

PYQSide

NEET BIOTECHNOLOGY AND ITS APPLICATIONS — BIOTECHNOLOGICAL APPLICATIONS IN AGRICULTURE (BT COTTON, RNA INTERFERENCE, PEST RESISTANT PLANTS) — PYQS

Max. Marks: 152

Questions: 38

Section A (MCQ)

Q.1 Match **List I** with **List II** : [NEET (UG) 2026]

List-I		List-II	
A.	Genetically modified organism	I.	<i>Agrobacterium tumefaciens</i>
B.	Thermostable DNA polymerase	II.	Bt cotton
C.	Ti plasmid	III.	<i>Thermus aquaticus</i>
D.	pBR322	IV.	<i>Escherichia coli</i>

- (1) A-II, B-I, C-IV, D-III (2) A-II, B-III, C-I, D-IV
(3) A-I, B-IV, C-III, D-II (4) A-I, B-II, C-IV, D-III

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Q.2 Arrange the following steps of somatic hybridisation in a correct sequence.
A. Digestion of cell walls.
B. Isolation of naked protoplasts.
C. Fusion of protoplasts to get hybrid protoplast.
D. Isolation of single cells from two different varieties of plants.
E. Growing of hybrid protoplast to form a new plant.

Choose the correct answer from the options given below :

[NEET (UG) 2026]

- (1) D, B, A, E, C (2) E, A, B, C, D
(3) E, B, A, D, C (4) D, A, B, C, E

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Q.3 The toxin proteins isolated from *Bacillus thuringiensis*, coded by which of the following genes would control cotton bollworms and corn borer, respectively? [NEET (UG) 2026]

- (1) cryIac and cryIIAb (2) cryIac and cryIIIAb
(3) cryIac and cryIAb (4) cryIIAb and cryIac

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Q.4 The inactive form of Bt toxin is converted to the active form in the insect gut _____

[RE-NEET (UG) 2026]

- (1) by nucleases (2) due to alkaline pH
(3) due to acidic pH (4) by proteases

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Q.5 Silencing of specific mRNA is possible via RNAi because of [NEET (UG) 2025]

- (1) Complementary tRNA
(2) Non-complementary ssRNA
(3) Complementary dsRNA
(4) Inhibitory ssRNA

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Q.6 Given below are two statements:

Statement-I: Bt toxins are insect group specific and coded by a gene cry Iac.

Statement-II: Bt toxin exists as inactive protoxin in *B. thuringiensis*. However, after ingestion by the insect the inactive protoxin gets converted into active form due to acidic pH of the insect gut.

In the light of the above statements, choose the correct answer from the options given below:

[NEET (UG) 2024]

- (1) Both Statement-I and Statement-II are true
(2) Both Statement-I and Statement-II are false
(3) Statement-I is true but Statement-II is false
(4) Statement-I is false but Statement-II is true

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Q.7 Match **List I** with **List II**

List-I		List-II	
A.	α -1 antitrypsin	I.	Cotton bollworm
B.	Cry IAb	II.	ADA deficiency
C.	Cry Iac	III.	Emphysema
D.	Enzyme replacement therapy	IV.	Corn borer

Choose the correct answer from the options given below:

[NEET (UG) 2024]

- (1) A-II, B-I, C-IV, D-III (2) A-III, B-I, C-II, D-IV
(3) A-III, B-IV, C-I, D-II (4) A-II, B-IV, C-I, D-III

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Q.8 The Bt toxin in genetically engineered Bt cotton kills the pest by: [RE-NEET (UG) 2024]

- (1) Creating pores in the midgut
(2) Damaging the respiratory system
(3) Degenerating the nervous system
(4) Altering the pH of body fluids

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Q.9 Following are the steps involved in action of toxin in Bt. Cotton

- A. The inactive toxin converted into active form due to alkaline pH of gut of insect.
B. *Bacillus thuringiensis* produces crystals with toxic insecticidal proteins.
C. The alkaline pH solubilises the crystals.
D. The activated toxin binds to the surface of midgut cells, creates pores and causes death of the insect.
E. The toxin proteins exist as inactive protoxins in bacteria.

Choose the correct sequence of steps from the options given below: [RE-NEET (UG) 2024]

- (1) E $\rightarrow$ C $\rightarrow$ B $\rightarrow$ A $\rightarrow$ D
(2) B $\rightarrow$ C $\rightarrow$ A $\rightarrow$ E $\rightarrow$ D
(3) A $\rightarrow$ E $\rightarrow$ B $\rightarrow$ D $\rightarrow$ C
(4) B $\rightarrow$ E $\rightarrow$ C $\rightarrow$ A $\rightarrow$ D

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Q.10 Given below are two statements :

Statement-I: RNA interference takes place in all Eukaryotic organisms as method of cellular defense.

Statement-II: RNAi involves the silencing of a specific mRNA due to a complementary single-stranded RNA molecule that binds and prevents translation of mRNA

In the light of the above statements, choose the correct answer from the options given below.

[RE-NEET (UG) 2024]

- (1) Statement-I is true but Statement-II is false.
(2) Statement-I is false but Statement-II is true.
(3) Both Statement-I and Statement-II are true.
(4) Both Statement-I and Statement-II are false.

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Q.11 Transposons can be used during which one of the following? [NEET (UG) 2022]

- (1) Polymerase Chain Reaction
(2) Gene Silencing
(3) Autoradiography
(4) Gene sequencing

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Q.12 Bt cotton variety that was developed by the introduction of toxin gene of *Bacillus thuringiensis* (Bt) is resistant to [NEET (UG) 2020]

- (1) Insect predators (2) Insect pests
(3) Fungal diseases (4) Plant nematodes

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Q.13 Match the following columns and select the correct option. [NEET (UG) 2020]

Column-I		Column-II	
a.	Bt cotton	i.	Gene therapy
b.	Adenosine deaminase deficiency	ii.	Cellular defence
c.	RNAi	iii.	Detection of HIV infection
d.	PCR	iv.	<i>Bacillus thuringiensis</i>

- (1) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)
(2) (a)-(iii), (b)-(ii), (c)-(i), (d)-(iv)
(3) (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)
(4) (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)

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Q.14 What triggers activation of protoxin to active Bt toxin of *Bacillus thuringiensis* in boll worm? [NEET (UG) 2019]

- (1) Acidic pH of stomach
(2) Body temperature
(3) Alkaline pH of gut
(4) Moist surface of midgut

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Q.15 Which of the following is true for Golden rice? [NEET (UG) 2019]

- (1) It is drought tolerant, developed using *Agrobacterium* vector.
(2) It has yellow grains, because of a gene introduced from a primitive variety of rice.
(3) It is Vitamin A enriched, with a gene from daffodil.
(4) It is pest resistant, with a gene from *Bacillus thuringiensis*.

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Q.16 Which part of the tobacco plant is infected by *Meloidogyne incognita*? [NEET 2016 (Phase 1)]

- (1) Flower (2) Stem (3) Leaf (4) Root

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Q.17 Golden rice is a genetically modified crop plant where the incorporated gene is meant for biosynthesis of - [AIPMT 2015]

- (1) Vitamin C (2) Omega 3
(3) Vitamin A (4) Vitamin B

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Q.18 In Bt cotton, the Bt toxin present in plant tissue as pro-toxin is converted into active toxin due to :

[AIPMT 2015 (Cancelled)]

- (1) action of gut micro-organisms
(2) presence of conversion factors in insect gut
(3) alkaline pH of the insect gut
(4) acidic pH of the insect gut

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Q.19 The crops engineered for glyphosate are resistant/tolerant to : [AIPMT 2015 (Cancelled)]

- (1) Bacteria (2) Herbicides
(3) Fungi (4) Insects

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Q.20 Which of the following Bt crops is being grown in India by the farmers? [NEET 2013]

- (1) Soybean (2) Cotton (3) Brinjal (4) Maize

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Q.21 RNA interference involves :-

[NEET 2013 (Karnataka)]

- (1) Interference of RNA in synthesis of DNA
(2) Synthesis of cDNA from RNA using reverse transcriptase
(3) Synthesis of mRNA from DNA
(4) Silencing of specific mRNA due to complementary RNA

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Q.22 Tobacco plants resistant to a nematode have been developed by the introduction of DNA that produced (in the host cells) : [AIPMT 2012 (Mains)]

- (1) An antifeedant
(2) A toxic protein
(3) Both sense and anti-sense RNA
(4) A particular hormone

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Q.23 Consumption of which one of the following foods can prevent the kind of blindness associated with vitamin 'A' deficiency? [AIPMT 2012 (Prelims)]

- (1) Flavr Savr tomato (2) Canola
(3) Bt-brinjal (4) Golden rice

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Q.24 *Bacillus thuringiensis* forms protein crystals which contain insecticidal protein. This protein:

[AIPMT 2011 (Mains)]

- (1) is activated by acid pH of the foregut of the insect pest.
(2) binds with epithelial cells of midgut of the insect pest ultimately killing it
(3) is coded by several genes including the gene cry
(4) does not kill the carrier bacterium which is itself resistant to this toxin

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Q.25 Silencing of mRNA has been used in producing transgenic plants resistant to: [AIPMT 2011 (Mains)]

- (1) White rusts (2) Nematodes
(3) Bacterial blights (4) Bollworms

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Q.26 The process of RNA interference has been used in the development of plants resistant to :

[AIPMT 2011 (Prelims)]

- (1) Nematodes (2) Fungi
(3) Viruses (4) Insects

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Q.27 The genetically-modified (GM) brinjal in India has been developed for: [AIPMT 2010 (Prelims)]

- (1) Enhancing shelf life
(2) Insect-resistance
(3) Drought-resistance
(4) Enhancing mineral content

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Q.28 Some of the characteristics of Bt cotton are –

[AIPMT 2010 (Prelims)]

- (1) High yield and production of toxic protein crystals which kill dipteran pests
- (2) High yield and resistance to bollworms
- (3) Long fibre and resistance to aphids
- (4) Medium yield, long fibre and resistance to beetle pests

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Q.29 An improved variety of transgenic basmati rice [AIPMT 2010 (Prelims)]

- (1) gives high yield but has no characteristic aroma
- (2) does not require chemical fertilizers and growth hormones
- (3) is completely resistant to all insect pests and diseases of paddy
- (4) gives high yield and is rich in vitamin A

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Q.30 What is true about Bt toxin? [AIPMT 2009]

- (1) The activated toxin enters the ovaries of the pest to sterilise it and thus prevent its multiplication.
- (2) Bt protein exists as active toxin in the *Bacillus*
- (3) The concerned *Bacillus* has antitoxins
- (4) The inactive protoxin gets converted into active form in the insect gut

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Q.31 Transgenic plants are the ones - [AIPMT 2009]

- (1) Produced after protoplast fusion in artificial medium
- (2) Produced by a somatic embryo in artificial medium
- (3) Generated by introducing foreign DNA into a cell and regenerating a plant from that cell
- (4) Grown in artificial medium after hybridization in the field

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Q.32 What is antisense technology? [AIPMT 2009]

- (1) RNA polymerase producing DNA
- (2) Production of somaclonal variants in tissue cultures
- (3) When a piece of RNA that is complementary in sequence is used to stop expression of a specific gene
- (4) A cell displaying a foreign antigen used for synthesis of antigens

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Q.33 Cry I endotoxins obtained from *Bacillus thuringiensis* are effective against:

[AIPMT 2008]

- | | |
|----------------|----------------|
| (1) Mosquitoes | (2) Flies |
| (3) Nematodes | (4) Boll worms |

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Q.34 Main objective of production/use of herbicide resistant GM crops is to: [AIPMT 2008]

- (1) eliminate weeds from the field without the use of manual labour
- (2) eliminate weeds from the field without the use of herbicides
- (3) encourage eco-friendly herbicides
- (4) reduce herbicide accumulation in food articles for health safety

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Q.35 A transgenic food crop which may help in solving the problem of night blindness in developing countries is [AIPMT 2008]

- | | |
|-------------------------|-----------------|
| (1) Flavr Savr tomatoes | (2) Bt soybean |
| (3) Starlink maize | (4) Golden rice |

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Q.36 Golden rice is a promising transgenic crop. When released for cultivation, it will help in [AIPMT 2006]

- (1) Herbicide tolerance
- (2) Alleviation of vitamin A deficiency
- (3) Producing a petrol-like fuel from rice
- (4) Pest resistance

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Q.37 *Bacillus thuringiensis* (Bt) strains have been used for designing novel - [AIPMT 2005]

- (1) Bio-metallurgical techniques
- (2) Biofertilizers
- (3) Bioinsecticidal plants
- (4) Bio-mineralization processes

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Q.38 Golden rice is a transgenic crop of the future with the following improved trait - [AIPMT 2005]

- (1) High lysine (essential amino acid) content
- (2) High protein content
- (3) Insect resistance
- (4) High vitamin A content

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ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	2	4	3	2	3	3	3	1	4	1	2
Ques.	12	13	14	15	16	17	18	19	20	21	22
Ans.	2	3	3	3	4	3	3	2	2	4	3
Ques.	23	24	25	26	27	28	29	30	31	32	33
Ans.	4	2	2	1	2	2	4	4	3	3	4
Ques.	34	35	36	37	38						
Ans.	1	4	2	3	4						