CBSE EXAMINATION PAPER-2025

BIOLOGY

(Solved)

Time allowed : 3 hours | Maximum Marks : 81

General Instructions :

Read the following instructions carefully and follow them :

i. This question paper contains **38 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 17** are multiple choice questions

v. **Section C** – questions number **18 to 25** are very short answer

vi. **Section D** – questions number **26 to 32** are short answer

vii. **Section E** – questions number **33 to 38** 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.

The most convincing evidence to trace evolutionary relationships between humans and different groups of animals come from the basic similarities seen at the molecular level. Study the table given below that depicts the number of amino acid differences between

the haemoglobin polypeptide of few animals with that of humans and answer the questions that follow.

(1)

To which category of evolution (Divergent or Convergent) do the following evolutionary relationships belong to :

(i) Humans and Macaque

(ii) Humans and Frog

[1 Marks]

(2)

What do the biochemical similarities in haemoglobin suggest about the evolutionary relationship between humans, frog and lamprey ?

[1 Marks]

(3)

Which one of the two lampreys' or macaques' evolution is more closely related to humans and why?

[2 Marks]

(4)

Which one of the two frogs' or dogs' evolution is more closely related to humans and why?

[2 Marks]

Question 3.

Read the following passage and answer the questions that follow.

Deaths related to the use of drugs were estimated at about 5,00,000 in 2019, 17.5 percent more than in 2009. Liver diseases attributed to Hepatitis B are a major cause of drug-

related deaths, according to UNODC, accounting for more than half of the total number of deaths attributed to the use of drugs. Drug overdoses account for a quarter of drug-related deaths.

Opioids contribute to account for the most severe drug-related harm, including fatal overdoses, when used non-medically. At the global level, two-third of direct drug-related deaths are due to opioids, and in some sub-regions the proportion can be as high as three-quarters of such deaths.

(1)

Why are people taking opioids more prone to liver diseases attributed to Hepatitis B ?

[1 Marks]

(2)

What is the scientific name of the plant from which the opioids are derived and from which part of the plant is it extracted ?

[2 Marks]

(3)

What is meant by direct drug-related disease ?

[1 Marks]

(4)

State two common warning signs of drug abuse among the youth.

[2 Marks]

Section B

Question 4.

In its extended 'beads-on-string' form of chromatin, the 'beads' in the string represent:

[1 Marks]

(A) Linker DNA

(B) Histone proteins

(C) NHC proteins

(D) Nucleosomes

Question 5.

Given below are a few statements with reference to the accessory ducts of the human male reproductive system :

(i) The seminiferous tubules of the testes open into rete testis then into the vas deferens.

(ii) The vasa efferentia leave the testes and open into the epididymis.

(iii) The epididymis leads to vas deferens that ascends into the abdomen.

(iv) The vas deferens receives a duct from the prostrate gland and opens into the urethra as ejaculatory duct.

(v) The urethra originates from the urinary bladder and extends through the penis to its external opening, urethral meatus.

Choose the option with all true statements from the given options :

[1 Marks]

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

(B) (i), (iii), (iv)

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

(D) (i), (ii), (iv)

Question 6.

The substrate used during DNA replication by the enzyme DNA-dependent DNA polymerase is :

[1 Marks]

(A) Ribonucleotide triphosphate

(B) Ribonucleoside triphosphate

(C) Deoxyribonucleoside triphosphate

(D) Deoxyribonucleotide triphosphate

Question 7.

In the given pedigree chart, a cross between a normal couple resulted in a son who was haemophilic and a normal daughter. In course of time, when the daughter was married to a normal man, to their surprise the grandson was also haemophilic.

Choose the option that indicates the correct inheritance of trait in the above pedigree chart :

[1 Marks]

(A) Sex-linked recessive trait

(B) Sex-linked dominant trait

(C) Autosome linked dominant trait

(D) Autosomal recessive trait

Question 8.

In which of the following human diseases does mechanism attack self-cells?

[1 Marks]

(A) Phenylketonuria

(B) Thalassemia

(C) Rheumatoid arthritis

(D) Filariasis

Question 9.

Select the statements that are true for a typical dicotyledonous embryo from the given options.

(i) It consists of an embryonal axis and scutellum.

(ii) The portion of embryonal axis above the level of cotyledon is epicotyl.

(iii) The portion of embryonal axis below the level of cotyledon is coleorhiza.

(iv) The lower end of the embryo has radicle covered with a root cap.

Choose the correct answer :

[1 Marks]

(A) (i) and (ii)

(B) (i) and (iii)

(C) (ii) and (iv)

(D) (iii) and (iv)

Question 10.

About 15 mya during human evolution, the primates which used to walk like gorillas and chimpanzees were :

[1 Marks]

(A) Homo habilis and Homo erectus

(B) Homo erectus and Homo sapiens

(C) Dryopithecus and Ramapithecus

(D) Australopithecine and Neanderthal

Question 11.

Use the given information to select the amino acid attached to the 3 end of tRNA during the process of translation, if the coding strand of the structural gene being transcribed has the nucleotide sequence TAC.

[1 Marks]

(A) Isoleucine

(B) Tyrosine

(C) Methionine

(D) Valine

Question 12.

The technique for the early detection of a disease based on the principle of antigen-antibody interaction is :

[1 Marks]

(A) PCR

(B) RNAi

(C) ELISA

(D) EST

Question 13.

The correct depiction of the experiment performed by Matthew Meselson and Franklin Stahl to prove that DNA replicates semi-conservatively on separation of DNA by centrifugation after 40 minutes is :

[1 Marks]

(A) B

(B) C

(C) A

(D) D

Question 14.

Bioactive molecule Cyclosporin A used for human welfare is derived from :

[1 Marks]

(A) Trichoderma polysporum

(B) Monascus purpureus

(C) Aspergillus niger

(D) Propionibacterium sharmanii

Question 15.

In a pea plant (Pisum sativum) inflated pod shape is dominant over constricted pod shape. The expected ratio of phenotypes of the offspring in a cross between both the parents with heterozygous inflated pod shape will be :

[1 Marks]

(A) 3 : 1

(B) 2 : 1

(C) 1 : 0

(D) 1 : 1

Question 16.

Assertion (A) : A person infected with malaria suffers from chill and high fever, recurring every three or four days.

Reason (R) : The parasite attacks the RBC resulting in their rupture and release of haemozoin.

[1 Marks]

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

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

Question 17.

Assertion (A) : ABO blood grouping in humans is an example of multiple allelism.

Reason (R) : More than two genes in a population govern the same character in ABO blood grouping in humans.

[1 Marks]

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

Section C

Question 18. Explain how the immunity of a person is affected if there is atrophy (degeneration) of the thymus gland at an early stage of life.

[2 Marks]

Question 19.

(i) What are interferons ? Explain their role in providing immunity to a person.

(ii) Which category of innate immunity defence barrier can interferons be classified into ?

[2 Marks]

Question 20.

Assume that the given mRNA (start site is not depicted) is theoretically translated in two reading frames.

(a) Translation starting from the first nucleotide (Reading frame 1)

(b) Translation starting from the second nucleotide (Reading frame 2)

Answer the following question :

How many amino acids will be specified in case (a) and case (b) on translation ? Justify your answer.

[2 Marks]

Question 21.

Explain what is meant by the term MTP. What was the main reason to legalize MTP by the Government of India ?

[2 Marks]

Question 22.

Name any two STIs which might occur in a human female. State its two early symptoms.

[2 Marks]

Question 23.

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

(a) Name the enzyme used in Step-1 to join the cut plasmid and alien DNA.

(b) State the technical term used for Step-3.

(c) Justify the use of same Restriction Enzyme EcoR I to cut both the vector DNA and the alien DNA.

[2 Marks]

Question 24.

Explain how the interaction between sea anemone and clownfish is one of the best examples of commensalism in nature.

[2 Marks]

Question 25.

Correctly depict (also indicate the trophic level) and describe the ecological pyramid of biomass in sea with 40 standing crop of phytoplankton supporting 90 standing crop of zooplankton which further supports 120 small fishes.

[2 Marks]

Section D

Question 26.

Explain the process of formation of placenta in a human female after the implantation of the blastocyst in the endometrium of the uterus.

[3 Marks]

Question 27.

Gregor Mendel conducted hybridisation experiments in garden pea for seven years and proposed the law of inheritance.

(a) Why was he successful in his hybridisation experiments ? Give two reasons.

(b) State the law of independent assortment as proposed by Mendel after his dihybrid crosses.

[3 Marks]

Question 28.

Study the given below single strand of deoxyribonucleic acid depicted in the form of a "stick" diagram with 5′ – 3′ end directionality, sugars as vertical lines and bases as single letter abbreviations and answer the questions that follow.

(a) Name the covalent bonds depicted as (a) and (b) in the form of slanting lines in the diagram.

(b) How many purines are present in the given "stick" diagram?

(c) Draw the chemical structure of the given polynucleotide chain of DNA.

[3 Marks]

Question 29.

Explain the biological treatment of primary effluent when passed into the large aeration tanks in a sewage treatment plant (STP).

[3 Marks]

Question 30.

Given below is a flower with its characteristic features specialised for the most common type of abiotic pollination.

Answer the following questions based on the above diagram :

(a) Name the mode of abiotic pollination that will be adopted by the given plant species in the above picture.

(b) State the need of exposed large feathery stigmas for the flower.

(c) What will be the two important adaptations in the pollen grains of the flowers pollinated by the above mode of pollination ?

(d) What could be the probable reason for the petals being small and non-green ?

[3 Marks]

Question 31.

According to a recent wildlife report, the biggest threat to the tiger's survival in Mudumalai Tiger Reserve (MTR) was found to be a small, beautiful flower, Lantana camara, a tropical American shrub, that invaded 40% of India's tiger range. Tamil Nadu department's Lantana weed eradication drive helped to restore the dying MTR thereby also reducing human-wildlife conflicts. MTR is home to 25 species of grasses and legumes.

Answer the given questions based on the information given above.

(a) Explain how did the removal of Lantana help in restoring the dying Mudumalai Tiger Reserve.

(b) Why is the invasion of Lantana camara a cause of concern in MTR.

[3 Marks]

Question 32.

Enlist one advantage and two disadvantages of green revolution.

[3 Marks]

Section E

Question 33.

(i) Explain how does double fertilisation take place in a flowering plant.

(ii) Write the fate of the products of double fertilization in these plants.

[5 Marks]

Question 34.

(i) Explain the structure of testicular lobules in human male reproductive system. Name the two types of cells present in the seminiferous tubules and state their role.

(ii) Describe the role of hypothalamic hormone GnRH in spermatogenesis.

[5 Marks]

Question 35.

Name and explain the biotechnological strategy wherein the infection by the nematode Meloidegyne incognitia can be prevented using Agrobacterium vectors in the roots of tobacco plant by RNA interference.

[5 Marks]

Question 36.

Explain the amplification of gene of interest using the technique of Polymerase chain reaction (PCR).

[5 Marks]

Question 37.

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

(ii) Give 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 Species-Area relationship within a natural forest and also predict the nature of graph when species richness is plotted against the area for a wide variety of taxa.

(ii) Depict the graphical relationship between species richness and area.

(iii) Give the equation of the Species-Area relationship for a wide variety of taxa on a logarithmic scale.

[5 Marks]