CBSE EXAMINATION PAPER-2025

BIOLOGY

(Solved)

Time allowed : 3 hours | Maximum Marks : 83

General Instructions :

Read the following instructions carefully and follow them :

i. This question paper contains **40 questions.** All questions are **compulsory.**

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

iii. **Section A** – questions number **1 to 3** are case based questions

iv. **Section B** – questions number **4 to 19** are multiple choice questions

v. **Section C** – questions number **20 to 27** are very short answer

vi. **Section D** – questions number **28 to 34** are short answer

vii. **Section E** – questions number **35 to 40** 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.

Highly conserved proteins such as Haemoglobin and Cytochrome-C provide the best biochemical evidences to trace evolutionary relationships between different groups. Cytochrome-C is formed of 104 amino acids. Cytochrome-C is the respiratory pigment present in all eukaryotic cells. It has evolved at a constant rate during evolution. In chimpanzees and humans, Cytochrome-C genes are

identical. The given data shows the evolution of the Cytochrome-C gene in different mammals from kangaroos, cows, rodents to humans :

Groups	Nucleotide substitution in the gene of Cytochrome-C	Millions of years ago
Human/Kangaroo	100	125 mya
Human/Cow	75	120 mya
Human/Rodent	60	75 mya

(1)

Select the correct option for the time of separation of two groups and the number of nucleotide substitutions in the gene of Cytochrome-C :

Options	Time of separation of two groups during evolution	Number of nucleotide substitutions
(i)	Lesser	Greater
(ii)	Greater	Lesser
(iii)	Greater	Greater

[1 Marks]

(2)

What do you infer about the type of evolution (convergent ordivergent) for the given pair of groups and why ?

(i) Human and Kangaroo

(ii) Human and Rodent

[1 Marks]

(3)

Define divergent evolution.

[2 Marks]

(4)

Define convergent evolution.

[2 Marks]

Question 3.

In 2021, 5·3 percent of 15 to 16-year-olds worldwide (13·5 million individuals) had used *Cannabis* in the past year according to UNODC. The adolescent brain is still developing and drug use can have long-term negative effects. Early drug use initiation can lead to faster development of dependence than in adults and other problems in adulthood. Parts of the Amazon Basin are at the intersection of multiple forms of organised crimes that are accelerating devastation, with severe implications for the security, health and well-being of the population across the region. The direct impact of coca cultivation on deforestation is minimal, but indirectly it acts as a catalyst for “Narco-deforestation”. The laundering of drug trafficking profits into land speculation etc. is posing a growing danger to the world’s largest rainforest.

(1)

Which age group or period of growth people are more vulnerable to drug abuse?

[1 Marks]

(2)

Explain the negative impact of coca cultivation on the world’s largest rainforest.

[1 Marks]

(3)

State the scientific name of the plant from which coca alkaloids are derived and state one negative impact of use of excessive dosage of cocaine.

[2 Marks]

(4)

From which part of the plant are cannabinoids mainly obtained ? Mention any one negative effect of this drug on adolescents.

[2 Marks]

Section B

Question 4.

The histone core in a nucleosome of chromatin thread is a/an:

[1 Marks]

(A) pentamer

(B) heptomer

(C) hexamer

(D) octamer

Question 5.

Given below are few statements with reference to the uterus in the female reproductive system:

(i) The myometrium exhibits strong contractions during the delivery of the baby.

(ii) The uterus opens into the cervix through a narrow opening called vagina.

(iii) The cavity of the cervix and the vagina forms the birth canal.

(iv) The outermost layer of uterus is a thin membranous perimetrium.

(v) The uterus is supported by tendons attached to the pelvic wall.

[1 Marks]

(A) (ii), (iv) and (v)

(B) (i), (ii) and (iv)

(C) (ii), (iii) and (v)

(D) (i), (iii) and (iv)

Question 6.

During the process of transcription, after binding to a promoter, RNA polymerase catalyses and makes the bases in the template strand of DNA available for base pairing, with the bases of:

[1 Marks]

(A) Ribonucleotide triphosphate

(B) Deoxyribonucleoside triphosphate

(C) Ribonucleoside triphosphate

(D) Deoxyribonucleotide triphosphate

Question 7.

Which of the following is not an example of aneuploidy?

[1 Marks]

(A) Turner’s syndrome

(B) Klinefelter’s syndrome

(C) Down’s syndrome

(D) Phenylketonuria

Question 8.

Colostrum secreted by the mother's mammary glands in human female during the initial days of lactation is rich in antibody:

[1 Marks]

(A) IgA

(B) IgG

(C) IgD

(D) IgE

Question 9.

Select the statements that are true for pollination mechanism in flowering plants from the given options.

(i) In Vallisneria, the female flowers are pollinated by pollen grains inside the water.

(ii) In Zostera, pollen grains are released on the surface of water.

(iii) In most of the water-pollinated species, pollen grains are covered by a mucilaginous coating.

(iv) Pollination by water is quite rare and limited to about 30 genera.

[1 Marks]

(A) (i) and (iv)

(B) (iii) and (iv)

(C) (ii) and (iii)

(D) (i) and (ii)

Question 10.

Which of the following combinations is a correct example of convergent evolution in Australian marsupials and Placental mammals?

[1 Marks]

(A) Bobcat Lemur

(B) Numbat Anteater

(C) Tasmanian tiger cat Anteater

(D) Lemur Spotted cuscus

Question 11.

Isolation of DNA from a fungal cell can be achieved by using:

[1 Marks]

(A) Protease

(B) Lysozyme

(C) Cellulase

(D) Chitinase

Question 12.

During a monohybrid cross involving a tall pea plant with a dwarf pea plant, the offspring populations were tall and dwarf in equal ratio. Find out the genotype of parent pea plants.

[1 Marks]

(A) TT Tt

(B) tt tt

(C) Tt tt

(D) Tt Tt

Question 13.

What would happen if a gene encoding a polypeptide of 50 amino acids, 25th codon (UAU) is mutated to "UAU"?

[1 Marks]

(A) A polypeptide of 50 amino acids will be formed.

(B) A polypeptide of 49 amino acids will be formed.

(C) A polypeptide of 25 amino acids will be formed.

(D) A polypeptide of 24 amino acids will be formed.

Question 14.

Large scale industrial production of Butyric acid for human welfare is done using the microbe:

[1 Marks]

(A) Aspergillus sp.

(B) Trichoderma sp.

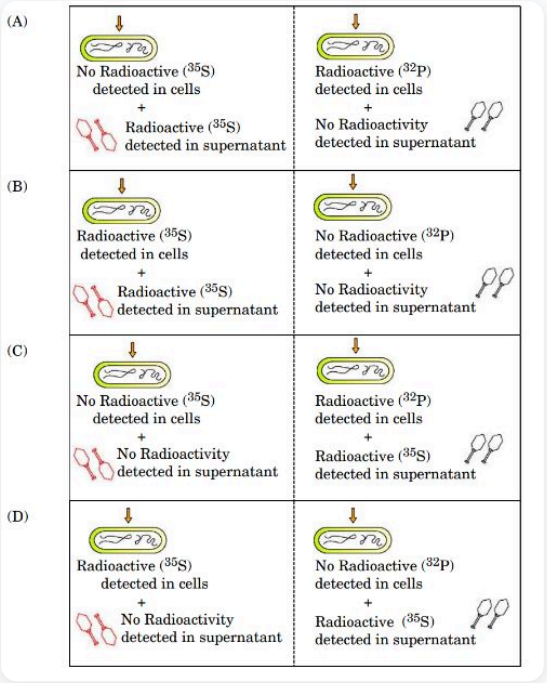
(C) Streptococcus sp.

(D) Clostridium sp.

Question 15.

The correct depiction of the centrifugation step of the experiment conducted by Alfred Hershey and Martha Chase on using radioactive labelled phages to prove that DNA is the genetic material is :

[1 Marks]



(A) No Radioactive (35S) detected in cells + Radioactive (35S) detected in supernatant. Radioactive (32P) detected in cells + No Radioactivity detected in supernatant.

(B) No Radioactive (35S) detected in cells + No Radioactivity detected in supernatant. Radioactive (32P) detected in cells + Radioactive (35S) detected in supernatant.

(C) Radioactive (35S) detected in cells + Radioactive (35S) detected in supernatant. No Radioactive (32P) detected in cells + No Radioactivity detected in supernatant.

(D) Radioactive (35S) detected in cells + No Radioactivity detected in supernatant. No Radioactive (32P) detected in cells + Radioactive (35S) detected in supernatant.

Question 16.

Assertion (A): To generate only a part of the plant from a cell is totipotency.

Reason (R): Suitable special nutrient media and sterile conditions are required in conditions for the division of cells in explants.

[1 Marks]

(A) Assertion (A) is true, but Reason (R) is false.

(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).

(C) Assertion (A) is false, but Reason (R) is true.

(D) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).

Question 17.

Assertion (A): Biogas plants are more often built in rural areas.

Reason (R): The excreta or gobar of cattle is rich in Methanobacterium.

[1 Marks]

(A) Assertion (A) is false, but Reason (R) is true.

(B) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).

(C) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).

(D) Assertion (A) is true, but Reason (R) is false.

Question 18.

Assertion (A): Gene pairs present on the same chromosome may be tightly linked or loosely linked.

Reason (R): Frequency of recombination between gene pairs on different chromosomes as a measure of the distance the chromosomes.

[1 Marks]

(A) Assertion (A) is false, but Reason (R) is true.

(B) Assertion (A) is true, but Reason (R) is false.

(C) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).

(D) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).

Question 19.

Assertion (A): Cu-T, Cu-7 and LNG-20 are the most widely used copper-releasing IUDs.

Reason (R): Cu-ions in IUDs effectively suppress sperm motility and the fertilising capacity of sperms.

[1 Marks]

(A) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).

(B) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).

(C) Assertion (A) is true, but Reason (R) is false.

(D) Assertion (A) is false, but Reason (R) is true.

Section C

Question 20. Give an account of the generalised structure of an antibody molecule produced by B-lymphocytes in response to the pathogen.

[2 Marks]

Question 21. Other than public awareness and counselling, enlist four measures taken up by NACO, WHO and other NGOs to prevent the spread of HIV infection in the society.

[2 Marks]

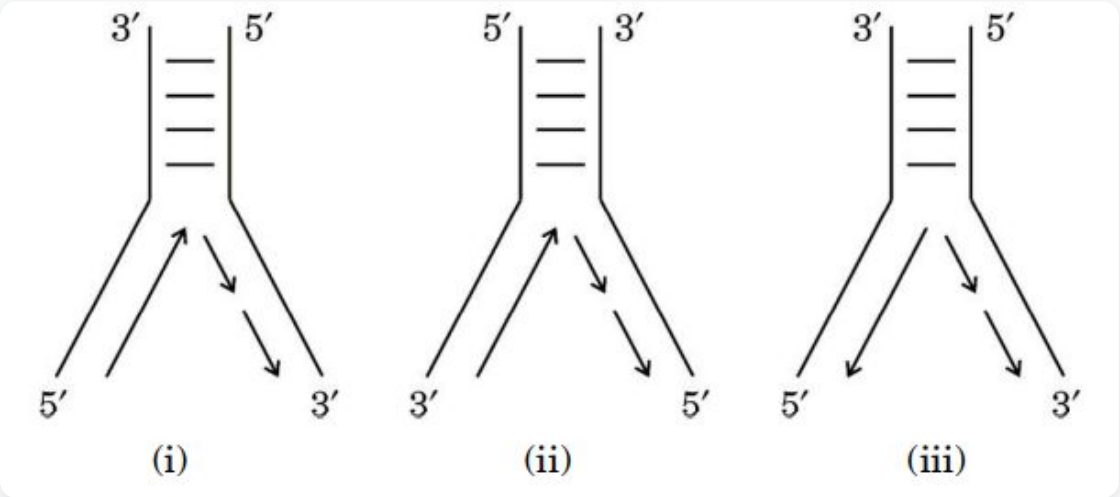
Question 22.

Given below are the diagrammatic representations of the replicating fork of DNA in E. coli. Study the diagrams and answer the questions that follow.

(a) Which one of the three diagrams (i), (ii) or (iii) is the correct representation of the replicating fork of DNA replication ? Explain your answer.

(b) Name the enzyme used in E. coli to join the newly synthesised fragments of DNA.

[2 Marks]



Question 23.

Explain what is meant by the term amniocentesis. How is this technique misused in India ?

[2 Marks]

Question 24.

Name any two VDs which might occur in a human female. State any two complications in a female if it is left untreated.

[2 Marks]

Question 25.

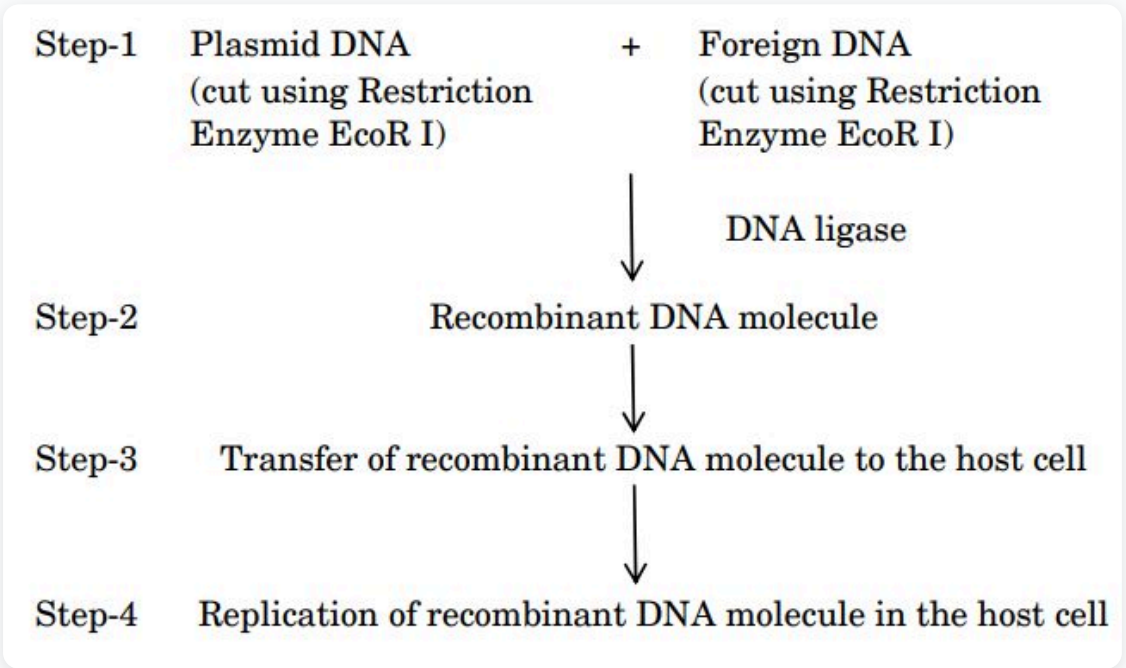
The basic scheme of the essential steps involved in the process of recombinant DNA technology is summarised below in the form of a flow diagram. Study the given flow diagram and answer the questions that follow :

(a) Name the specific enzyme that might have been used to make the multiple copies of foreign DNA before undergoing Step-1 of the process.

(b) How does the use of restriction enzyme EcoR I in Step-1 facilitate the action of DNA ligase to form the recombinant DNA molecule ? Explain.

(c) Name the most commonly used host in the above process.

[2 Marks]



Question 26.

Explain how the interaction between a fig tree and its tight one-to-one relationship with the pollinator species of wasp is one of the best examples of mutualism.

[2 Marks]

Question 27.

Correctly depict (also indicate the trophic level) and describe the ecological pyramid of number with 32 birds dependent on 20 insects feeding on one banyan tree.

[2 Marks]

Section D

Question 28.

Explain the neuroendocrine mechanism involved in the process of parturition in a human female leading to the expulsion of the baby out of the uterus through the birth canal.

[3 Marks]

Question 29.

During a medical investigation, an infant was found to possess an extra copy of chromosome no. 21. Identify the disorder the child is suffering from. Describe the symptoms the child is likely to develop later in life.

[3 Marks]

Question 30.

(a) Write the full form of BOD.

(b) Define BOD. Explain how it is a measure of the organic matter present in the water body.

[3 Marks]

Question 31.

Enlist three advantages of genetically modified plants.

[3 Marks]

Question 32.

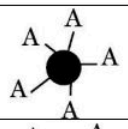
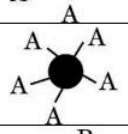
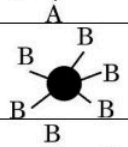
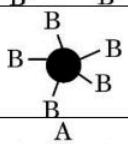
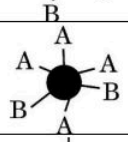
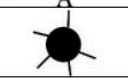
Study the diagram above and answer the following questions:

(a) How many alleles are involved in blood grouping?

(b) A person having 'AB' blood group has both dominant alleles. What is this inheritance type called?

(c) A man with 'A' blood group marries a woman with 'B' blood group. Can they have a child with 'O' blood group? Explain with the help of a cross.

[3 Marks]

Genotype	RBC	Phenotype
I^AI^A		A
I^Ai		A
I^BI^B		B
I^Bi		B
I^AI^B		AB
ii		O

Question 33.

Explain how the loss of habitat and fragmentation drives plants and animals to extinction with the help of an example of habitat loss in the Tropical Rain Forest. Also write the effect of fragmentation of a habitat on the population decline.

[3 Marks]

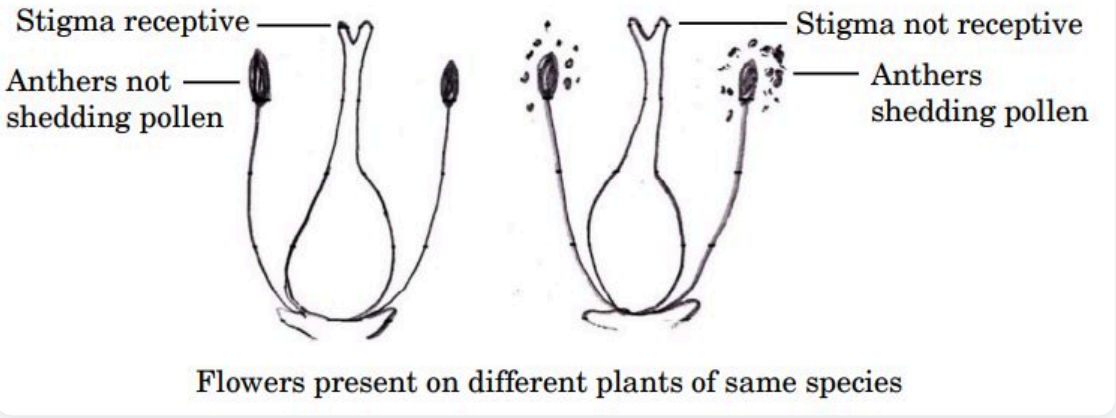
Question 34.

Many of the flowering plants producing hermaphrodite flowers have developed many devices to discourage self-pollination and to encourage cross-pollination. Given below is a picture of one such outbreeding device in a flowering plant. Study the picture and answer the questions that follow :

(a) Explain how the given type of pollination is advantageous to the plant.

(b) Can this flowering plant show geitonogamy ? Justify your answer.

[3 Marks]



Flowers present on different plants of same species

Section E

Question 35. Define transgenic animals. Explain in detail any four areas where they can be used for human benefit.

[5 Marks]

Question 36.

Describe the structure and working of a sparged stirred-tank bioreactor.

[5 Marks]

Question 37.

(i) Describe the population growth curve applicable in a population of any species in nature that has unlimited resources at its disposal.

(ii) Explain the equation of this growth curve.

(iii) Name the growth curve and depict a graphical plot for this type of population growth.

[5 Marks]

Question 38.

(i) Explain the conclusion drawn by Alexander von Humboldt during his extensive explorations in the wilderness of South American jungles.

(ii) Give the equation of the Species-Area relationship.

(iii) Draw a graphical representation of the relation between species richness and area for a wide variety of taxa such as birds, bats, etc.

[5 Marks]

Question 39.

(i) Explain the structure of a typical monocotyledonous embryo of a flowering plant.

(ii) How are multiple embryos formed in a citrus fruit ? What is the mechanism known as ?

[5 Marks]

Question 40.

(i) Name and explain the structural organisation of the male sex accessory ducts in the human male reproductive system.

(ii) Describe the role of gonadotropin FSH in the regulation of spermatogenesis.

[5 Marks]