



### **BIOLOGY**

## **BOOKS - SRIJAN BIOLOGY (ENGLISH)**

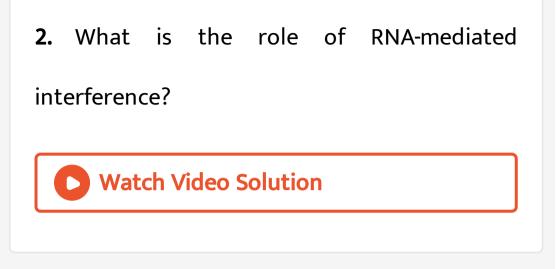
# BIOTECHNOLOGY AND ITS APPLICATIONS

**Illustrative Questions** 

**1.** A multinational company (XYZ) marked 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 authority.

(a) What is the term used to refer to such an act committed by the multinational company?(b) Justify the meaning of the term. (c) What has our government done to prevent such deeds?



3. What are transgenic bacteria? Illustrate

using any one example.



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

Watch Video Solution

5. Does our blood have proteases and

nucleases?

6. In view of the current food crisis, it is said,that we need another green revolution.Highlight the major limitations of the earliergreen revolution.



7. Expand GMO. How is it different from a

hybrid?

8. Differentiate between diagnostics and therapeutics. Give one example for each category.
Watch Video Solution

**9.** Give the full form of ELISA. Which disease can be detected using it? Discuss the principle underlying the test.

**10.** Can a disease be detected before its symptoms appear? Explain the principle involved.



**11.** Many proteins are secreted in their inactive form. This is also true of many toxic proteins produced by microorganisms. Explain how the mechanism is useful for the organism producing the toxin?



12. Give any two reasons why the patent on Basmati should not have gone to an American Company.

**Watch Video Solution** 

**13.** How was Insulin obtained before the advent of DNA technology? What were the problems encountered?

14. With respect to understanding diseases, discuss the importance of transgenic animal models

Watch Video Solution

15. PCR is a useful tool for early diagnosis of an

infectious disease. Elaborate.

**16.** What is GEAC and what are its objectives?

<b>Watch Video Solution</b>	
-----------------------------	--

**17.** Gene expression can be controlled with the help of RNA. Explain the method with an example.



**18.** Ignoring our traditional knowledge can prove costly in the area of biological patenting. Justify.



**19.** Highlight any four areas where genetic modification of plants has been useful.



20. What is recombinant DNA vaccine? Give

two examples.

Watch Video Solution

**21.** Why is it that the line of treatment for a genetic disease is different from infectious diseases?

22. Who was the first patient who was given gene therapy? Why was the given treatment recurrent in nature?



**23.** Taking examples under each category, discuss upstream and downstream processing,

**24.** ELISA technique is based on the principles of antigen-antibody interaction. Can this technique be used in the molecular diagnosis of a genetic disorder, such as phenylketonuria?

**Watch Video Solution** 

**25.** Gene therapy is an attempt to correct a genetic defect by providing a normal gene into the individual. By this the normal function

can be restored. An alternate method would be to provide the gene product (protein/enzyme) known as enzyme replacement therapy, which would also restore the function. Which in your opinion is a better option? Give reason for your answer.

**O** Watch Video Solution

**26.** You have identified a useful gene in bacteria. Make a flow chart of the steps that

you would follow to transfer this gene to a

plant.

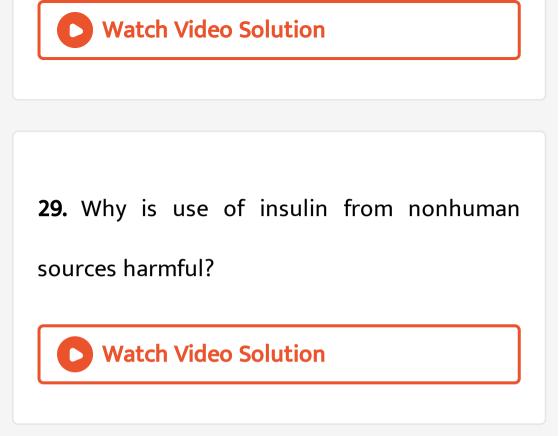


27. Why is insulin not administered orally to

diabetic patients?

Watch Video Solution

**28.** Why does flavr savr tomato possess long shelf life?



# **30.** Why is genetically produced insulin better

than those produced by conventional methods?

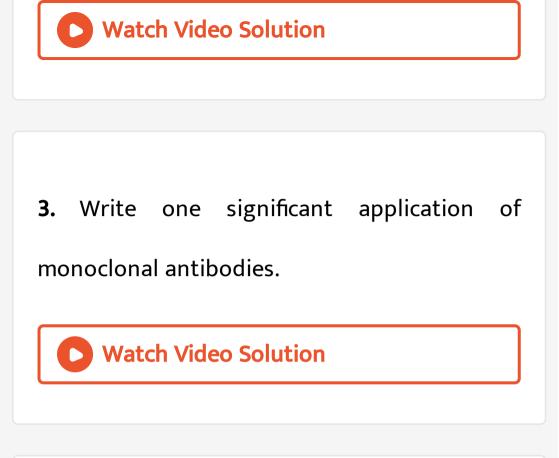


Practice Questions Very Short Answer Type Questions

 Name the technique which is used for detecting presence of pathogens in an organism.

Watch Video Solution

**2.** Name two diseases against which genetically engineered vaccines are available.



4. Name the nematode that attacks roots of

tobacco plant.

5. Name the toxic protein secreted by Bacillus

thuringiensis.



6. Name the company which started selling

human insulin in 1983.

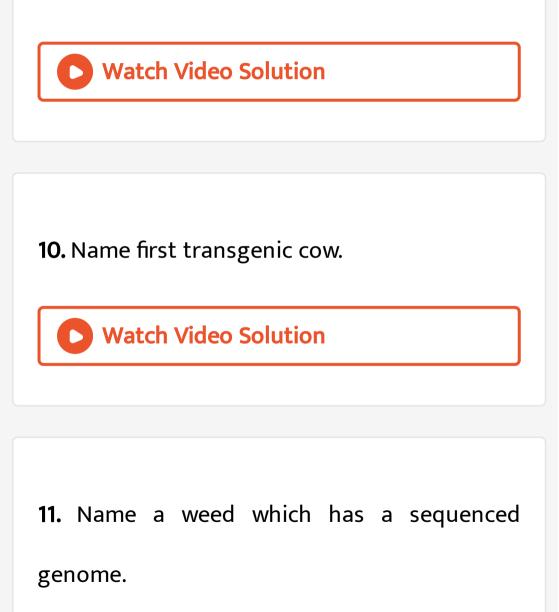
7. Name the first genetically modified non human primate.
Watch Video Solution

8. How many polypeptides is insulin made of?

By which bond do these chains bind together?

9. Which of the following bacteria is used as a

vector for plant genetic engineering ?





### 12. For which disease first clinical gene therapy

was given?

**Watch Video Solution** 

### **13.** Name antiviral proteins.



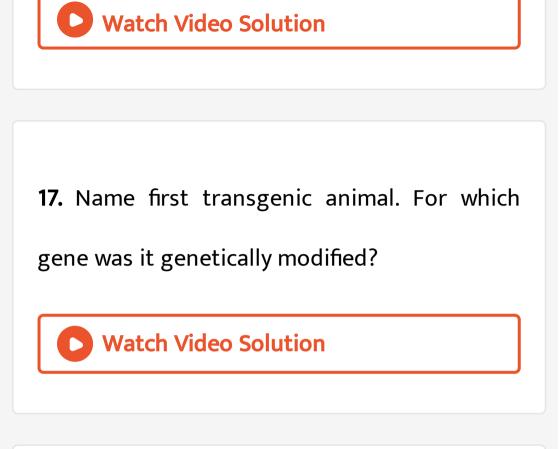
**14.** In case of Bt cotton, how does the toxic insecticide protein produced by the bacterium kill the insects?



#### 15. Name two genetically modified hormones.



16. Name genes that control cotton bollworms.



**18.** Correct the given statement with respect to brazzein. 'Brazzein is a high calorie carbohydrate.'

### Practice Questions Short Answer Type I Questions

1. Name the first transgenic crop in India.

Watch Video Solution

2. Name the insulin obtained from a genetically modified microorganism. Also name that microorganism.

**3.** What is the main advantage of GM crops?

Watch Video Solution

4. Name two medically important proteins

manufactured by genetic engineering.

5. What is the cause of adenosine deaminase

deficiency in humans?

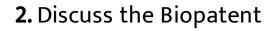
Watch Video Solution

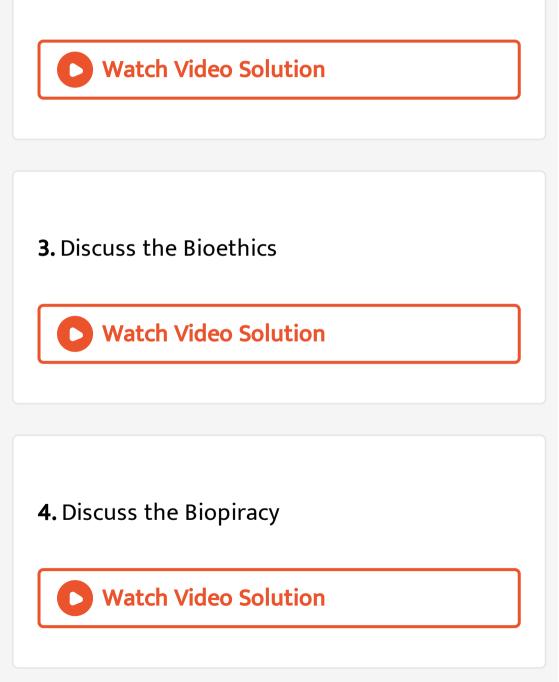
6. You have developed a GM organism. Which government organisation would you approach to obtain clearance for its mass production? Why is such a body necessary? Give two reasons **7.** Why is gene encoding for 'Cry' protein inserted into a crop plant?

Watch Video Solution

### Practice Questions Short Answer Type li Questions

1. Define molecular farming.





5. With an example, explain how biotechnology

has been applied in curing diabetes mellitus

### Watch Video Solution

**6.** With an example, explain how biotechnology

has been applied in raising pest resistant plants

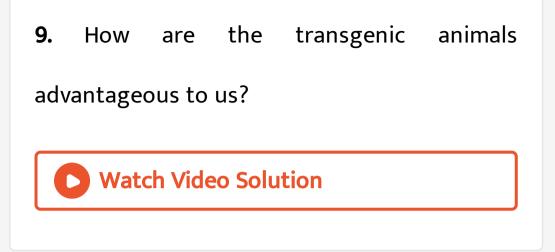
7. With an example, explain how biotechnology has been applied in producing more nutritionally balanced milk.



8. Name some microorganisms used for

production of different antibiotics.





**10.** Name some commercially grown transgenic crops with their traits which have been manipulated in them

11. Write a short note on role of biotechnology

in agriculture.

Watch Video Solution

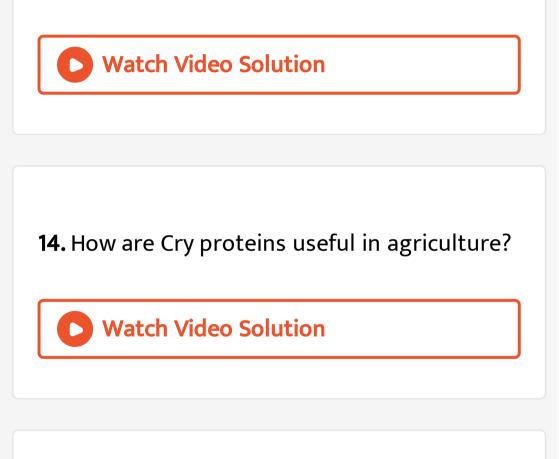
12. What are advantages and probable risks of

genetic engineering?

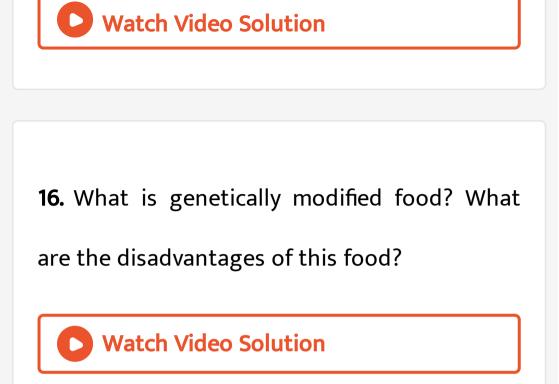


13. Give the scientific name of soil bacterium

which produces crystal (Cry) proteins.

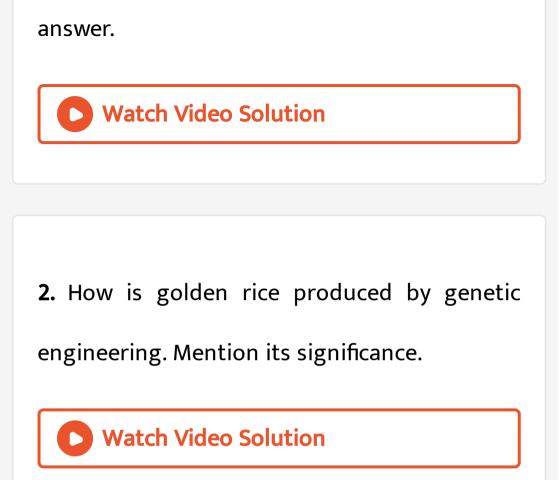


**15.** How do the differently written terms Cry and cry denote?



#### **Practice Questions Long Answer Type Questions**

**1.** Do you think it is ethical to manipulate organisms for human benefits? Justify your



**3.** What are transgenic plants? Describe briefly how hirudin protein is being produced through a transgenic plant.



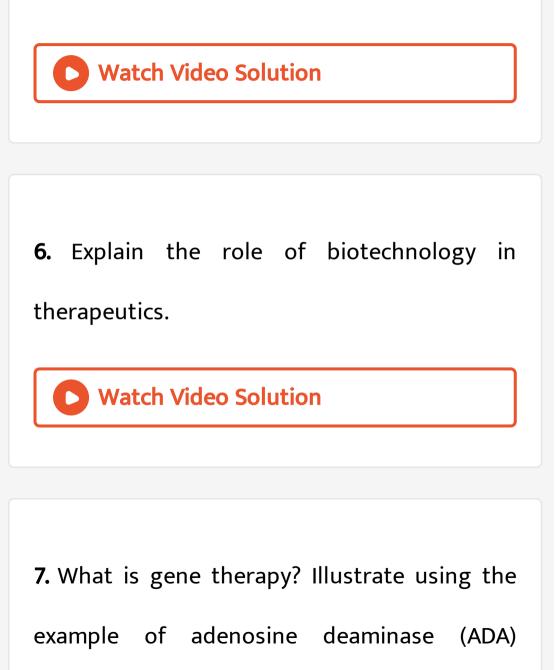
**4.** What is meant by genetically modified crops? How does a genetically modified food primarily differ from the produce of conventionally developed varieties?

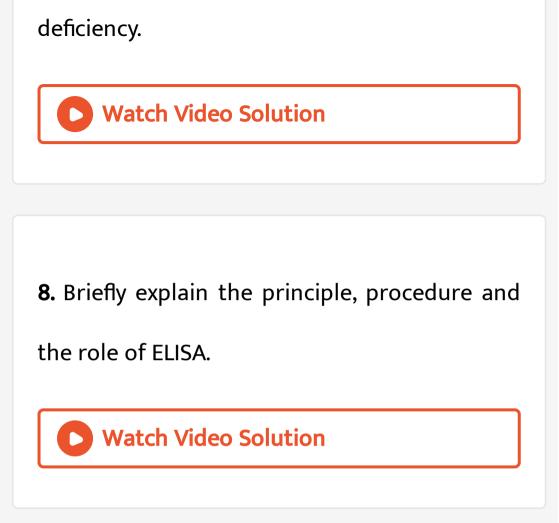
# Watch Video Solution

5. What is a transgenic crop? State the advantages of the technique involved in the

production of transgenic crop over breeding

activities





**9.** What is meant by ADA deficiency? How is gene therapy a solution to this problem? Why is it not a permanent cure?

# Previous Year S Board Paper Questions Short Answer Type Questions

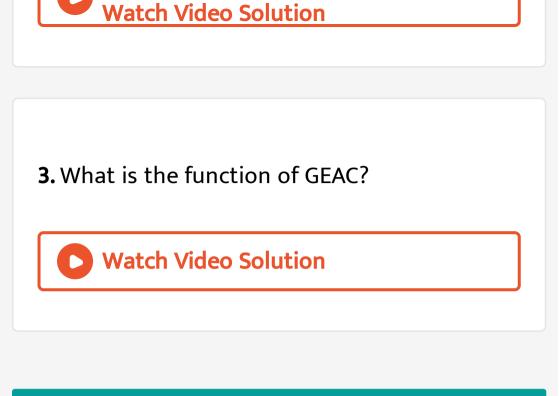
1. Why are biofertilisers preferred over

chemical fertilisers?

Watch Video Solution

**2.** Define biopatent.





Previous Year S Board Paper Questions Short Answer Type Ii Questions

1. What are stem cells? Write two applications

of stem cells in medical treatment.

2. Write a short note on stem cells.

Watch Video Solution

**3.** Explain gene therapy, with reference to

treatment of SCID.



Previous Year S Board Paper Questions Long Answer Type Questions **1.** Give a brief account of genetic engineering.



2. Explain how insulin can be produced using

recombinant DNA technology.

Watch Video Solution

**3.** Give the significance of transgenic animals.



**Review Questions** 

1. Name first transgenic cow.

Watch Video Solution

2. Give a brief answer

What are iPS cells?

**3.** The most common bacterium used in genetic engineering is

A. Escherichia

B. Clostridium

C. Salmonella

D. Bacillus

Answer:

4. Genetic material of virus is

A. RNA only

B. DNA only

C. Either DNA or RNA

D. Both DNA and RNA

Answer:

5. Who discovered recombinant DNA (DNA) technology?

A. Har Gobind Khorana

B. James D. Watson

C. S. Cohen and H. Boyer

D. Sutton and Avery

#### Answer:

6. Which one of the following is not obtained

from genetic engineering?

A. Haemoglobin

B. Flavr savr tomato

C. Golden rice

D. None of these

#### Answer:

7. Mention one significant function of the following:

Restriction endonuclease



8. Mention one significant function of the

following:

Monoclonal antibodies

9. State the best known contribution of:

Kohler and Milstein



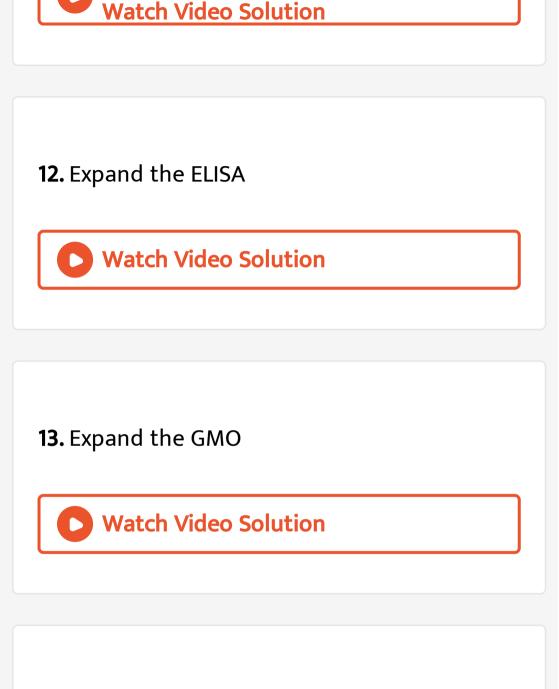
10. State the best known contribution of

P.Maheswari

Watch Video Solution

**11.** Expand the PCR





**14.** Expand the CBD





15. What are the advantages and probable

risks of genetic engineering?

Watch Video Solution

**16.** Write any three uses of gene cloning?

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

Watch Video Solution

Competition Corner Objective Type Questions Multiple Choice Questions

**1.** Bacillus thuringiensis (Bt) strains have been used for designing novel

- A. Biofertilisers
- B. Biometallurgical techniques
- C. Biomineralisation processes
- D. Bioinsecticidal plants

Answer: D

Watch Video Solution

**2.** A tumour inducing plasmid widely used in the production of transgenic plants is that of

- A. Escherichia coli
- B. Bacillus thuringiensis
- C. Staphylococcus aureus
- D. Agrobacterium tumefaciens

Answer: D

Watch Video Solution

3. 'Bt' cotton is resistant to

A. Insects

## **B.** Herbicides

C. Salt

D. Draught

Answer: A

Watch Video Solution

4. 'Bt' toxin is

A. Intracellular lipid

B. Intracellular crystalline protein

C. Extracellular crystalline protein

D. Lipid

## Answer: C



# 5. Transgenic golden rice is enriched with high

A. Lysine

- B. Methionine
- C. Glutenin

D. Vitamin A

Answer: D

Watch Video Solution

6. Reagent used in ELISA test is

A. Endonuclease

B. Polymerase

C. Ligase

D. Peroxidase

#### Answer: D



- **7.** The scientists associated with human genome project
  - A. Watson and Crick
  - B. Beadle and Tatum
  - C. Paul Berg and Wollman
  - D. Francis Collins and Craig Venter





# 8. Anticoagulant hirudin is found in

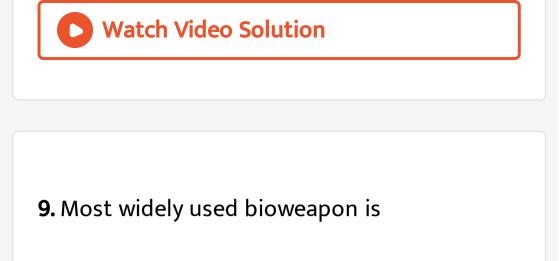
A. Snake

B. Lizard

C. Leech

D. Scorpion

Answer: C



- A. Bacillus subtilis
- B. Pseudomonas putida
- C. Bacillus anthracis
- D. None of the above

Answer: C



## 10. Herbicide resistant gene in plants is

A. Ct

B. Mt

C. Bt

D. Gst

Answer: D

11. Which of the following has been covered

under the broad patent category

A. Triticum

B. Oryza

C. Pisum sativum

D. Brassica

**Answer: B** 

## 12. Bt toxin is obtained from

A. Prokaryotes

B. Eukaryotes

C. Both (a) and (b)

D. None of these

Answer: A

13. Blindness is prevented by use of this crop

in poor countries

A. Golden rice

B. Wheat

C. Gram

D. Pea

Answer: A

14. In September 2001, which of the following

was used as a bioweapon agent in America

A. Botulinum

B. Anthrax (Bacillus anthracis)

C. Polio virus

D. AIDS virus

Answer: B

**15.** A genetically engineered microorganism used successfully in bioremediation of oil spills is a species of

A. Xanthomonas

B. Bacillus

C. Pseudomonas

D. Trichoderma

Answer: C

**16.** Human insulin is being commercially produced from a transgenic species of

A. (a) Rhizobium

B. (b) Saccharomyces

C. (c) Escherichia

D. (d) Mycobacterium

## Answer: C

**17.** Main objective of production/use of herbicide resistant GM crops is to

A. eliminate weeds from the field without

the use of manual labour

B. Eliminate weeds from the field without

the use of herbicides

- C. Encourage eco-friendly herbicides
- D. Reduce herbicide accumulation in food

articles for health safety

Answer: D



**18.** A transgenic food crop, which may help in solving the problem of night blindness in developing countries is

A. (a) Flavr savr tomatoes

B. (b) starlink maize

C. (c) Bt soyabean

D. (d) Golden rice

Answer: D



- **19.** 'Golden rice' is a rice variety rich in
  - A.  $\beta$ -carotene
  - B. Lysine
  - C. Vitamin-C
  - D. Iron

#### Answer: A



**20.** In Bt cotton , a transgenic plant , Bt refers to

A. Botanical

B. Beta

C. Biotechnology

D. Bacillus thuringiensis

Answer: D

**21.** Golden rice is a transgenic crop of the future with which of the following improved trait?

A. High lysine (essential amino acid)

content

B. Insect resistance

C. High protein content

D. High vitamin A content

#### Answer: D





22. Transgenic plants are

A. Produced by a somatic embryo in

artificial medium

B. Generated by introducing foreign DNA in

a cell and regenerating a plant from that

cell

C. Produced after protoplast fusion in artificial medium



hybridisation in the field

Answer: B

Watch Video Solution

**23.** Golden rice was created by transforming rice with two beta-carotene biosynthesis genes, namely,

A. psy and cryl genes

B. LCY-e

## C. CHY-1

D. CHY-2

Answer: A

Watch Video Solution

24. In transgenics, expression of transgene in

target tissue is determined by

A. Enhancer

#### B. Transgene

C. Promoter

D. Reporter

#### Answer: D

Watch Video Solution

## 25. The genetically-modified (GM) brinjal in

India has been developed for

A. Insect-resistant

- B. Enhancing shelf life
- C. Enhancing mineral content
- D. Drought-resistance

Answer: A

Watch Video Solution

# 26. Some of the characteristics of Bt cotton

are

A. Long fibre and resistance to aphids

B. Medium yield, long fibre and resistance

to beetle pests

C. High yield and production of toxic

protein crystals which kill dipteran pests

D. High yield and resistance to bollworms

Answer: D

**27.** An improved variety of transgenic basmati rice

A. Does not require chemical fertilisers and growth hormones

B. Gives high yield and is rich in vitamin A

C. Is completely resistant to all insect pests

and diseases of paddy

D. Gives high yield but has no characteristic

aroma





**28.** cryllAb and crylAb produce toxins that control

A. Cotton bollworms and corn borer respectively

B. Corn borer and cotton bollworms

respectively

C. Tobacco budworms and nematodes respectively D. Nematodes and tobacco budworms respectively Answer: A Watch Video Solution

**29.** Which of the following is a transgenic

plant?

A. Hirudin

B. Flavr savr

C. Triticale

D. All of these

Answer: B

Watch Video Solution

**30.** Plants are more rapidly manipulated by genetic engineering than animals due to

A. Single somatic cell can regenerate a

whole plant body

B. A group of somatic cells can regenerate

a whole plant body

C. May be (a) or (b)

D. None of the above

Answer: A

**31.** First genetically modified plant

commercially released in India is

A. Golden rice

B. Slow ripening tomato

C. Bt brinjal

D. Bt cotton

Answer: D

32. Maximum number of existing transgenic

animals is of

A. Fish

B. Mice

C. Cow

D. Pig

Answer: B

33. The process of RNA interference has been

used in the development of plants resistant to

A. Nematodes

B. Fungi

C. Viruses

D. Insects

Answer: A

34. Which body of the Government of India regulates GM research and safety of introducing GM organisms for public services? A. Bio-safety committee B. Indian Council of Agricultural Research C. Genetic Engineering Approval Committee D. Research Committee on Genetic Manipulation

Answer: C



**35.** In Bt cotton, the Bt toxin present in plant tissue as pro-toxin is converted into active toxin due to

- A. Alkaline pH of the insect gut
- B. Acidic pH of the insect gut
- C. Action of gut microorganisms
- D. Presence of conversion factors in insect





# **36.** The crops engineered for glyphosate are resistant/tolerant to

A. Fungi

B. Bacteria

C. Insects

D. Herbicides

#### Answer: D



**37.** In context of amniocentesis, which of the following statement is incorrect?

A. It can be used for detection of Down syndrome.

B. It can be used for detection of cleft palate.

C. It is usually done when a woman is

between 14 - 16 week pregnant.

D. It is used for prenatal sex determination.

Answer: B

Watch Video Solution

Competition Corner Objective Type Questions Assertion And Reason Type Questions **1.** Assertion: Humulin is more effective than the insulin produced by conventional methods.

Reason: Humulin is absorbed rapidly in the blood than the conventionally produced insulin.

A. If both Assertion and Reason are true and the Reason is the correct explanation of the Assertion. B. If both Assertion and Reason are true

and the Reason is not the correct explanation of the Assertion.

C. If Assertion is true but the Reason is

false.

D. If both Assertion and Reason are false.

Answer: A

**2.** Assertion: Interferons are effective against viruses.

Reason: Proteins which can be synthesised only be genetic engineering are effective against viruses.

**Watch Video Solution** 

**3.** Assertion: 'Bt' toxin gene has been cloned from bacteria and expressed in plants to provide resistance from insect without the

need of insecticides.

Reason: 'Bt' toxin is produced from bacterium

Bacillus thuringiensis.

Watch Video Solution

 Assertion: ELISA is widely used for the detection of infectious diseases like AIDS.
 Reason: ELISA is very sensitive and selective

test and needs very small amount of reagents.

**5.** Assertion: Terrorist are trying to adopt bioweapons these days.

Reason: Bioweapons are liked by terrorist

organisation as these are costly.

Watch Video Solution

**6.** Assertion: Vaccination is also called preventive inoculation.

Reason: A vaccine prevents the formation of

antibodies inside the body.

**7.** Assertion: Interferons are a type of antibodies produced by cells infected by bacteria.

Reason: Interferons stimulate inflammation at

the site of injury.

Watch Video Solution

8. Assertion: In recombinant DNA technology,

human genes are often transferred into

bacteria (prokaryote) or yeast (eukaryote). Reason: Both bacteria and yeast multiply very fast to form huge populations which express the desired gene.



**9.** Assertion: Agrobacterium tumefaciens is popular in genetic engineering because this bacterium is associated with roots of all cereals and pulse crops.

Reason: A gene is incorporated in the bacterial

chromosomal genome gets automatically transferred to the crop with which the bacterium is associated.