



BIOLOGY

BOOKS - NEW JYOTHI BIOLOGY (TAMIL ENGLISH)

BIOTECHNOLOGY AND ITS APPLICATIONS

Activities For You Solutions Ncert Exercises

1. Crystals of Bt toxin produced by some bacteria do not kill the Bacteria them.

(a) bacteria are resistant to the toxin

(b) toxin is immature,

(c) toxin is inactive,

(d) bacteria encloses toxin in a special sac.



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2. What are transgenic bacteria? Illustrate using any one example.





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3. Compare and contrast the advantages and disadvantages of production of genetically modified crops.



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4. What are Cry proteins? Name an organism that produces it. How Has man exploited this protein to his benefit?



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5. What is gene therapy ? Illustrate using the example of adenosine deaminase (ADA) deficiency.



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6. Diagrammatically represent the experimental steps in cloning and expressing a human gene (say the gene for growth hormone) into a bacterium like E.coli?



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7. Can you suggest a method to remove oil (hydrocarbon) from seeds based on your understanding of rDNA technology and chemistry of oil?



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8. Find out from internet what is golden rice.



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9. Does our blood have proteases and nucleases?



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10. Consult internet and find out how to make orally active protein pharmaceutical. What is the major problem to be encountered?



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1. Expand the following short form related to biotechnology.

a. dsRNA

b. RNA

c. Bt

d. G.M.O

e. ADA

f. PCR

g. ELISA

h. GEAC



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2. Genetically modified cotton is named as Bt cotton. What does the prefix Bt' mean?



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3. Name of the gene which encodes for the toxin called crystal protein in *Bacillus thuringiensis* is 'cry'. What are the different types of 'cry' gene and name the type of insects controlled by each type?



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4. Biopiracy affects developing countries like India more than industrialised nations, because our country is rich in and related to bio-resources. (Bioethics / Biodiversity / Biopatent, Traditional resources/Traditional cultivation/Traditional knowledge)



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5. Name the nematode which injects the roots of tobacco plants and was treated with the help of RNA interference.



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6. *Bacillus thuringiensis* makes our environment pesticide free. Comment.



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7. Bt toxin seen inside Bt cotton exists in an inactive form. But when a pest feeds on Bt cotton, it dies. How does the toxin in cotton plant kill the pest?



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8. Briefly describe the RNA interference process for preventing nematode infestation of plants.



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9. In tobacco plants, a nematode *Meloidogyne incognita* infects the roots of tobacco plants and causes a great reduction in yield. To prevent this nematode infection a new method was introduced called as RNA interference (silencing of specific (RNA). Briefly explain this method done in tobacco plants using *Agrobacterium* vectors.



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10. The development of biotechnology has made immense impact in the area of health care. Briefly explain any three such developments with examples.



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11. ELISA test is done to detect HIV in AIDS patients. What is the principle behind this test?



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12. Transgenic animals are animals that have had their DNA manipulated to possess and express an extra gene. Comment on some of the areas where these transformed organisms are used.



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13. Transgenic organisms are used by humans in various fields, especially to test the action of vaccines before they are used in humans.

According to your opinion is there any ethical issue in such experiments? Comment.



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14. Suppose a foreign company applies for patent for a medicine made from turmeric. Turmeric is indigenously used in India as a medicine for skin diseases.

a. What is your opinion against such a theft of knowledge?

b. What do you call such an unauthorised use of bioresources?



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15. Genetic modification of organisms can have unpredictable results when such organisms are introduced into the ecosystem. Is there any regulatory authority in India to, monitor such development of GM crops? Give a brief account.



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16. Define the term biopiracy. Explain the issue of Basmati rice patent in this context.



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17. There are several arguments against Genetically Modified crops (G.M crops.). Organisations like 'Green Peace' protest against the cultivation of G.M. crops. Suppose you are also a protestor, what will be your two main arguments against G.M. crops?



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18. Biopiracy affects developing countries like India more than industrialised nations, because our country is rich in and related to bio-resources. (Bioethics / Biodiversity / Biopatent, Traditional resources/Traditional cultivation/Traditional knowledge)



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19. Transgenic animals that produce useful biological products can be created by biotechnology. In 1997 the first transgenic cow was produced. Name the cow and significance of its milk.



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20. PCR is used to amplify desired DNA for a billion times. It is also used in the molecular diagnosis of human disorders. Explain.



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21. Name any three techniques related to biotechnology that help in early diagnosis of some diseases.



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22. Briefly explain the structure of human insulin. What was the main challenge for production of insulin using rDNA technique?



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Question From Edumate

1. Basmati' rice is indigenous to our country. But now it is under the control of the USA. How it happened so?



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2. Some important applications of biotechnology are given below. Arrange them

in correct order.

Myorrhiza	Single cell protein	Bioinsecticide
Brassica napus	Phosphorus	Food
Bacillus thuringiensis	Hirudin	Biofertilizer
Spirulina	Cry protein	Medicine

Ans.



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Question From Previous Hse

1. Biotechnology is a necessary evil' was the topic in a seminar. Suppose you are a speaker, how will you present the theme?



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2. Raju is searching blight resistant plants for his crossing experiments. Unfortunately no such varieties are available.

- a. Suggest a process to create such plants.
- b. Justify your suggested method.



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3. Teacher asked Balan to write the principle of RNAi technology. Help him by describing the method.



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4. Gemini opened the fridge in her home and found that a small bottle labelled with rDNA insulin

a. Is it a natural insulin?

b. Identify the major steps involved in this rDNA insulin production.



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5. Bt. cotton is a well known example of application of Biotechnology in agriculture. Bt. cotton reduces the use of pesticides. Explain.



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6. Adenosine deaminase (ADA) deficiency is a hereditary disease, where ADA, which is crucial for functioning of immune system is absent. Explain how ADA deficiency can be treated.





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Previous Entrance Exam Corner

1. What does Bt stand for in the popular crop Bt cotton?

- A. Biotechnology
- B. Best type
- C. Bacillus thuringensis
- D.

Answer: D



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2. A cybrid is a hybrid carrying a . .

b.

c.

A. cytoplasm of two different plants

B. genomes and cytoplasm of two
different plants

C. cytoplasms of two different plants and genome of one plant.

D. genomes of two different plants.

Answer: C



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3. Both in callus and suspension cultures commonly used auxin is

A. naphthalene acetic acid

B. indole 3- butyric acid

C. 2, 4, 5 - trichlorophenoxy acetic acid

D. dichlorophenoxy acetic acid (2-4 D)

Answer: D



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4. Choose the correct statement with reference to 'Dolly'.

A. She was created by taking nucleus from unfertilized eggs and cytoplasm from unfertilized eggs

B. She was created by taking nucleus from udder cell and from cytoplasm from unfertilized egg

C. She was created by taking cytoplasm from udder cell and nucleus from unfertilized egg

D. She was created by taking nucleus from
udder cells and unfertilized eggs

Answer: B



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5. Find the incorrect statement.

A. Gene therapy is a genetic engineering
technique used to treat disease at

molecular level by replacing defective genes with normal genes

B. Calcitonin is a medically useful recombinant product in the treatment of infertility

C. Bt toxin is biodegradable insecticide obtained from *Bacillus thuringiensis*.

D. *Trichoderma* sp. is a biocontrol agent for fungal diseases of plants

Answer: B



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6. The technique that was employed to produce haploids of *Datura* was

- A. meristem culture
- B. anther culture
- C. embryo culture
- D. protoplast culture

Answer: B



7. SCID is caused by defective gene coding for the enzyme called

- A. adenosine transaminase
- B. guanosine transaminase
- C. adenosine deaminase
- D. guanosine deaminase

Answer: C



8. 6-furfuryl amino purine, 2-4-dichlorophenoxy acetic acid and indole-3 acetic acid are examples respectively for

A. synthetic auxin, kinetin and natural auxin

B. gibberellin, natural auxin and kinetin

C. natural auxin, kinetin and synthetic auxin

D. kinetin, synthetic auxin and natural auxin

Answer: D



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9. How has biotechnology been applied in each of the following?

i. In curing diabetes mellitus

ii. In raising pest resistant plants

iii. In producing more nutritionally balanced milk. Do you think it is ethical to manipulate organisms for human benefits? Justify your answer.



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10. Find out the pairs, which are correctly, matched.

a. Cyanobacteria i. Biopesticides

b. Mycorraiza ii. Solubilization of phosphate

c. Bacillus thuringiensis .iii. Cry protein

d. Single cell protein . Iv. Rhizobia.



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11. Which of the following is/are true?

- i. Biowar - Biowar is the use of biological weapons against humans and or their crops
- ii. Bio ethics is the unauthorized use of bio resources .
- iii. bio patent is the exploitation of bio resources of other nations .



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12. Cry II Ab and Cry I Ab produce toxins that control





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Cbse Corner

1. List any four advantages of genetically modified crop plants over their wild/domesticated relatives.



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2. in case of Bt cotton, how does the toxic insecticide protein produced by the bacterium

kills the insect pest but not the cell of *Bacillus thuringiensis* where the toxic protein is generated?



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3. A multinational company (XYZ) marketed a medicine extracted from medicinal herbs grown in the sprawling fields in a foreign country. This herb is found only in our country and no compensation was paid or permission taken from relevant authorities

i) What is the term used to refer to such an act committed by the multinational company?

ii. Justify the meaning of the term.

ii. What has our government done to prevent such deeds?



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5. You have developed a GM organism. Which government organisation will you approach to obtain clearance for its mass production? Why is such a body necessary? Give two reasons,



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6. Explain the steps involved in the production of genetically engineered insulin.



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7. What is somatic hybridization?



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Continuous Evaluation

1. What a plant tissue culture lab and prepare a report of basic requirements of a tissue culture lab.



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2. Using internet try to fine out some genetically modified organisms and GM foods. Prepare a note on the merits and demerits of GM foods.



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3. Prepare a chart showing the procedus of cloning .



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