



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:

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

[Hint: Role of RNAi]

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

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

- (A) A
- (B) B
- (C) C
- (D) 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) A
- (B) B
- (C) C
- (D) D

[Hint: Limitation of therapy]

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

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

- (A) A
- (B) B
- (C) C
- (D) 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.

- Name the source organism of cry gene.
- Why is Bt toxin inactive in bacteria?
- Name the target pest.
- Mention one environmental advantage.

Hints:

- Bacterial source
- Protoxin
- Reduced insecticides

27. A child suffering from SCID is treated using gene therapy.

- Which enzyme is deficient?
- Which cells are used initially?
- Why is repeated treatment needed?
- Name the permanent solution approach.

Hints:

- Short-lived cells

28. Rosie, the first transgenic cow, produced human protein-rich milk.

- Name the protein produced.
- State its importance.
- Why are transgenic animals used for safety testing?
- Mention one ethical concern.

Hints:

- Milk protein
- Therapeutic use
- Drug testing
- 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	