

Topic :- Biotechnology & It's Applications

- 1 **(a)**
T_i – plasmid of the bacterium *Agrobacterium tumefaciens* is used to carry DNA into plant cells.
- 2 **(d)**
Earlier, insulin was extracted from the pancreas of slaughtered cattle and pigs but some patients began developing allergies. Bacteria can not be made to synthesise insulin from its gene because of the presence of introns. Bacteria do not possess enzymes for removing intron mediated transcription
- 3 **(d)**
Food production can be increased by applying biotechnology in the following ways
 - (i) Agrochemical – based agriculture
 - (ii) Organic agriculture
 - (iii) Genetically engineered crop-based agriculture
- 4 **(d)**
The term green revolution leads to the very substantial yield increase obtained by plants resulted from the development of new crop varieties under intensive programme of fertilizers, water and pesticide management. The high yielding varieties of wheat and rice have been the key element in the green revolution.
- 5 **(b)**
A nematode *Meloidogyne incognitia* infects the roots of tobacco plants, which reduces the production of tobacco. It can be prevented by using RNA interference process. In this process, by using *Agrobacterium* vector, nematode specific genes were introduced into the host plants, which

produced both sense and antisense RNA in the host cells

- 6 **(d)**
DNA fingerprinting (= DNA typing = DNA profiling = genetic fingerprinting) was invented by Sir Alec Jeffreys of UK in 1985. It is a technique to identify a person on the basis of his or her DNA specificity. During this technique, the dark bands on X-ray film present the DNA fingerprint (= DNA profiles). It is very helpful in identifying criminals of rape/murder (using blood/semen/hair) as well as for settling matters related to parentage and paternity.
- 7 **(c)**
Pasteurization is the heating of milk at 62°C for 30 minutes or at 73°C for 15 seconds. It kills all the microorganisms of milk.
- 11 **(b)**
In recombinant DNA technology, a probe is allowed to hybridise to its complementary DNA in the clone of cells. The cells are then detected by autoradiography. The cells with mutated genes will not be observed on the photographic film because the probe was not complementary to the mutated genes
- 12 **(d)**
Adenosine deaminase enzyme is very important for the immune system to function. In the absence of adenosine deaminase enzyme, purine metabolism is disturbed and T-lymphocytes fails to function. ADA deficiency can lead to Severe combined Immune Deficiency (SCID)
SCID is caused due to defect in the genes for the enzyme adenosine deaminase. The genetic diseases that are being investigated for gene therapy ranges from sickle-cell anaemia to Severe Combined Immuno Deficiency (SCID). In some children, ADA deficiency can be cured by bone marrow transplantation
However, in others it can be treated by the enzyme replacement therapy, in which functional ADA is given to the patient by injection. But in

both approaches, the patients are not completely cured. For permanent cure, gene isolated from the bone marrow cells producing ADA at early embryonic stage can be a possible cure

13 **(a)**

The diversity of rice in India is one of the richest in the world. Basmati rice is distinct for its aroma and flavour and 27 documented varieties of Basmati are grown in India. There is reference to Basmati in ancient books as it has been grown for centuries.

In 1997, an American company got patent rights on Basmati rice through the US patent and Trademark office. This allowed the company to sell a new variety of Basmati, in the US and abroad. This new variety of basmati had actually been derived from Indian farmer's varieties. Indian Basmati was crossed with semi dwarf varieties and claimed as an invention or a novelty

14 **(b)**

The technique of DNA fingerprinting was developed for the first time by **Alec Jeffreys** (1985, 86) and his colleagues at Leicester University in UK.

15 **(d)**

Callus culture and suspension culture are two types of plant tissue cultures differentiated on the basis of in vitro growth of the explant, which is higher in case of suspension culture than in callus culture. Usually, the medium contains the auxin 2, 4-D (dichlorophenoxy acetic acid) and BAP.

16 **(b)**

The drug chorionic gonadotropin is obtained through genetic engineering and is useful for treating infertility.

17 **(c)**

India is a country rich in traditions, communal knowledge and expertise in natural medicines, spices, food preparation, biological pesticides and diverse agriculture. That's why, it is under the surge from biopirates.

The patents have been taken out on the plants such as Basmati rice (*Oryza sativa*), black pepper (*piper nigrum*), pomegranate (*Punica granatum*), Indian mustard (*Brassica campestris*), turmeric (*Curcuma/longa*) and neem (*Azadirachta indica*). US, Japanese and German companies are the principal patenting pirates

18 **(a)**
Genes of plants, bacteria, fungi and animals have been changed by manipulations therefore, these organisms are called Genetically Modified Organisms (GMOs). The behavior of a GMOs depends on the nature of genes transferred, nature of host plants, bacterium and animals

19 **(d)**
Some strains of *Bacillus thuringiensis* produces proteins that kills some insects like lepidopteran (tobacco budworm, armyworm), coleopterans (beetles) and dipterans (flies, mosquitoes)

20 **(c)**
The genetic variability present among cultured cells or plants derived from such cells or progeny of such plants is called **somaclonal variation**. Generally, the term somaclonal variation is used for genetic variability present among all kinds of cells/plants obtained from cells cultured in vitro.

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