CBSE EXAMINATION PAPER-2022

BIOLOGY

(Solved)

Time allowed : 3 hours | Maximum Marks : 59

General Instructions :

Read the following instructions carefully and follow them :

i. This question paper contains **31 questions.** All questions are **compulsory.**

ii. This question paper is divided into **5 sections.**

iii. **Section A** – questions number **1 to 4** are case based questions

iv. **Section B** – questions number **5 to 14** are multiple choice questions

v. **Section C** – questions number **15 to 22** are very short answer

vi. **Section D** – questions number **23 to 28** are short answer

vii. **Section E** – questions number **29 to 31** are long answer

viii. There is no overall choice given in the question paper. However, an internal choice has been provided in few questions.

ix. Use of calculator is NOT allowed.

Section A

Question 1.

Question 2.

Read the paragraph given below and answer the questions that follow :

Enzyme Taq polymerase, is extracted from a eubacterial microorganism *Thermus aquaticus* from Yellowstone National Park in Montana, USA and isolated by Chien et al. (1976). Taq polymerase

successfully replaced the DNA polymerase from E.coli that was being used in PCR earlier and this shift revolutionised the PCR technique.

(1)

(i) Taq polymerase after its discovery replaced E.coli DNA polymerase in PCR technique. Explain giving reasons why was the need felt for the change?

[1 Marks]

(2)

(ii) What is a primer and its importance in PCR ?

[2 Marks]

(3)

(iii) Write the importance of PCR as a diagnostic tool.

[2 Marks]

(4)

From which microorganism is Taq polymerase extracted, and who first isolated it?

[1 Marks]

Question 3.

Question 4.

Read the following paragraph and answer the questions that follow : Biotechnology revolves around the "gene of interest", with an objective to open various avenues for human welfare in health, medicine, pharma, agriculture etc. using different techniques, tools and processes. One of the breakthroughs of biotechnology in medicine is the gene therapy.

(1)

(i) Name the human disease for which the gene therapy was used for the first time.

[1 Marks]

(2)

(ii) Explain the steps of gene therapy carried to cure the disease using the lymphocytes of the patient. Why is this therapy not a permanent cure of the disease ?

[2 Marks]

(3)

(iii) Write the possible permanent cure of the disease by the gene therapy that is in progress.

[2 Marks]

Section B

Question 5.

Which of the following is a vestigial organ in humans?

[1 Marks]

(A) Liver

(B) Appendix

(C) Pancreas

(D) Kidney

Question 6.

In which part of the nephron does selective reabsorption of glucose occur?

[1 Marks]

(A) Bowmans capsule

(B) Distal convoluted tubule

(C) Loop of Henle

(D) Proximal convoluted tubule

Question 7.

3. Which plant hormone is responsible for cell elongation?

[1 Marks]

(A) Cytokinin

(B) Abscisic acid

(C) Gibberellin

(D) Auxin

Question 8.

DNA replication occurs during which phase of the cell cycle?

[1 Marks]

(A) G1 phase

(B) G2 phase

(C) S phase

(D) M phase

Question 9.

Which of the following diseases is caused by a protozoan?

[1 Marks]

(A) Tuberculosis

(B) Malaria

(C) Typhoid

(D) Influenza

Question 10.

What is the function of the xylem in plants?

[1 Marks]

(A) Transport of food

(B) Transport of water

(C) Photosynthesis

(D) Reproduction

Question 11.

Mendels law of segregation states that:

[1 Marks]

(A) Genes are linked together

(B) Genes mutate spontaneously

(C) Alleles separate during gamete formation

(D) All traits blend in offspring

Question 12.

Which gas is produced during anaerobic respiration in muscles?

[1 Marks]

(A) Methane

(B) Carbon dioxide

(C) Lactic acid

(D) Oxygen

Question 13.

Which blood group is called the universal donor?

[1 Marks]

(A) A

(B) B

(C) AB

(D) O

Question 14.

Which vitamin is essential for blood clotting?

[1 Marks]

(A) Vitamin A

(B) Vitamin C

(C) Vitamin D

(D) Vitamin K

Section C

Question 15.

A boy developed some allergic reactions when he straight entered into his air conditioned room after a game of football outside his house. Write any two symptoms that could be noticed in such condition. How does our body combat such conditions ?

[2 Marks]

Question 16.

(i) Write the Scientific name of the plant from where natural cannabinoids are obtained.

(ii) Mention the parts of the plant that are used for extracting the drug.

(iii) How does the drug affect human body?

[2 Marks]

Question 17.

Farmers are often suggested to use the following organisms in their crop land so as to improve the soil fertility.

(i) *Rhizobium*

(ii) *Anabaena*

Explain.

[2 Marks]

Question 18.

Organic farmer use *Trichoderma* and *Baculovirus* as biological control agents. Explain.

[2 Marks]

Question 19.

Mammals are capable of maintaining homeostasis. But, very few smaller animals can survive in polar regions. Give reasons.

[2 Marks]

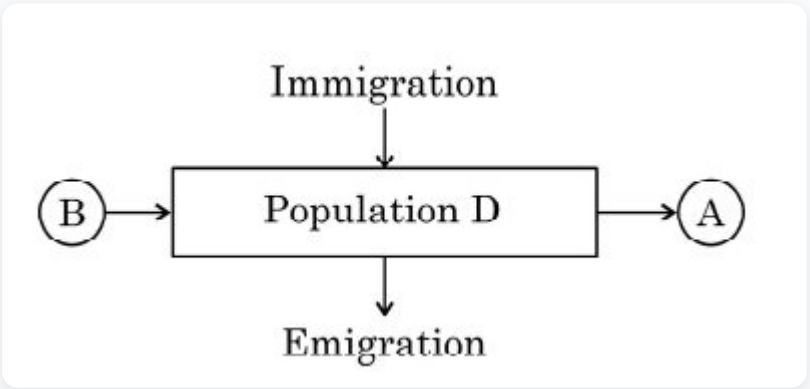
Question 20.

Observe the schematic representation given above and answer the following questions:

(i) Identify A and B.

(ii) Calculate the growth rate of bacteria in a curd sample,where**1** million bacteria increased to two million, within a period of one hour.

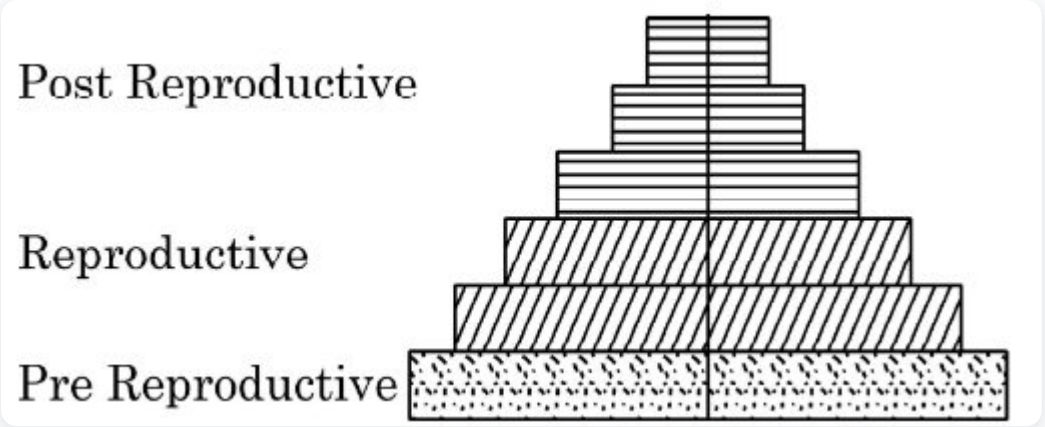
[2 Marks]



Question 21.

Identify the type of pyramid given above. Write the identifying feature on the basis of which you identified it.

[2 Marks]



Question 22.

Epithelial lining of our intestine is considered as secondary lymphoid organ. Justify the statement.

[2 Marks]

Section D

Question 23.

(a) Write the complete name of the diagnostic test for AIDS. Explain the principle it works on.

(b) Name the type of genetic material present in AIDS causing pathogen.

[3 Marks]

Question 24.

A patient complains of suffering from constipation, stomach ache, stool with blood clots and excess mucous. The physician diagnosed it as amoebiasis, after stool test.

(a) Write the scientific name of the microbe identified in the stool sample.

(b) How do you think, the patient must have contracted it?

(c) Write your suggestions to the patient to avoid infection in future.

[3 Marks]

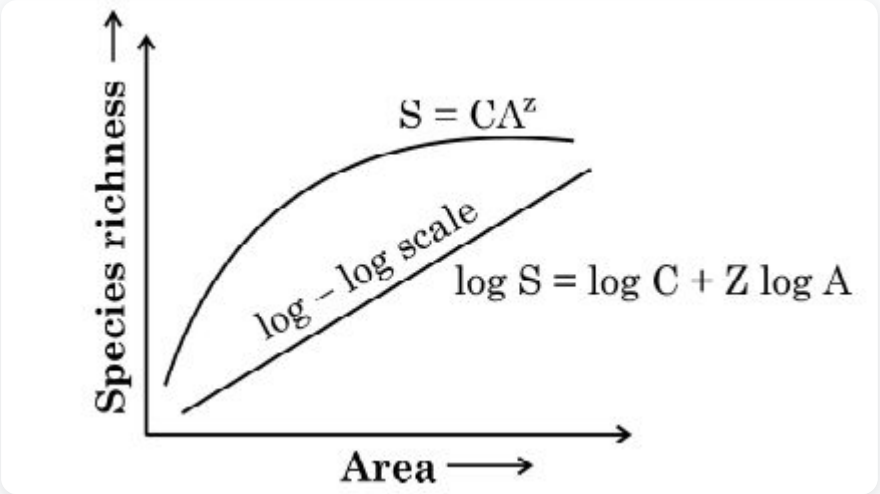
Question 25.

(a) Write the inference drawn by Alexander von Humboldt after his extensive explorations of South Americal jungle.

(b) Study the graph given below:

As per Alexander von Humboldt, what do the symbols S, A, Z and C in the graph stand for, in respect of a species and area relationship ?

[3 Marks]



Question 26.

Explain the concept of "co-extinction" by taking two examples.

[3 Marks]

Question 27.

(a) Given below is the stepwise schematic representation of the process of electrophoresis. Identify the 'alphabets' representing

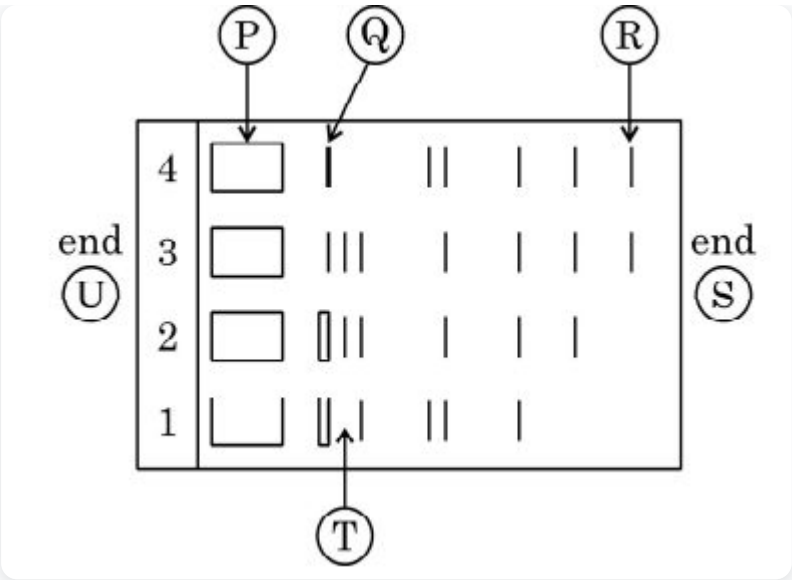
(i) Anode end

(ii)smallest/lightest DNA strand in the matrix

(iii)Agarose gel

(b) What is elution? State the importance of elution in this process.

[3 Marks]



Question 28.

"Forests provide intangible benefits to us." Explain by taking three different areas, how.

[3 Marks]

Section E

Question 29.

Explain the process of DNA replication in eukaryotes.

[5 Marks]

Question 30.

Discuss the process of protein synthesis (translation) in eukaryotes.

[5 Marks]

Question 31.

What is the role of biotechnology in agriculture? Give examples.

[5 Marks]
