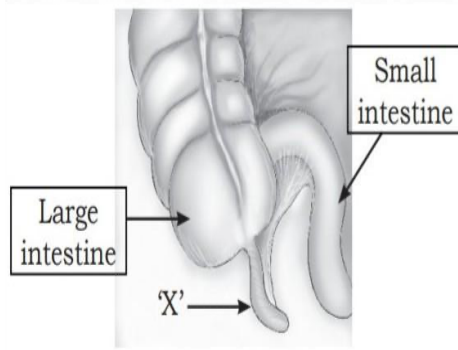


- What type of sequences are seen in such recognition sites? Define.
- Explain the nomenclature of the REN that can cleave this recognition site.

Question 11

[3]

Observe the figure given below and answer the following questions.

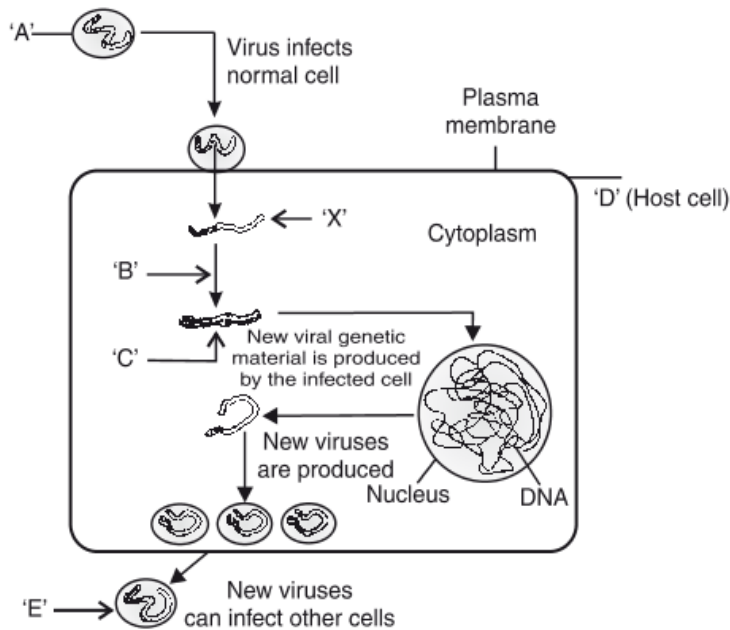


- (i) Identify the part labelled as 'X'.
- (ii) What type of organ is 'X'?
- (iii) Mention any other example of such organ in humans.

Question 12

[3]

The figure shown below is a representative image of replication of a retrovirus. Study it carefully and answer the questions that follow.



1. Write the chemical nature of the coat 'A'

2. Name the enzyme 'B' acting on 'X' to produce molecule 'C'.

3. Mention the name of the host cell 'D' the HIV attacks first when it enters into the human body.

Question 13

[3]

Name the source and applications of the following.

- (a) Streptokinase
- (b) Statin
- (c) Lipase

Question 14

[3]

Draw a well labelled diagram female gametophyte in an angiosperm.

Question 15

[3]

Answer the following with respect to human reproductive health.

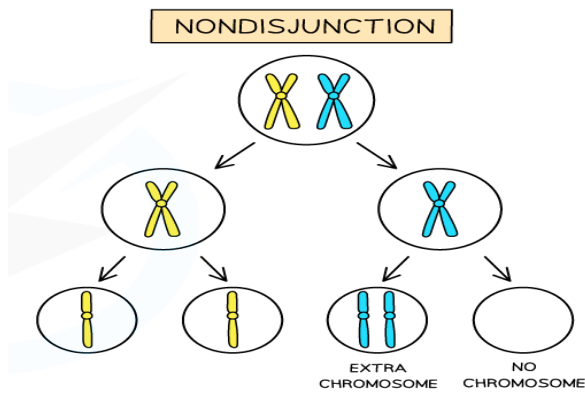
- a) Differentiate between ZIFT and IUT
- b) Explain the mechanism of action of hormonal IUDs

SECTION D – 15 MARKS

Question 16

[5]

- a) Shown below is the diagrammatic representation of non-disjunction of a pair of chromosomes during gamete formation in an individual. Four gametes are seen to form at the end of the process in which the last two are defective, the third gamete having an extra chromosome and the fourth one having no chromosome.
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- (i) Name a disease that can be caused if a gamete similar to the third gamete fuses with a normal gamete. Mention the karyotype and two symptoms of the disease. [1.5]
- (ii) What type of mutations are caused due to such non-disjunctions? [0.5]
- (iii) What are frame shift mutations.[1]
- (iv) Comment on a disease that is caused due to substitution mutation.[2]

OR

- b) Answer the following with respect to transcription.
 - (i) Explain in detail ρ independent termination in transcription.
 - (ii) Explain post transcription processing in eukaryotes.

Question 17

[5]

What is population density? Mention the four factors affecting population density.
Explain any two methods of measuring population density.

Question 18

[5]

- a) Transgenic organisms are used for the production of bioactive molecules. Explain.
- b) Mention the application of biotechnology in the early diagnosis of various diseases.