

## Biotechnology and its Applications

Question 1.

Which of the following is not a benefit of transgenic animals ?

- (a) Investigation of new treatments for diseases
- (b) Early detection of diseases
- (c) Testing the safety of vaccines
- (d) To produce useful biological products

Answer:

- (b) Early detection of diseases

Question 2.

GEAC stands for

- (a) Genome Engineering Action Committee
- (b) Ground Environment Action Committee
- (c) Genetic Engineering Approval Committee
- (d) Genetic and Environment Approval Committee.

Answer:

- (c) Genetic Engineering Approval Committee

Question 3.

$\alpha$  - 1 - antitrypsin is

- (a) an antacid
- (b) an enzyme
- (c) used to treat arthritis
- (d) used to treat emphysema.

Answer:

- (d) used to treat emphysema.

Question 4.

A probe which is a molecule used to locate specific sequences in a mixture of DNA or RNA molecules could be

- (a) a single stranded RNA
- (b) a single stranded DNA
- (c) either RNA or DNA
- (d) can be ssDNA but not ssRNA.

Answer:

- (a) a single stranded RNA, (b) a single stranded DNA

Question 5.

The site of production of ADA in the body is

- (a) erythrocytes
- (b) lymphocytes
- (c) blood plasma
- (d) osteocytes.

Answer:

- (b) lymphocytes



Question 6.

A protoxin is

- (a) a primitive toxin
- (b) a denatured toxin
- (c) toxin produced by protozoa
- (d) inactive toxin.

Answer:

- (d) inactive toxin.

Question 7.

Pathophysiology is the

- (a) study of physiology of pathogen
- (b) study of normal physiology of host
- (c) study of altered physiology of host
- (d) none of the above

Answer:

- (c) study of altered physiology of host

Question 8.

The trigger for activation of toxin of *Bacillus thuringiensis* is

- (a) acidic pH of stomach
- (b) high temperature
- (c) alkaline pH of gut
- (d) mechanical action in the insect gut.

Answer:

- (c) alkaline pH of gut

Question 9.

Golden rice is

- (a) a variety of rice grown along the yellow river in China
- (b) long stored rice having yellow colour tint
- (c) a transgenic rice having gene for  $\beta$  -carotene
- (d) wild variety of rice with yellow coloured grains.

Answer:

- (c) a transgenic rice having gene for  $\beta$  -carotene

Question 10.

In RNAi, genes are silenced using

- (a) ssDNA
- (b) dsDNA
- (c) dsRNA
- (d) ssRNA.

Answer:

- (c) dsRNA

Question 11.

All are the biotechnological applications in order to increase food production except

- (a) apiculture
- (b) agro-chemical based agriculture
- (c) organic farming

(d) genetically engineered crop-based agriculture.

Answer:

(a) apiculture

Question 12.

Agro-chemical based agriculture includes

- (a) fertilisers and pesticides
- (b) genetically modified crops
- (c) RNA interference
- (d) all of these.

Answer:

(a) fertilisers and pesticides

Question 13.

'Golden rice' developed through transgene approach is enriched with

- (a) high lysine content
- (b) high methionine content
- (c) high glutenin content
- (d) high vitamin A content.

Answer:

(d) high vitamin A content.

Question 14.

Golden rice is yellow in colour due to the presence of

- (a) riboflavins
- (b)  $\beta$  - carotene
- (c) vitamin B<sub>1</sub>
- (d) complex genetic material.

Answer:

(b)  $\beta$  - carotene

Question 15.

First genetically modified plant commercially released in India is

- (a) golden rice
- (b) FlavrSavr
- (c) Bt brinjal
- (d) Bt cotton.

Answer:

(d) Bt cotton.

Question 16.

Which one of the following is not used as biofertiliser ?

- (a) *Bacillus thuringiensis*
- (b) *Anabaena*
- (c) *Nostoc*
- (d) *Rhizobium*

Answer:

(a) *Bacillus thuringiensis*



Question 17.

Which of the following agricultural challenges cannot be solved with transgenic techniques ?

- (a) Crops are damaged by frost or drought
- (b) Crops are damaged by insect pests
- (c) Public concern about safety of synthetic pesticides
- (d) Public preference for organic vegetables

Answer:

- (d) Public preference for organic vegetables

Question 18.

Bt toxins are

- (a) intracellular lipids
- (b) intracellular crystalline proteins
- (c) extracellular crystalline proteins
- (d) intracellular polysaccharides

Answer:

- (b) intracellular crystalline proteins

Question 19.

Bt toxin protein crystals present in bacterium *Bacillus thuringiensis*, do not kill the bacteria themselves because

- (a) bacteria are resistant to the toxin
- (b) toxins occur as inactive protoxins in bacteria
- (c) bacteria enclose toxins in a special sac
- (d) none of these.

Answer:

- (b) toxins occur as inactive protoxins in bacteria

Question 20.

What causes the inactive form of Bt toxin i.e., protoxin to get converted into its active form in the body of an insect ?

- (a) Temperature of the gut
- (b) Enzymes present in the saliva
- (c) Alkaline pH of the gut
- (d) There is no specific reason.

Answer:

- (c) Alkaline pH of the gut

Question 21.

The first clinical gene therapy was done for the treatment of

- (a) AIDS
- (b) cancer
- (c) cystic fibrosis
- (d) SCID (Severe Combined Immuno Deficiency resulting from deficiency of ADA).

Answer:

- (d) SCID (Severe Combined Immuno Deficiency resulting from deficiency of ADA).

Question 22.

Silencing of a gene could be achieved through the use of



- (a) RNAi only
- (b) antisense RNA only
- (c) both RNAi and antisense RNA
- (d) none of the above.

Answer:

- (c) both RNAi and antisense RNA

Question 23.

Rules of conduct that may be used to regulate our activities in relation to the biological world is called

- (a) bioethics
- (b) biowar
- (c) biopatent
- (d) biopiracy.

Answer:

- (a) bioethics

Question 24.

Which variety of rice was patented by a U.S. company even though the highest number of varieties of this rice are found in India ?

- (a) Sharbati Sonora
- (b) Co-667
- (c) Basmati
- (d) LermaRojo

Answer:

- (c) Basmati

Question 25.

Which of the following has been covered under the broad patent category ?

- (a) Triticum
- (b) Oryza
- (c) Pisum sativum
- (d) Brassica

Answer:

- (b) Oryza

Question 26.

Biopiracy means

- (a) use of biopatents
- (b) thefts of plants and animals
- (c) stealing of bioresources
- (d) exploitation of bioresources without authentic permission.

Answer:

- (d) exploitation of bioresources without authentic permission.

Question 27.

Which step has been taken by Government of India to cater to the requirement of patent terms and other emergency provisions in this regard ?

- (a) Biopiracy act
- (b) Indian Patents Bill



- (c) ETIact
  - (d) Negotiable instruments act
- Answer:
- (b) Indian Patents Bill

Question 28.

Potential pathogens for bioweapons are

- (a) Bacillus anthracis
- (b) Yersinia pestis
- (c) Vibrio cholerae
- (d) all of these.

Answer:

- (d) all of these.

Question 29.

Bt cotton is not

- (a) a GM-plant
- (b) insect resistant
- (c) a bacterial gene expressing system
- (d) resistant to all pesticides.

Answer:

- (d) resistant to all pesticides.

Question 30.

C-peptide of human insulin is

- (a) a part of mature insulin molecule
- (b) responsible for formation of disulphide bridges
- (c) removed during maturation of pro-insulin to insulin
- (d) responsible for its biological activity.

Answer:

- (c) removed during maturation of pro-insulin to insulin

Question 31.

Which of the following genes were introduced in cotton to protect it from cotton bollworms ?

- (a) Cry Ac and CryAb
- (b) BtAc and Btab
- (c) CryIAc and CryIIAb
- (d) Nif genes

Answer:

- (c) CryIAc and CryIIAb

Question 32.

Cry 11 Ab and cryIAb 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) cotton bollworms and corn borer respectively



Question 33.

Bt corn has been made resistant from corn borer 24. disease by introduction of the gene

- (a) cryIAb
- (b) cryIIAb
- (c) amp<sup>R</sup>
- (d) Trp.

Answer:

- (a) cryIAb

Question 34.

The process of RNA interference has been used to make tobacco plant resistant to 25.

- (a) *Bacillus thuringiensis*
- (b) *Meloidogyne incognita*
- (c) flies and mosquitoes
- (d) Both (a) and (b).

Answer:

- (b) *Meloidogyne incognita*

Question 35.

roots of tobacco plants ?

- (a) *Agrobacterium tumefaciens*
- (b) *Rhizobium leguminosarum*
- (c) *Meloidogyne incognita*
- (d) *Taenia solium*

Answer:

- (c) *Meloidogyne incognita*

Question 36.

RNA interference involves

- (a) synthesis of cDNA and RNA using reverse transcriptase
- (b) silencing of specific mRNA due to complementary RNA
- (c) interference of RNA in synthesis of DNA
- (d) synthesis of mRNA from DNA.

Answer:

- (b) silencing of specific mRNA due to complementary RNA

Question 37.

The transgenic plant 'Flavr Savr' tomato carries an artificial gene of

- (a) delayed ripening process
- (b) longer shelf life
- (c) enhanced flavour
- (d) all of these

Answer:

- (d) all of these

Question 38.

'Flavr Savr' variety of tomato which remains fresh for a longer period than normal tomato variety

- (a) has high amount of enzyme polygalacturonase
- (b) has reduced amount of enzyme polygalacturonase



- (c) is a pest resistant variety
- (d) is rich in vitamin A and prevents night blindness. `

Answer:

- (b) has reduced amount of enzyme polygalacturonase

Question 39.

Nif gene for nitrogen fixation in cereal crops like wheat, jowar etc., is introduced by cloning

- (a) Rhizobium meliloti
- (b) Bacillus thuringiensis
- (c) Rhizopus stolonifer
- (d) Agrobacterium tumefaciens.

Answer:

- (a) Rhizobium meliloti

Question 40.

How many recombinant therapeutics worldwide have been approved for human use ?

- (a) 13
- (b) 25
- (c) 30
- (d) 40

Answer:

- (c) 30

Question 41.

How many recombinant therapeutics are being marketed in India ?

- (a) 8
- (b) 12
- (c) 15
- (d) 30

Answer:

- (b) 12

Question 42.

During the processing of proinsulin into the mature insulin

- (a) C – peptide is added to proinsulin
- (b) C – peptide is removed from proinsulin
- (c) B – peptide is added to proinsulin
- (d) B – peptide is removed from proinsulin.

Answer:

- (b) C – peptide is removed from proinsulin

Question 43.

Which of the following companies started selling humulin in the year 1983 ?

- (a) EliLilly
- (b) Genetech
- (c) GEAC
- (d) None of these

Answer:

- (a) EliLilly





Question 44.

Human insulin is being commercially produced from a transgenic species of

- (a) Mycobacterium
- (b) Rhizobium
- (c) Saccharomyces
- (d) Escherichia.

Answer:

- (d) Escherichia.

Question 45.

A genetic disorder can be cured through

- (a) rDNA technology
- (b) embryo transfer
- (c) gene therapy
- (d) all of these.

Answer:

- (c) gene therapy

Question 46.

Gene therapy can be referred to as

- (a) pre-clinical testing for inherited diseases in newborns
- (b) treatment of diseases caused by genetic defect
- (c) genetic engineering using rDNA technology
- (d) cancer treatment using in vitro cultured stem cells.

Answer:

- (b) treatment of diseases caused by genetic defect

Question 47.

What might be an advantage of beginning gene therapy prior to birth ?

- (a) This would give the body plenty of time to utilise the new genes.
- (b) The body would not reject it as it has not yet recognised 'self'.
- (c) The cells being extremely young, are more receptive of gene therapy.
- (d) There probably is not any advantage.

Answer:

- (b) The body would not reject it as it has not yet recognised 'self'.

Question 48.

Early detection of a disease is possible by

- (a) PCR
- (b) gene therapy
- (c) recombinant DNA technology and ELISA
- (d) Both (a) and (c).

Answer:

- (d) Both (a) and (c).

Question 49.

It is a single stranded DNA or RNA, tagged with a radioactive molecule and is used to detect mutated genes.

- (a) RNAi
- (b) Probe

- (c) Plasmid
  - (d) Primer Technique used to detect the DNA in a clone is
- Answer:
- (b) Probe

Question 50.

- (a) polymerase chain reaction
- (b) gel electrophoresis
- (c) chromatography
- (d) autoradiography.

Answer:

- (d) autoradiography.

Question 51.

Molecular probes are used for many genetic disorders like

- (a) Duchenne muscular dystrophy
- (b) cystic fibrosis
- (c) Tay-Sachs disease
- (d) All of these.

Answer:

- (d) All of these.

Question 52.

Second generation vaccines are prepared by recombinant DNA technology. Which out of the following are the examples of such vaccines ?

- (a) Hepatitis B virus vaccine
- (b) Herpes virus vaccine
- (c) Salk's polio vaccine
- (d) Both (a) and (b)

Answer:

- (d) Both (a) and (b)

Question 53.

Animals that have had their DNA manipulated to possess and express a foreign gene are called

- (a) transgenic animals
- (b) somatic hybrids
- (c) somaclones
- (d) super animals.

Answer:

- (a) transgenic animals

Question 54.

95% of the existing transgenic animals are

- (a) fish
- (b) pigs
- (c) sheep
- (d) mice.

Answer:

- (d) mice.



Question 55.

The transgenic animals are those which have

- (a) foreign RNA in all its cells
- (b) foreign DNA in some of its cells
- (c) foreign DNA in all its cells
- (d) both (a) and (c).

Answer:

- (c) foreign DNA in all its cells

Question 56.

Giant mouse has been produced through

- (a) gene transfer
- (b) gene differentiation
- (c) tissue culture
- (d) all of these.

Answer:

- (a) gene transfer

Question 57.

What is ANDI ?

- (a) Transgenic cow
- (b) Transgenic dog
- (c) Transgenic sheep
- (d) Transgenic monkey

Answer:

- (d) Transgenic monkey

Question 58.

Given are names of some transgenic animals. Identify the name of transgenic sheep.

- (a) Rosie
- (b) Dogie
- (c) Tracy
- (d) ANDI

Answer:

- (c) Tracy

Question 59.

Which of the following is not a genetically modified organism (GMO) ?

- (a) Golden rice
- (b) Rosie
- (c) Dogie
- (d) Dolly

Answer:

- (d) Dolly

Question 60.

A Human protein which is being obtained from transgenic animals and is used to treat emphysema is

- (a) alpha-lactalbumin
- (b) thyroxine



- (c)  $\alpha$  - 1 - antitrypsin
- (d) insulin.

Answer:

- (c)  $\alpha$ -1-antitrypsin

