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 **41 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 20** are multiple choice questions

v. **Section C** – questions number **21 to 28** are very short answer

vi. **Section D** – questions number **29 to 35** are short answer

vii. **Section E** – questions number **36 to 41** 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 following passage and answer the questions that follow

According to evolutionary theory, every evolutionary change involves the substitution of a new gene for the old one and the new allele arises from

the old one. Continuous accumulation of changes in the DNA coding for proteins leads to evolutionary differences. The chemical composition of

DNA is basically the same in all living beings, except for differences in the sequence of nitrogenous bases. Given below are percentage relative similarities between human DNA and DNA of other vertebrates :

Question 3.

Read the following passage and answer the questions that follow

According to evolutionary theory, every evolutionary change involves the substitution of a new gene for the old one and the new allele arises from

the old one. Continuous accumulation of changes in the DNA coding for proteins leads to evolutionary differences. The chemical composition of

DNA is basically the same in all living beings, except for differences in the sequence of nitrogenous bases. Given below are percentage relative similarities between human DNA and DNA of other vertebrates :

S.No.	Vertebrates	Percentage similarities
1.	Chimpanzee	100
2.	Gibbon	94
3.	Rhesus Monkey	88
4.	Lemur	47
5.	Treeshrew	28
6.	Mouse	21
7.	Hedgehog	19
8.	Chicken	10

(1)

What is the term used for the substitution of a new gene for the old one and the new allele arising from the old one during evolutionary process ?

[1 Marks]

(2)

Greater the evolutionary distance, greater are the differencesin the nitrogenous bases

[1 Marks]

(3)

Greater the evolutionary distance, lesser are the differencesin the nitrogenous bases.

[1 Marks]

(4)

Lesser the evolutionary distance, lesser are the differences in the nitrogenous bases.

[1 Marks]

(5)

(i) To which category of evolution (divergent or convergent) doesthe following relationship belong to ? Justify your answer.Human and Rhesus Monkey

[1 Marks]

(6)

Lesser the evolutionary distance, greater are the differencesin the nitrogenous bases.

[1 Marks]

(7)

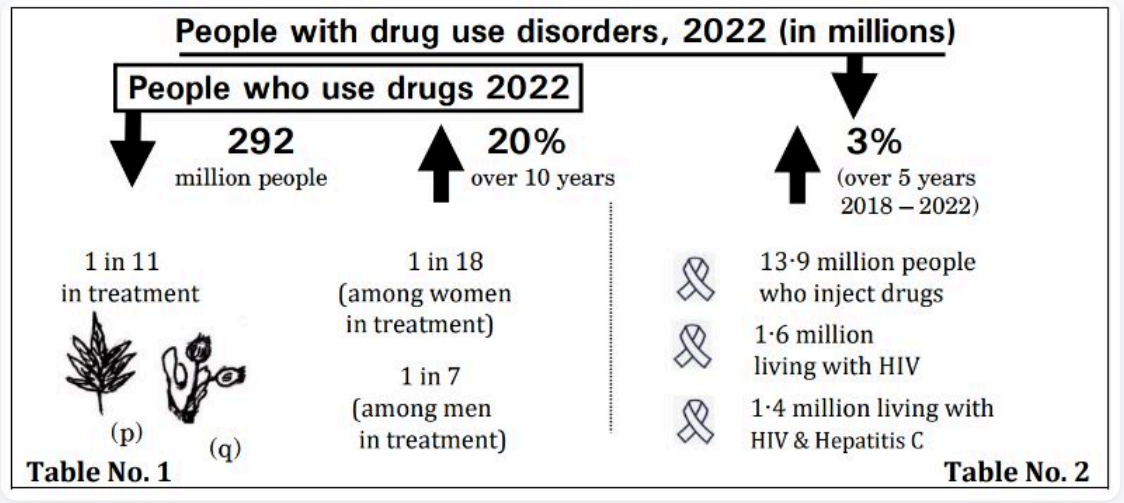
Differentiate between Convergent and Divergent evolution.

[1 Marks]

Question 4.

Read the following passage and answer the questions that follow.

Prevention is the frontline response to drug use. Effective interventions address the underlying conditions contributing to drug use, such as a lack of connection to family or community, instability, insecurity, trauma, mental health issues, etc. When addressed, these factors can effectively prevent the initiation of drug use and the progression to drug use disorders. Study the few key figures of drug use given below and answer the questions that follow.



(1)

What do you infer from the figures in Table No. 1 about the people with drug use disorders, 2022 (in million) ? State any two of your observations.

[1 Marks]

(2)

What do you infer from the figures in Table No. 1 about the people with drug use disorders, 2022 (in million) ? State any two of your observations.

[1 Marks]

(3)

How are Hepatitis C and HIV related to drug use disorders by people, as shown in Table No. 2 ? State the correlation between the two.

[1 Marks]

(4)

(i) Give the scientific name of (p) shown in Table

[1 Marks]

(5)

(ii) Give the scientific name of (q) shown in Table

[1 Marks]

Section B

Question 5.

The process of splicing in eukaryotes represents the dominance of the :

[1 Marks]

(A) Protein world

(B) Lipid world

(C) RNA world

(D) DNA world

Question 6.

Regulation of lac operon by repressor is referred to as :

[1 Marks]

(A) Inducible regulation

(B) Negative regulation

(C) Repressible regulation

(D) Positive regulation

Question 7.

SNPs in Human Genome Project refers to :

[1 Marks]

(A) Single-base DNA differences.

(B) Loss or gain of a gene function.

(C) Polymorphism in repetitive sequences.

(D) Single changes in nucleotide of mRNA.

Question 8.

If a natural population with 50 individuals is in Hardy-Weinberg equilibrium for a gene with two alleles A and a, with the gene frequency of allele A of 0·6, the genotype frequency of Aa will be :

[1 Marks]

(A) 0·16

(B) 0·36

(C) 0·24

(D) 0·48

Question 9.

Given below are a few statements with respect to spermatogenesis in a human male. Choose the option with all true statements from the given options:

(i) Sperms are released from the seminiferous tubules by the process of spermiation.

(ii) Spermiogenesis involves the maturation of spermatids into sperms.

(iii) Spermatogonia produce spermatids by the process of spermiogenesis.

(iv) Meiosis II in secondary spermatocytes results in the formation of four equal haploid spermatids.

(v) Primary spermatocyte completes the first meiotic division forming two equal, diploid cells called secondary spermatocytes.

[1 Marks]

(A) (i), (ii) and (iv)

(B) (ii), (iv) and (v)

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

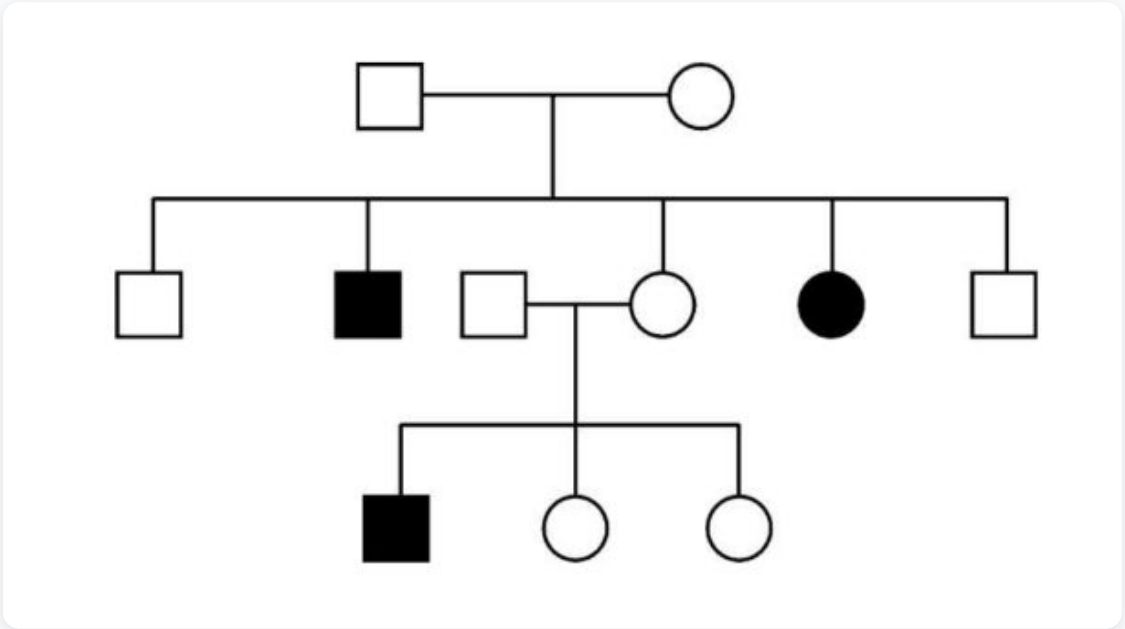
(D) (i), (iii) and (iv)

Question 10.

Study the pedigree chart of a family sharing the inheritance of sickle cell anemia.

The trait traced in the above pedigree chart is :

[1 Marks]



(A) Dominant X-linked

(B) Autosomal dominant

(C) Autosomal recessive

(D) Recessive X-linked

Question 11.

Select the statements that are true for the seed of angiosperm from the given options:

(i) Non-albuminous seeds have no residual endosperm.

(ii) Residual, persistent nucellus in wheat is known as perisperm.

(iii) Integuments of ovules harden as tough protective seed coat.

(iv) Metabolic activity of the embryo slows down in dormancy.

[1 Marks]

(A) (ii) and (iii)

(B) (i) and (ii)

(C) (i), (iii), and (iv)

(D) (i) and (iv)

Question 12.

Which of the following do not follow the law of independent assortment ?

[1 Marks]

(A) Two or more genes on homologous chromosomes

(B) Genes on non-homologous chromosomes and absence of linkage

(C) Two or more distant genes present on the same chromosome

(D) Linked genes located on the same chromosomes

Question 13.

A characteristic property that distinguishes a malignant tumor from a benign tumor is :

[1 Marks]

(A) Metastasis

(B) Metagenesis

(C) Metabolism

(D) Metamorphosis

Question 14.

The cloning site present in the tetracycline resistance gene of E. coli cloning vector pBR322 is :

[1 Marks]

(A) EcoR I

(B) Pvu II

(C) Sal I

(D) Pst I

Question 15.

Bottled fruit juices are clearer as compared to those made at home, as they are clarified by the use of :

[1 Marks]

(A) Lipases and pectinases

(B) Proteases and cellulases

(C) Nucleases and lipases

(D) Pectinases and proteases

Question 16.

In his observations of small black birds in the Galapagos Islands, Darwin found that all the finches arose from the original ancestor :

[1 Marks]

(A) Cactus-eating finches

(B) Seed-eating finches

(C) Insect-eating finches

(D) Fruit-eating finches

Question 17.

Assertion (A): In dihybrid crosses involving sex-linked genes in Drosophila, generation of non-parental gene combinations are observed. Reason (R): Two genes present on different chromosomes show linkage and recombination in Drosophila.

[1 Marks]

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

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

(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): A condom is used for avoiding chances of ovum and sperm meeting. Reason (R): It is made of thin rubber/latex sheath and is used to cover the penis before coitus.

[1 Marks]

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

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

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

(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): Isolated single cells can be fused to produce somatic hybrids. Reason (R): Cells selected for somatic hybridisation have desirable characters.

[1 Marks]

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

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

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

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

Question 20.

Assertion (A): In humans, filariasis is characterized by inflammation in the lower limbs. Reason (R): Filarial worm usually lives in the lymphatic vessels of the lower limbs.

[1 Marks]

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

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

Section C

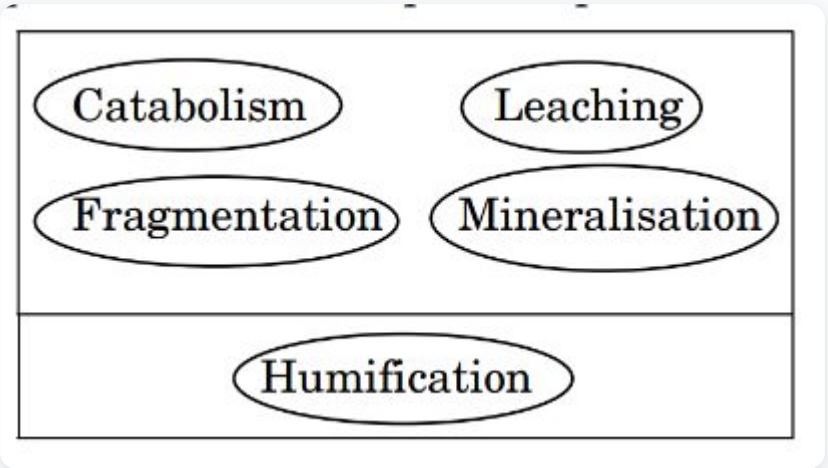
Question 21. Expand PID. Name any two common viral infections transmitted through sexual contact in human females.

[2 Marks]

Question 22.

Arrange the given important steps of decomposition in their correct order of occurrence in the breakdown of complex organic matter and explain the fourth step in the process.

[2 Marks]



Question 23.

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)What is the technical term used for Step 4 in the above process ?

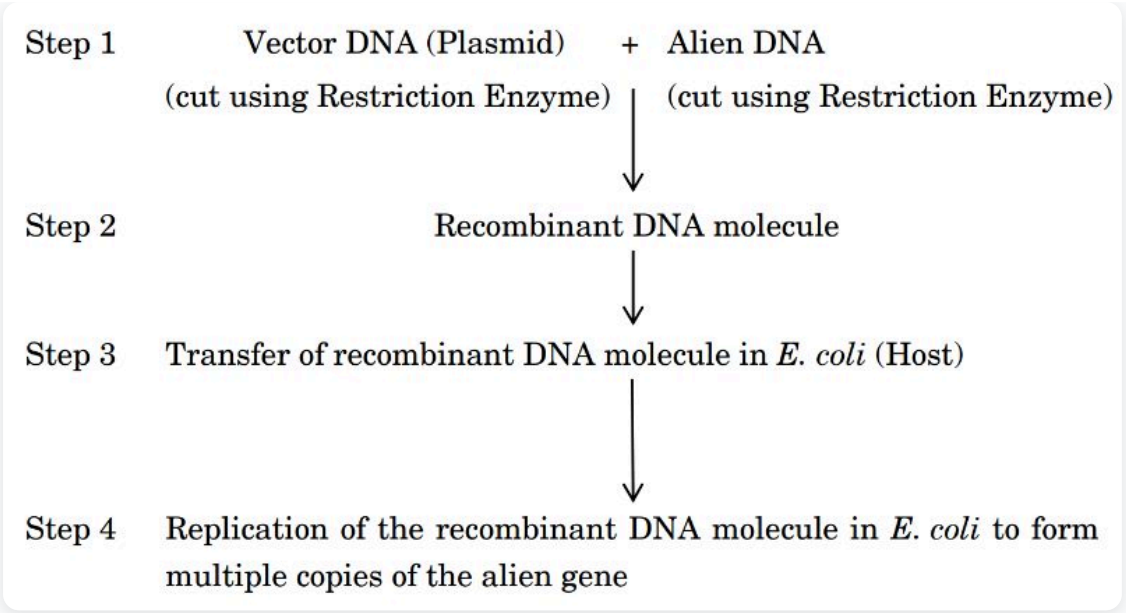
(b) Which of the given two combinations of restriction enzyme should

be used in Step 1 ? Justify your answer.

(i) EcoR I to cut the plasmid and Hind III to cut the alien DNA.

(ii) EcoR I to cut both the plasmid and alien DNA.

[2 Marks]



Question 24.

(a) (i) Explain why the milk produced by the mother during the initial days of lactation is considered to be very essential for the newborn infant.

(ii) What is the term used for the milk produced during the initial days of lactation ?

[2 Marks]

Question 25.

Many children in the metro cities are suffering from a very common exaggerated response of the immune system to certain weak antigens in air.

(i) What is the term used for the above mentioned disease ?

(ii) Name the main type of antibody produced by the immune system in response to this disease.

(iii) Which two main inflammation-causing chemicals are produced by the mast cells in such an immune response ?

[2 Marks]

Question 26.

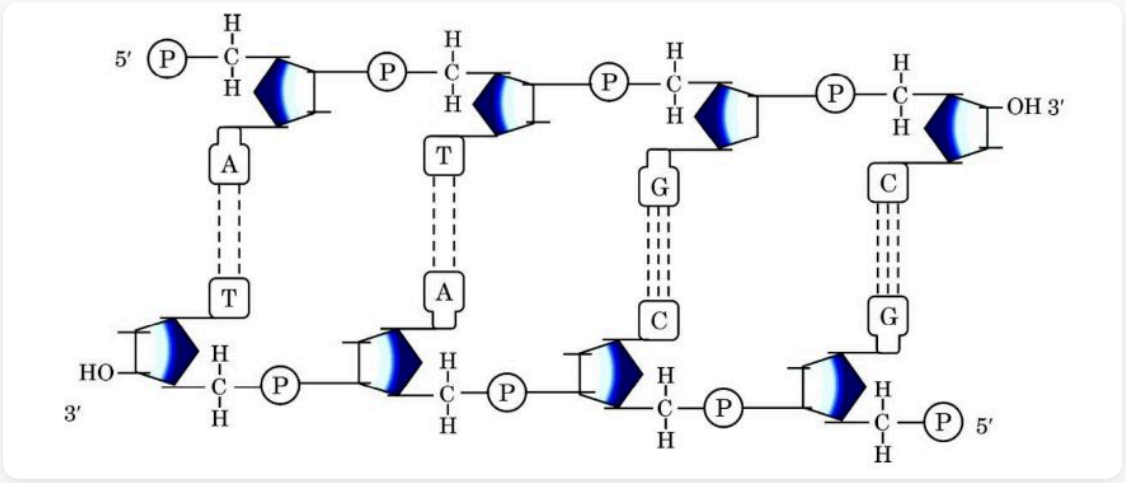
Study the given molecular structure of double-stranded polynucleotide chain of DNA and answer the questions that follow.

(a) How many phosphodiester bonds are present in the given double-stranded polynucleotide chain ?

(b) How many base pairs are there in each helical turn of double helix structure of DNA ? Also write the distance between a base pair in a helix.

(c) In addition to H-bonds, what confers additional stability to the helical structure of DNA ?

[2 Marks]



Question 27.

Why are restrictions imposed on MTP in India ? Up to how many weeks or trimesters, is MTP considered relatively safe for a female, if necessary to perform, by a medical practitioner ?

[2 Marks]

Question 28.

How is the interaction between Ophrys and its specific bee

pollinator one of the best examples of co-evolution ? Explain.

[2 Marks]

Section D

Question 29.

Flowering plants with hermaphrodite flowers have developed many reproductive strategies to ensure cross-pollination. Study the given outbreeding devices adopted by certain flowering plants and answer the questions that follow

All plants belong to the same species.

- No pollen tube growth/inhibition of pollen germination on stigma.

- Pollen germination on stigma.

(a) Name and define the outbreeding device described in the above

table.

(b) Explain what would have been the disadvantage to the plant in the

absence of the given strategy.

[3 Marks]

Pollen grains / Stigma	Pollen grains of Plant A	Pollen grains of Plant B	Pollen grains of Plant C
Stigma of Plant A	×	✓	✓
Stigma of Plant B	✓	×	✓
Stigma of Plant C	✓	✓	×

Question 30.

(a) Alien species are highly invasive and are a threat to indigenous species. Substantiate this statement with the help of any two examples.

(b) State any two criteria for determining biodiversity hotspots

[3 Marks]

Question 31.

Answer the following questions with respect to the sex determining

mechanism observed in honey bee.

(a) Name the type of sex determination system observed in honey bee.

(b) Fill in the blanks (i), (ii) and (iii) in the given question.

(c) What will be the sex and chromosome number of the progeny formed from the unfertilised eggs of honey bee ?

[3 Marks]

Parent	Male
• Type of cell division involved during gamete formation in males	(i) _____
• Number of chromosomes in the gametes	(ii) _____
• Number of chromosomes in the diploid cell of the progeny	(iii) _____

Question 32.

Explain how the addition of lactose in the medium regulates the switching on of the lac operon in bacteria.

[3 Marks]

Question 33.

(a) Name and explain the role of inner and middle walls of the human female uterus.

(b) Write the location and function of fimbriae in human female

[3 Marks]

Question 34.

(a) What do you mean by activated sludge in an STP ?

(b) Explain the biological treatment of the major part of the sludge transferred from the large aeration tank into the anaerobic sludge digesters before its final release into the natural water bodies.

[3 Marks]

Question 35.

Explain the beneficial role of the following, produced as a result of the

processes of biotechnology, to mankind : 3

(a) Cow named Rosie

(b) -1-antitrypsin

[3 Marks]

Section E

Question 36.

(i) Explain how some strains of Bacillus thuringiensis produce proteins that kill certain insects such as lepidopterans but do not kill the Bacillus.

(ii) How is the above mechanism exploited for the production of Bt cotton plant by biotechnologists ?

[5 Marks]

Question 37.

(i) Explain how the amplification of gene of interest is done using PCR.

(ii) State two applications of the desired amplified fragment of DNA.

[5 Marks]

Question 38.

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

(ii) How is triple fusion achieved in these plants ?

[5 Marks]

Question 39.

(b) Describe the changes in the ovary and the uterus as induced by the changes in the level of pituitary and ovarian hormones during menstrual cycle in a human female.

[5 Marks]

Question 40.

(i) Describe the Species-Area relationship as observed by Alexander von Humboldt, for a wide variety of taxa in nature.

(ii) Draw the graph showing Species-Area relationship for S = CAZ Species-Area relationship ?

[5 Marks]

Question 41.

(i) Describe the logistic population growth curve with the help of a suitable graphical representation.

(ii) Write the equation of Verhulst-Pearl logistic growth curve and explain wHat "K" and 'r' suggest in the given equation

[5 Marks]