



# 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 - 2(Higher Order)**

## MCQ Type Questions:

- Which of the following is not a characteristic of Bt toxin?  
(A) Protoxin (B) Activated in acidic medium  
(C) Highly specific to insects (D) Harmless to humans  
[Hint: Site of activation]
- RNA interference (RNAi) involves:  
(A) Inhibition of translation (B) Destruction of mRNA  
(C) Prevention of transcription (D) Protein degradation  
[Hint: Mode of gene silencing]
- Golden rice is genetically engineered to be rich in:  
(A) Vitamin C (B) Vitamin A (C) Vitamin D (D) Iron  
[Hint: Deficiency disease targeted]
- The cry genes in Bt cotton are derived from:  
(A) *Agrobacterium* (B) *Bacillus anthracis* (C) *Bacillus thuringiensis* (D) *Pseudomonas*  
[Hint: Full form of Bt]
- Which pest is controlled by Bt cotton?  
(A) Aphids (B) Bollworm (C) Locust (D) Whitefly  
[Hint: Major cotton pest]
- ADA deficiency can be cured by:  
(A) Insulin therapy (B) Antibiotic therapy (C) Gene therapy (D) Chemotherapy  
[Hint: Genetic disorder]
- The first clinical gene therapy was used to treat:  
(A) Thalassemia (B) SCID (C) Sickle cell anemia (D) Haemophilia  
[Hint: Immune system disorder]
- Which technique helps in identifying genetically modified food?  
(A) ELISA (B) PCR (C) Hybridization (D) Chromatography  
[Hint: DNA amplification]
- Transgenic animals are produced mainly to:  
(A) Increase meat yield (B) Improve milk quality only  
(C) Study gene regulation (D) Replace natural species  
[Hint: Research purpose]
- Which protein is produced by transgenic cows?  
(A) Insulin (B) Lactoferrin (C) Somatostatin (D) Interferon  
[Hint: Milk protein]

## 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 (A):** Bt cotton plants do not require chemical insecticides.

**Reason (R):** Bt toxin kills insect larvae by destroying gut epithelium.

- ☐ A                      ☐ B                      ☐ C                      ☐ D

[Hint: Mode of action of Bt toxin]

12. **Assertion (A):** RNAi is a cellular defense mechanism.

**Reason (R):** RNAi prevents virus multiplication in host cells.

- ☐ A                      ☐ B                      ☐ C                      ☐ D

[Hint: Role of RNAi]

13. **Assertion (A):** Transgenic animals help in vaccine safety testing.

**Reason (R):** They replace all animal testing methods.

- ☐ A                      ☐ B                      ☐ C                      ☐ D

[Hint: Ethical use]

14. **Assertion (A):** Gene therapy provides permanent cure for ADA deficiency.

**Reason (R):** Functional ADA gene is introduced into bone marrow cells.

- ☐ A                      ☐ B                      ☐ C                      ☐ D

[Hint: Limitation of therapy]

15. **Assertion (A):** GM crops increase agricultural productivity.

**Reason (R):** They are always harmful to biodiversity.

- ☐ A                      ☐ B                      ☐ C                      ☐ D

[Hint: Environmental impact]

## Short Answer Type Questions (3 marks)

16. What is Bt toxin? Why is it safe for humans?

[Hint: Protoxin & specificity]

17. Explain RNA interference with an example.

[Hint: Nematode resistance]

18. Write any three advantages of genetically modified crops.

[Hint: Yield, resistance, nutrition]

19. What is gene therapy? Mention one disorder treated using it.

[Hint: ADA deficiency]

20. List three purposes of producing transgenic animals.

[Hint: Research, safety, therapeutics]

## Long Answer Type Questions

21. Explain the production of Bt cotton. Describe the mode of action of Bt toxin.

[Hint: cry gene → protoxin → gut activation]

22. Describe RNA interference as a method of gene silencing.  
[Hint: dsRNA → mRNA degradation]
23. Explain gene therapy for ADA deficiency. Why is it not a permanent cure?  
[Hint: Lymphocytes vs stem cells]
24. Discuss the applications of transgenic animals in biotechnology.  
[Hint: Disease study, vaccines, therapeutics]
25. What are GM crops? Explain their benefits and concerns.  
[Hint: Environmental & ethical issues]

## Case-Based Questions

26. Bt cotton plants contain cry genes that protect them from insect pests.
  - a) Name the source organism of cry gene.
  - b) Why is Bt toxin inactive in bacteria?
  - c) Name the target pest.
  - d) Mention one environmental advantage.

**Hints:**

- a) Bacterial source
- b) Protoxin
- d) Reduced insecticides

27. A child suffering from SCID is treated using gene therapy.
  - a) Which enzyme is deficient?
  - b) Which cells are used initially?
  - c) Why is repeated treatment needed?
  - d) Name the permanent solution approach.

**Hints:**

- c) Short-lived cells

28. Rosie, the first transgenic cow, produced human protein-rich milk.
  - a) Name the protein produced.
  - b) State its importance.
  - c) Why are transgenic animals used for safety testing?
  - d) Mention one ethical concern.

**Hints:**

- a) Milk protein
- b) Therapeutic use
- c) Drug testing
- d) Animal welfare

## ANSWER

- |      |      |      |      |       |       |       |       |
|------|------|------|------|-------|-------|-------|-------|
| 1. B | 3. B | 5. B | 7. B | 9. C  | 11. A | 13. C | 15. C |
| 2. B | 4. C | 6. C | 8. B | 10. B | 12. A | 14. D |       |