CBSE
Class XII Biology
Sample Paper 3

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. Where are Sertoli cells located? [1]

2. What technical term is applied to fruits formed without fertilization? [1]

3. Why do pollen grains produce in enormous quantities in anemophilous flowers? [1]

4. What is the disadvantage of amniocentesis? [1]

5. The map distance in a certain organism between genes A and B is 8 units, between B and C is 4 units and between C and D is 12 units. Which one of these gene pairs will show more recombination frequency? Give reason. [1]

6. A mother has 'O' blood group and the child has also 'O' blood group. What will be the expected blood group of the father? [1]

7. State the function of enzyme – DNA ligase. [1]

8. Why is the enzyme cellulase used for isolating genetic material from plant cells but not for animal cells? [1]

9. Name the bacterium which produces Bt toxin. [1]

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

i. Cucuta growing on a shoe flower plant.

ii. Mycorrhizae living on the roots of higher roots.

11. Assertion: Mutations are necessary for the survival of the species. [1]

Reason: Lack of mutation gives a temporary advantage to a species in an unchanged environment.

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: Only the sense strand of DNA is copied into mRNA.

Reason: The antisense strand plays a role in replication.

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: Monoclonal antibodies are ideal for diagnosis of diseases caused by closely related pathogens. [1]

Reason: Monoclonal antibodies are far more specific and reproducible than the antibodies produced by conventional techniques.

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: Leguminous plants can grow well in nitrogen deficient soils. [1]

Reason: They need little nitrogen.

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: Species diversity on earth is not uniformly distributed but shows interesting patterns. [1]

Reason: It is generally highest in the tropics and decreases towards the poles.

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]

Biocontrol refers to the use of biological methods for controlling plant diseases and pests. In modern society, the problems of controlling plant diseases and pests have been tackled increasingly by the use of chemicals like insecticides and pesticides. These chemicals are toxic and extremely harmful, to human beings and animals alike, and have been polluting our environment. Our soil is also polluted through the use of weedicides to remove weeds. The use of biocontrol measures will greatly reduce our dependence on toxic chemicals and pesticides. An important part of the biological farming approach is to become familiar with the various life forms that inhabit the field, predators as well as pests, and also their life cycles, patterns of feeding and the habitats that they prefer. This will help develop appropriate means of biocontrol.

(i) Which of the following are used to get rid of mosquitoes?
   a. Scale insect
   b. Dragonflies
   c. Houseflies
   d. Butterflies

(ii) Soil bacterium, _____ acts as a biopesticide.
   a. Bacillus thuringiensis
   b. Rhizobium
   c. Azotobacter
   d. Clostridium

(iii) _____ are the biological control agents that attack insects and other arthropods.
   a. Baculoviruses
   b. Bacillus thuringiensis
   c. Rhizobium
   d. Azotobacter

(iv) A bioherbicide obtained from fungus _____ is used to control several plant pathogens.
   a. Agaricus
   b. Penicillium
   c. Trichoderma
   d. Aspergillus

(v) **Assertion:** Trichoderma species are free-living fungi.
Reason: They are effective biocontrol agents of several plant pathogens.

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]

The process of copying genetic information from one strand of the DNA into RNA is termed as transcription. The principle of complementarity governs the process of transcription. In transcription only a segment of DNA and only one of the strands is copied into RNA because if both strands act a template, they would code for RNA molecule with different sequences, and in turn, if they code for proteins, the sequence of amino acids in the proteins would be different. Hence, one segment of the DNA would be coding for two different proteins, and this would complicate the genetic information transfer machinery. The other reason is the two RNA molecules if produced simultaneously would be complementary to each other, they would form a double stranded RNA. This would prevent RNA from being translated into protein and the exercise of transcription would become a futile one.

(i) During transcription, adenine forms base pair with
a. Cytosine
b. Guanine
c. Uracil
d. Thymine

(ii) Which of the following is NOT a part of transcription unit?
a. A promoter
b. The structural genes
c. A terminator
d. Replication fork

(iii) _____ is the formation of m-RNA strand on a DNA strand in the nucleus.
a. Central dogma
b. Transcription
c. Replication
d. Translation

(iv) Replication fork is formed during
a. transcription
b. Replication
c. Translation
d. DNA Fingerprinting

(v) Which of the following initiates the transcription process?

a. Rho factor
b. RNA polymerase
c. AAA sequence
d. Ligase

Section B

17. A bilobed and dithecous anther has 100 microspore mother cells per microsporangium. How many male gametophytes can it produce? [2]

18. Among the following genotypes: [2]

AA, I^AI^B, aa, Bb, I^Bi, Aa, rr, BB, ii

(i) Which are heterozygous and which are homozygous?

(ii) Which of the genotypes have the same phenotypes (the capital letter stands for dominance)?

19. In which ways have the study of biology helped us to control infectious diseases? [2]

20. How can the following be made possible for biotechnology experiments? [2]

(a) Introduction of DNA from bacterial cell.

(b) Reintroduction of the recombinant DNA into a bacterial cell.

OR

What are transgenic plants? Give some examples.

21. Explain why children eating golden rice are unlikely to suffer from 'night blindness'?[2]

22. Give one example each of transgenic plant and transgenic animal. [2]

OR

How is 'Rosie' considered different from a normal cow? Explain. [2]

23. Give two examples of commensal species. [2]

24. Write a short note on interspecific competition. [2]

25. How is cactus adapted to survive in its habitat? [2]

Section C

26. What are the similarities between spermatogenesis and oogenesis? [3]

27. Why is pedigree analysis done in the study of human genetics? State the conclusions which can be drawn from it. [3]

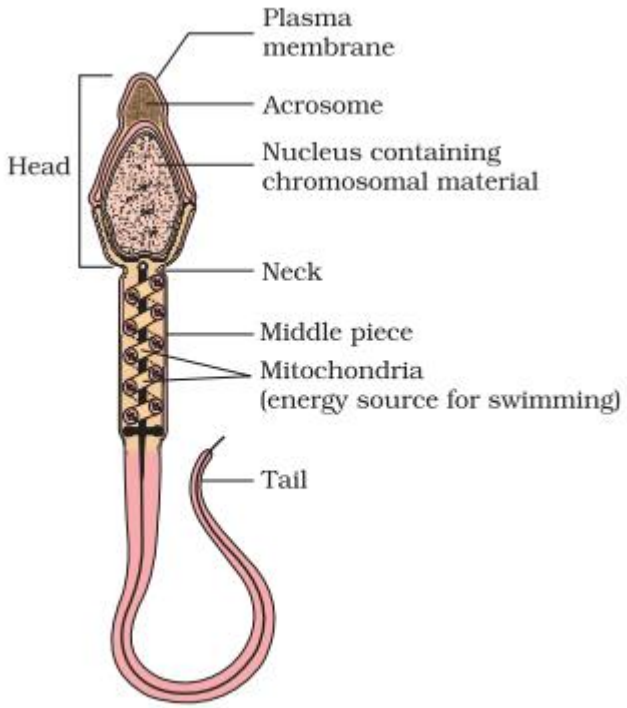
28. Give the pathogen, mode of transmission and symptoms of the disease Ascariasis. [3]

29. Expand PCR. Mention its importance in biotechnology. [3]

30. Name and explain the type of interaction that exists in mycorrhizae and between cattle egret and cattle. [3]

Section D

31. With reference to the given diagram of human sperm, answer the following questions: [5]



(a) Name the enzyme that helps the sperm to penetrate into ovum during fertilization. Where is this enzyme present?
(b) What is the utility of mitochondria in the middle piece of sperm?
(c) What will happen in the absence of mitochondria?
(d) State the function of LH in human males.

OR

Describe briefly the structure of a monocotyledonous albuminous (maize) seed. Also, draw a labelled diagram to show its parts.

32. What will happen in each case? Also, cite example for the conditions provided.

(i) When complete sets of chromosomes are added to the diploid genome?

(ii) When individual chromosomes are added to or deleted from the diploid genome?

(iii) When a part of the chromosome is lost?

(iv) When a part of chromosome breaks and attaches to another non-homologous chromosome?

(v) When a part of the chromosome breaks and attaches to its homologue? [5]

OR

Give the salient features of the double helix structure of DNA.

33.

(i) What does AIDS stand for? Write its causative agent.

(ii) What are the various routes by which transmission of the human immunodeficiency virus takes place?

(iii) List any two high risk group of people.

(iv) Suggest any two methods for its prevention. [5]

OR

(i) Write the source and the effect on the human body of the following drugs:

a. Morphine
b. Cocaine
c. Marijuana

(ii) What are antibiotics? Name the classes of organisms that produce antibiotics.