

Topic :- Biotechnology & It's Applications

- 1 **(a)**
Vitamin-A.
Bt toxin protein crystals present in bacterium *Bacillus thuringiensis*, do not kill the bacteria themselves because toxins occur as inactive protoxin in bacteria
- 2 **(a)**
Restriction endonuclease recognizes a specific DNA base sequence (recognition sequence, recognition site, restriction sequence or restriction site having palindromic sequence) and cleaves both the strands of DNA at or near that site. The enzyme cuts the DNA, generating restriction fragments with overhanging ends or blunt ends.
- 3 **(c)**
Drosophila melanogaster commonly called as fruitfly and is often used in genetic and development biology researches. The ripe banana is the most suitable medium to culture this fly.
- 4 **(d)**
A single-stranded DNA or RNA joined with a radioactive molecule (probe) is allowed to hybridise to its complementary DNA in a clone of the cells. It is followed by the detection using autoradiography
- 5 **(b)**
Genetic engineering is related with euphenics. **Euphenics** is the study of improvement of human race by altering the protein synthesis (by *mRNA*) process in cell. It is also called **medical engineering**.

- 6 **(b)**
Production of insulin by recombinant DNA techniques was achieved by an American company, Eli Lilly, in 1983. They prepared two DNA sequences corresponding to A and B-chains of the human insulin and introduced them into the plasmids of *E. coli* for production. The A and B chains produced were separated, extracted and combined by creating disulphide bonds to form human insulin
- 7 **(c)**
Rangaswami (1961) of Delhi University was the first to develop nucellar embryos of Citrus microcarpa. The nucellar embryos are used for producing disease free clones.
- 8 **(d)**
Restriction enzymes are degradative enzymes, which recognize and cut up DNA that is foreign to a cell. These enzymes protect bacteria against intruding DNA from other organisms such as virus or other bacterial cells.
- 10 **(c)**
In 1984, Caesar Milstein of England and George Kohler of Switzerland were awarded Nobel Prize for engineering the monoclonal antibodies. Monoclonal antibodies have been used in genetic engineering for identifying the levels of gene product which is not detectable by other methods. These bodies are also used in pregnancy testing, diagnosis of diseases, treatment of disease, preventing rejection of transplants and tissue typing for transplant
- 12 **(b)**
The haploid content of human DNA is 3.3×10^9 bp.
- 13 **(b)**
RNA interference.
Nematodes is a group of organisms, which parasitise a large number of plants and animals including human being. One of the common nematodes *Meloidogyne incognita* infects the

roots of tobacco plants and causes a great loss by causing reduction in yield.

This infestation was prevented by using a novel strategy, which was based on the process of RNA interference (RNAi). RNA is powerful reverse genetic tool to study gene function

15 **(a)**

The two DNA sequences or genes were made to fuse with plasmids of *Escherichia coli* and later allowed to form insulin chains.

16 **(b)**

Meloidegyme incognitia.

Alleviation of vitamin-A deficiency.

Golden rice a variety of *Oryza sativa* is produced through the genetic engineering of biosynthesis beta-carotene, a precursor of provitamin-A in the edible parts of rice. The research that led to golden rice was conducted with the goal of helping children who suffer from vitamin-A deficiency and blindness in poor countries. Golden rice has been bred to be especially disease-resistant, resulting in better crop yield

17 **(d)**

Bio-insecticidal plants.

Meloidegyme incognitia.

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18 **(c)**

The bacterium *Bacillus thuringiensis* is a common soil bacteria, which produces a protein toxin that kills certain insects. The toxin is a crystal (Cry) protein. There are several kinds of cry toxin which are toxic to different groups of insects. The gene encoding Cry protein is called by gene

19 **(c)**

DNA fingerprinting is a modern technique that compares sets of DNA by locating identical sequences of nucleotides. It is often used to solve many mysteries involving murders, robberies and rapes.

20 (d)

Plant cells do not have endogenous plasmids. The plasmid vectors used for plant cell transformation are mostly based on *Agrobacterium tumefaciens*-Ti plasmid. These are plant pathogenic Gram-ve soil bacteria which cause crown gall disease of dicot plants.

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