

Topic :- Biotechnology & It's Applications

- 1 **(a)**
Bt toxin is coded by a gene named *Cry*. There are a number of them, *e.g.*, the proteins encoded by the genes *CryI Ac* and *CryII Ab* control the cotton bollworms, that of *CryI Ab* controls corn borer.
- 2 **(b)**
In 1983, an American company Eli Lilly synthesized artificial insulin with the help of plasmids of *Escherichia coli*. It was named as humulin. Since then, genetically engineered *E. coli* bacteria are being used to produce human insulin.
- 3 **(d)**
Micropropagation is the practice of rapidly multiplying stock plant material to produce a large number of progeny plants, using modern plant tissue culture methods. It is used to provide a sufficient number of plantlets for planting from a stock plant, which does not produce seeds or does not respond well to vegetative reproduction.
- 4 **(d)**
 S^{35} radioisotope is not suitable for DNA labeling based studies as DNA does not contain sulphur. S^{35} radioisotope is suitable for protein labeling based studies because protein contains sulphur.
- 5 **(d)**
For the first time in 1990, M Blease and WF Andresco of National Institute of Health attempted gene therapy on a 4 year old girl with Adenosine Deaminase (ADA) deficiency. The SCID patient has a defective gene for the enzyme

- Adenosine Deaminase (ADA)
- 6 **(b)**
Haploids have a single genome as found in the gametes of the species. A haploid has only one copy of each chromosome and is highly sterile. **Guha and Maheshwari** (1964), developed a culture technique to produce haploid plants. It is called androgenic haploid culture, in which very young unopened sterilised flowers are opened to remove young anthers. **Anthers** are introduced over **culture medium** for 4-6 weeks, to give rise to large number of **embryoids** (haploids).
- 7 **(b)**
Differentiation of organs and tissues in a developing organism, is associated with differential expression of genes. In regulation of gene expression, the chromosomal proteins play important role. The chromosomal proteins are of two types-histones and non-histones. The regulation of gene expression involves an interaction between histones and non-histones.
- 8 **(c)**
Rice is being used since thousands of years in Asia's agricultural history of which 200,000 varieties are in India alone
- 10 **(c)**
A cybrid is a hybrid carrying cytoplasm of two different plants but genome of only one plant.
- 11 **(a)**
Agrobacterium tumefaciens (updated scientific name: *Rizobium radiobacte*) is the causal agent of crown gall disease (the formation of tumour) in over 140 species of dicot. It is a rod-shaped, Gram negative soil bacterium (Smith, et. al, 1907). Symptoms are caused by the insertion of a small segment of DNA, known as T-DNA (transfer DNA) into the plant cell, which is incorporated at a semi-random location into the plant genome.
- 12 **(c)**
In callus culture, cell division in explant forms a

callus. Callus is irregular unorganized and undifferentiated mass of actively dividing cells. Darkness and solid medium gelled by agar stimulates callus formation. The culture medium contains growth regulators auxin 2, 4-D and often a cytokinin like BAP. Both of these growth regulators stimulate meristematic property in callus.

- 13 **(a)**
Bt toxin is an intracellular crystalline protein. Specific *Bt* toxin genes obtained from *Bacillus thuringiensis* are used in several crop plants like cotton. *Bt* toxins are initially inactive protoxins but after ingestion by the insects their inactive toxin becomes active due to the alkaline pH of the gut which dissolves the crystals
- 15 **(c)**
Endonuclease hydrolyses internal phosphodiester bonds in a polynucleotide chain.
- 16 **(b)**
White revolution – Milk production
Golden revolution – Egg production
Blue revolution – Fish production
- 17 **(a)**
Bacillus thuringiensis toxin is an inactive protoxin, which gets converted into active form in the insect gut. It works as an insecticide.
- 19 **(a)**
Hirudin is an anticoagulant protein found in leech (*Hirudinaria*). It is now produced through genetic engineering from seeds of a plant *Brassica napus*. The hirudin accumulates in seeds and it is purified as medicine.
- 20 **(d)**
GEAC was set up by the ministry of environment and forests to regulate research, testing and commercial release of GM crops, food and organisms

The aim and objectives of GEAC are

- (i) to permit the use of GM organisms and their products for the commercial applications
- (ii) to adopt the procedures for restriction, production a scale, import, export and application of GM organisms
- (iii) approval to conduct a large scale field trails and release of transgenic crops in the environment
- (iv) to authorise agencies or persons to have large scale production and the release of GM organisms into the environment or curb and take **punitive** action against them

ANSWER-KEY										
Q.	1	2	3	4	5	6	7	8	9	10
A.	A	B	D	D	D	B	B	C	C	C
Q.	11	12	13	14	15	16	17	18	19	20
A.	A	C	A	D	C	B	A	B	A	D