DPP
DAILY PRACTICE PROBLEMS

Class : XIIth
Date :

Solutions

Subject : BIOLOGY
DPP No. : 3

Topic :- Biotechnology Principles & Processes

1 **(a)**
Escherichia coli and *Agrobacterium tumefaciens* are the microbes found to be very useful in genetic engineering. *E.coli* is a motile, Gram negative, rod-shaped bacterium which is a normal inhabitant of human colon. It is most extensively used in bacterial genetic and molecular biology *Agrobacterium tumefaciens* is a soil bacterium. It has Ti-plasmid (tumour inducing plasmid) and it can be used for the transfer of a desired gene in dicot plants

2 **(c)**
pUC 18 is a plasmid cloning vector commonly used with *E. coli.* The vector length is 2686 bp and is isolated from *E. coli* strain DH5α by standard procedures

3 **(b)**
A – Vector; B-DNA

4 **(b)**
The probes used for DNA fingerprinting are usually prepared from minisatellite or microsatellite DNA

5 **(d)**
In recent times, PCR is being used in the detection of HIV (virus of AIDS) mutation are related to genetic disease. By using PCR phenylketonuria, muscular dystrophy, sickle-cell anaemia, hepatitis, chlamydia and tuberculosis can be diagnosed. PCR is also used in DNA fingerprinting

7 **(c)**
Ti-plasmid is a plasmid present in *Agrobacterium tumefaciens*. It is used in genetic engineering in plants, *e.g.*, as a vector in gene transfer to dicot plants

8 **(a)**

The role of DNA ligase in the construction of a recombinant DNA molecule is formation of phosphodiester bond between two DNA fragments. DNA ligase help in sealing gaps in DNA fragments

Therefore, they act as a molecular glue. In 1969 Har Govind Khorana discovered DNA ligase in T_4-bacteriophage

13 **(b)**

In gene gun or biolistic method tungsten or gold particles, coated with foreign DNA are bombarded into target cells at a very high velocity

Although this method is suitable for plants yet this technique is also used to insert genes into animal that promote tissue repair into cells (particularly cancer of mouth) near wounds

14 **(c)**

The final step in PCR is extension (polymerization), where in *Taq* DNA polymerase synthesizes the DNA region between the primers using deoxynucleotide triphosphates and Mg^{2+}. It means the primers are extended towards each other so that the DNA segment lying between the two primer is copied. The optimum temperature for this polymerization step is 72°C

Taq polymerase is thermostable enzyme, isolated from Thermophilic bacterium, Thermus aquaticus

15 **(a)**

EFB – European Federation of Biotechnology

A definition of biotechnology which covers both traditional views and modern molecular biotechnology has been given by European Federation of Biotechnology. According to EFB "Biotechnology is the integrated use of biochemistry, microbiology and engineering sciences in order to achieve technological application of the capabilities of microorganisms, cultured tissues/cells and part there of"

16 **(a)**

A technique developed by EM Southern in 1975 for detection of a specific DNA sequences (gene or other) in a large, complex sample of DNA (*e.g.*,

cellular DNA). It is also used to determine the molecular weight of a restriction fragment and to measure relative amounts in different sample

Uses Southern blots are used in gene discovery and mapping, evolution and development studies, diagnostics and forensics

In regards to genetically modified organisms, Southern blotting is used as a definitive test to ensure that a particular section of DNA of known genetic sequence has been successfully incorporated into the genome of the host organism

17 **(b)**

Cry I endotoxins obtained from *Bacillus thuringiensis* are effective against bollworm larvae

18 **(a)**

In the naming of restriction enzymes the first letter is derived from genus name and next two letters from the species name of the prokaryotic cell from where the enzymes are extracted

19 **(d)**

A molecule of DNA can be cut into fragments by the enzyme restriction endonucleases. These fragments of DNA can be separated by a technique of gel electrophoresis. It is a technique used for the separation of substances of different ionic properties

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