CBSE
Class XII Biology
Sample Paper 4

Time: 3 Hours **Total Marks: 70**

General Instructions:

(i) All questions are compulsory.

(ii) The question paper has four sections: Section A, Section B, Section C and Section D. There are 33 questions in the question paper.

(iii) Section A 14 questions of 1 mark each and 02 case-based questions. Section B has 9 questions of 2 marks each. Section C has 5 questions of 3 marks each. Section D has 3 questions of 5 marks each.

(iv) There is no overall choice in the question paper. However, internal choices are provided in some questions. A student has to attempt only one of the alternatives in such questions.

(v) Wherever necessary, neat and properly labelled diagrams should be drawn.

Section A

1. How is Copper T used? [1]

2. From where do the signals for parturition originate? [1]

3. Seeds are considered better for a staple food than vegetative parts of the plant? [1]

4. Name the accessory genital glands in human male. [1]

5. Name two sex-linked diseases in human beings. [1]

6. Which principle is associated with monohybrid cross of 3:1 ratio? [1]

7. What do the triplets AUG and UGA code for during protein synthesis? [1]

8. How is the action of exonuclease different from that of endonuclease? [1]

9. Why does toxin insecticidal protein not kill the Bacillus? [1]

10. Name the interactions in each of the following: [1]

i. Clown fish living among the tentacles of sea anemone.

ii. Ticks living on the skin of dogs.

11. Assertion: Addition or deletion of a base from a gene produces entirely a new polypeptide. [1]

Reason: Substitution mutation replaces a single amino acid in a polypeptide.

a. Both assertion and reason are true, and reason is the correct explanation of the assertion.

b. Both assertion and reason are true, and reason is not the correct explanation of the assertion.

c. Assertion is true but reason is false.

d. Both assertion and reason are false.

OR

Assertion: During DNA replication, the discontinuous synthesised fragments are joined by DNA polymerase.

Reason: A RNA sequence provides binding site for RNA polymerase.

a. Both assertion and reason are true, and reason is the correct explanation of the assertion.
b. Both assertion and reason are true, and reason is not the correct explanation of the assertion.
c. Assertion is true but reason is false.
d. Both assertion and reason are false.

12. Assertion: In recombinant DNA technology, human genes are often transferred into bacteria (prokaryotes) or yeast (eukaryote). [1]

Reason: Both bacteria and yeast multiply very fast to form huge populations which express the desired gene.

a. Both assertion and reason are true, and reason is the correct explanation of the assertion.
b. Both assertion and reason are true, and reason is not the correct explanation of the assertion.
c. Assertion is true but reason is false.
d. Both assertion and reason are false.

13. Assertion: Scavenging improves the environment. [1]

Reason: A scavenger disposes of dead organic matter.

a. Both assertion and reason are true, and reason is the correct explanation of the assertion.
b. Both assertion and reason are true, and reason is not the correct explanation of the assertion.
c. Assertion is true but reason is false.
d. Both assertion and reason are false.

14. Assertion: Earth's rich biodiversity is vital for the very survival of mankind. [1]

Reason: Besides the direct benefits, there are many indirect benefits we receive through ecosystem services such as pollination and flood control.

a. Both assertion and reason are true, and reason is the correct explanation of the assertion.
b. Both assertion and reason are true, and reason is not the correct explanation of the assertion.
c. Assertion is true but reason is false.
d. Both assertion and reason are false.

15. *Read the following and answer any four questions from 15 (i) to 15 (v) given below:* [4]

Cancer is one of the most dreaded diseases of human beings and is a major cause of death all over the globe. More than a million Indians suffer from cancer and a large number of them die from it annually. The mechanisms that underlie development of cancer or oncogenic transformation of cells, its treatment and control have been some of the most intense areas of research in biology and medicine. In our body, cell growth and differentiation is highly controlled and regulated. In cancer cells, there is breakdown of these regulatory mechanisms. Normal cells show a property called contact inhibition by virtue of which contact with other cells inhibits their uncontrolled growth. Cancer cells appears to have lost this property. As a result of this, cancerous cells just continue to divide giving rise to masses of cells called tumors.

(i) The chemical carcinogens present in tobacco smoke have been identified as a major cause of _____ cancer.

a. Lung
b. Skin
c. Breast
d. Prostate

(ii) In _____, a piece of the suspected tissue cut into thin sections is stained and examined under microscope.

a. X-ray
b. Biopsy
c. CT Scan
d. MRI

(iii) In which type of cancer treatment, the tumor cells are irradiated lethally?

a. Immunotherapy
b. Surgery
c. Radiotherapy
d. Chemotherapy

(iv) Which substances help in activating the immune system and destroying the tumor in cancer patients?

a. α-interferon
b. antibiotics
c. analgesics
d. Tranquilisers

(v) **Assertion**: Several chemotherapeutic drugs are used to kill cancerous cells. Some of these are specific for particular tumors.
Reason: Majority of drugs have side effects like hair loss, anemia, etc.

a. Both assertion and reason are true, and reason is the correct explanation of the assertion.
b. Both assertion and reason are true, and reason is not the correct explanation of the assertion.
c. Assertion is true but reason is false.
d. Both assertion and reason are false.

16. *Read the following and answer any four questions from 16 (i) to 16 (v) given below:* [4]

Genetic code

During replication and transcription, a nucleic acid was copied to form another nucleic acid. Hence, these processes are easy to conceptualise on the basis of complementarity. The process of translation requires transfer of genetic information from a polymer of nucleotides to a polymer of amino acids. Neither does any complementarity exist between nucleotides and amino acids, nor could any be drawn theoretically. There existed ample evidences, though, to support the notion that change in nucleic acids (genetic material) were responsible for change in amino acids in proteins. This led to the proposition of a genetic code that could direct the sequence of amino acids during synthesis of proteins. It was George Gamow, a physicist, who argued that since there are only 4 bases and if they have to code for 20 amino acids, the code should constitute a combination of bases. He suggested that in order to code for all the 20 amino acids, the code should be made up of three nucleotides. Marshall Nirenberg's cell-free system for protein synthesis finally helped the code to be deciphered. Severo Ochoa enzyme (polynucleotide phosphorylase) was also helpful in polymerising RNA with defined sequences in a template independent manner (enzymatic synthesis of RNA). Finally a checker-board for genetic code was prepared.

(i) How many codons are there in the genetic code?
a. 61
b. 64
c. 71
d. 74

(ii) Out of total number of codons how many of them do not code for any amino acids?
a. 5
b. 6
c. 3
d. 7

(iii) From bacteria to human, _____ would code for Phenylalanine (phe).
a. AUU
b. AUA
c. UAA
d. UUU

(iv) Which of the following codon has dual function?
a. AUG
b. AUU
c. AUA
d. UAA

(v) Which of the following statement is incorrect regarding genetic code?
a. The codon is triplet.
b. Some amino acids are coded by more than one codon.
c. The genetic code has commas.
d. The code is nearly universal.

Section B

17. Write the location and function of Cowper's gland. [2]

18. The haploid chromosome number for Drosophila is 4.
(a) How many linkage groups should you expect to find in Drosophila?
(b) What can you say about the inheritance of two characters governed by two different genes, one located on chromosome number 3 and the other on chromosome number 4? [2]

19. Mention any two symptoms of AIDS. [2]

20. What are the advantages of the techniques of GM crops? [2]

OR

Bacillus thuringiensis produces insecticidal protein. Why does this toxin not kill *Bacillus*?

21.
(a) State the role of DNA ligase in biotech.
(b) What happens when *Meloidoyne incognitia* consumes cells with RNAi gene? [2]

22. Why is the introduction of genetically engineered lymphocytes into an ADA deficiency patient not a permanent cure? Suggest a possible permanent cure. [2]

OR

How are restriction enzymes different from the topoisomerases functionally?

23. A particular species of wild cat is endangered. In order to save them from extinction, which is a desirable approach in situ or ex situ? Justify your answer. [2]

24. What is camouflage? Explain by giving an example. [2]

25. How do humans maintain constant body temperature in summer and winter? [2]

Section C

26. Explain why meiosis and gametogenesis are always interlinked? [3]

27. In human beings, blue eye colour is recessive to brown eye colour.
A brown-eyed man has a blue-eyed mother.
(a) What is the genotype of the man and his mother?
(b) What are the possible genotypes of his father?
(c) If a man marries a blue-eyed woman, what are the possible genotypes of their offspring? [3]

28. The mosquitoes grow in stagnant water around the residential areas, coolers in the house, flower pots, etc. They act as vectors for various diseases.
(a) Name any three diseases spread by mosquitoes.
(b) How can we control the breeding of insect vectors?
(c) Mention the name of the fish that feeds on mosquito larvae. [3]

29. Name the genes responsible for making Bt cotton plants resistant to bollworm attack. How do such plants attain resistance against bollworm attacks? Explain. [3]

30. Explain mutualism with the help of any two examples. How is it different from commensalism?

Section D

31.
(i) Draw a labelled sectional view of the seminiferous tubule of a human male.
(ii) Define spermiogenesis. Where does it occur? [5]

OR

(i) State what is apomixis. Comment on its significance. How can it be commercially used?
(ii) Draw a longitudinal section of a post-pollinated pistil showing the entry of the pollen tube into the mature embryo sac.

32. Who proposed the chromosome theory of inheritance? Give the salient features of this theory. [5]

OR

Describe in brief the process of transcription.

33. [5]

(i) Which gas gives puffed appearance to the dough? Name the metabolic pathway taking place resulting in the formation of this gas.

(ii) In which food would you find lactic acid bacteria? Mention any two applications of it.

(iii) What is the significance of SCP?

OR

(i) Define the term cirrhosis.

(ii) What are the side-effects of the use of anabolic steroids in females and males?

(iii) Mention any two useful measures for prevention and control of alcohol and drugs abuse among adolescents.