CBSE NCERT Based Chapter wise Questions (2025-2026)

Class-XII

Subject: Biology

Chapter Name : *Biotechnology and Its Applications* (Chapter : 10)

Total : 7 Marks (expected) [MCQ(1)-1 Mark, SA(1)-2 Marks, CBQ(1)-4 Marks]

Level - 1

MCQ Type Questions:

1. Bt cotton is resistant to:
   Ⓐ Viruses Ⓑ Fungi Ⓒ Insects Ⓓ Bacteria
   [**Hint:** Cry toxin acts on insect gut.]

2. Cry genes used in Bt crops are derived from:
   Ⓐ *Bacillus anthracis* Ⓑ *Bacillus thuringiensis*
   Ⓒ *Agrobacterium tumefaciens* Ⓓ *E. coli*
   [**Hint:** Source bacterium of Bt toxin.]

3. Which RNA molecule is used in RNA interference (RNAi)?
   Ⓐ mRNA Ⓑ tRNA Ⓒ dsRNA Ⓓ rRNA
   [**Hint:** Double-stranded RNA silences genes.]

4. Insulin produced by recombinant DNA technology is called:
   Ⓐ Animal insulin Ⓑ Natural insulin Ⓒ Humulin Ⓓ Proinsulin
   [**Hint:** Commercial recombinant insulin.]

5. Gene therapy is mainly used to treat:
   Ⓐ Infectious diseases Ⓑ Genetic disorders Ⓒ Nutritional diseases Ⓓ Allergies
   [**Hint:** Corrects defective genes.]

6. ADA deficiency affects:
   Ⓐ Liver Ⓑ Brain Ⓒ Immune system Ⓓ Heart
   [**Hint:** Lack of immune response.]

7. Transgenic animals are produced mainly to:
   Ⓐ Increase milk yield Ⓑ Study gene regulation Ⓒ Increase population Ⓓ Reduce cost

8. Which crop is enriched with Vitamin A?
   Ⓐ Bt cotton Ⓑ Golden rice Ⓒ Maize Ⓓ Soybean
   [**Hint:** Rich in β-carotene.]

9. Edible vaccines are generally produced in:
   Ⓐ Animals Ⓑ Bacteria Ⓒ Plants Ⓓ Fungi

10. Which protein is toxic to insect larvae?
    Ⓐ Cry protein Ⓑ Insulin Ⓒ ADA Ⓓ Interferon
    [**Hint:** Bt toxin.]

Assertion-Reason based questions

Directions: The questions 11 to 15 have two statements—Assertion (A) and Reason (R). Of the two statements, mark the correct answer from the options given below :

A. Both Assertion and Reason are true and Reason is the correct explanation of the Assertion
B. Both Assertion and Reason are true but Reason is not the correct explanation of the Assertion
C. Assertion is true, but Reason is false
D. Assertion is false, but Reason is true

11. **Assertion:** Bt toxin is harmful to insects but safe for humans.
Reason: Bt toxin becomes active only in alkaline pH.

Ⓐ A Ⓑ B Ⓒ C Ⓓ D

[**Hint:** Insect gut is alkaline.]

12. **Assertion:** RNAi is used to control nematode infection in plants.
Reason: RNAi degrades mRNA of target genes.

Ⓐ A Ⓑ B Ⓒ C Ⓓ D

[**Hint:** Gene silencing mechanism.]

13. **Assertion:** Gene therapy is a permanent cure for genetic disorders.
Reason: Corrected genes are inserted into germ cells.

Ⓐ A Ⓑ B Ⓒ C Ⓓ D

[**Hint:** Usually somatic cells are treated.]

14. **Assertion:** Transgenic animals help in vaccine safety testing.
Reason: They produce human-like immune responses.

Ⓐ A Ⓑ B Ⓒ C Ⓓ D

[**Hint:** Used before human trials.

15. **Assertion:** Golden rice helps prevent night blindness.
Reason: It contains iron in high quantity.

Ⓐ A Ⓑ B Ⓒ C Ⓓ D

[**Hint:** Vitamin A, not iron.]

Short Answer Type Questions (3 marks)

16. What is Bt toxin? How does it act on insects?

[**Hint:** Protoxin → active toxin in gut]

17. Define RNA interference. Mention one application.

[**Hint:** Gene silencing]

18. What is a transgenic animal? Give one example.

[**Hint:** Foreign gene insertion]

19. What is gene therapy?

[**Hint:** Defective gene correction]

20. What are edible vaccines? Give one example.

[**Hint:** Plant-based vaccine]

Long Answer Type Questions (5 marks)

21. Explain the production of insulin using recombinant DNA technology.

[**Hint:** A and B chains, *E. coli*]

22. Describe RNA interference and its application in pest control.
[**Hint:** dsRNA → mRNA degradation]

23. Explain the role of Bt crops in pest management.
[**Hint:** Cry gene, specificity]

24. Discuss the importance of transgenic animals.
[**Hint:** Disease models, testing]

25. Explain gene therapy for ADA deficiency.
[**Hint:** Lymphocytes, normal gene]

Case Based Questions

26. Bt cotton contains a gene from Bacillus thuringiensis.
a) Name the gene inserted.
b) Why is Bt toxin inactive in bacteria?
c) Why is Bt cotton safe for humans?
d) Name the target insect.
[**Hints:** Cry gene, protoxin]

27. RNAi Technology - RNA interference is used in plants to control nematodes.
a) Which organism provides RNAi genes?
b) Name the type of RNA involved?
c) Discuss the mode of action?
d) What is the advantage of this method over pesticides?
[**Hints:** dsRNA, gene silencing]

28. Golden rice was developed to combat vitamin deficiency.
a) Which vitamin is enriched?
b) Name the precursor molecule present?
c) Name the deficiency disease prevented?
[**Hints:** β-carotene]

ANSWER

1. ©	4. ©	7. Ⓑ	10. Ⓐ	13. ©
2. Ⓑ	5. Ⓑ	8. Ⓑ	11. Ⓐ	14. Ⓐ
3. ©	6. ©	9. ©	12. Ⓐ	15. ©