

**Topic :- Biotechnology & It's Applications**

- 1 **(c)**  
Gel electrophoresis is a technique to separate fragments of DNA. Since, DNA fragments are negatively charged molecules they can be separated by forcing them to move towards the anode under an electric field through a medium/matrix. Now-a-days the most commonly used matrix is agarose which is a natural polymer extracted from seaweeds (e.g., *Gelidium*, *Gracilaria*, *Gigartina*, etc.)
- 2 **(b)**  
Totipotency is the inherent capability of a single cell to provide the genetic programme required to direct the development of an entire individual.
- 3 **(b)**  
Pure culture without any contamination is called axenic culture.
- 4 **(b)**  
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 breed to be especially disease-resistant, resulting in better crop yield
- 5 **(c)**  
**Herbarium** is a collection of preserved plant material. **Genome** refers to total genetic material within a cell of individual. **Gene library** is the collection of DNA fragments. **Gene bank** (= world

collections) are large collections of germplasm (in the viable condition) representing materials from various parts of the world.

- 6 **(b)**  
ELISA is based on the principle of antigen-antibody interactions. It can detect very small amount of proteins (antibody or antigen) with the help of enzymes (*e.g.*, peroxidase or alkaline phosphatase)
- 7 **(c)**  
Basmati is unique for its aroma and flavor, whose 27 varieties are cultivated in India
- 8 **(d)**  
*Agrobacterium tumefaciens* is a widespread naturally occurring soil bacterium that causes crown gall and has the ability to introduce new genetic material into the plant cell
- 10 **(a)**  
Adenosine deaminase.  
SCID is caused due to defect in the genes for the enzyme adenosine deaminase. 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 patient by injection. But in both approaches, the patients are not completely cured. For permanent cure, genes isolated from the bone marrow cells producing ADA at early embryonic stage can be a possible cure
- 11 **(d)**  
Vitamin-A deficiency causes nightblindness among children. Vitamin-A deficiency often occurs where rice is the staple food since, rice grain does not contain  $\beta$  – carotene.
- 12 **(c)**  
DNA fingerprinting is a technique to identify a person on the basis of person's DNA specificity. The technique is based upon the fact that the DNA constitution of an individual carries some specific sequence of nucleotides, which do not carry any

information for protein synthesis.

From the given options, leucocytes are to be used for identifying the criminal because they are nucleated, whereas erythrocytes are enucleated.

- 13 **(c)**  
A single-stranded DNA or RNA joined with a radioactive molecule (probe) is allowed to hybridise to its complementary DNA in a clone of cells. It is followed by the detection using autoradiography
- 14 **(d)**  
Restriction enzyme is used in genetic engineering. Restriction enzyme is an endonuclease, that recognizes a specific DNA base sequence and cleaves both the strands of a DNA at or near that site.
- 15 **(c)**  
The uptake of foreign DNA or transgenes by plant cells is called transformation. A variety of techniques have been used to introduce transgenes into plant cells, these can be grouped into the following two categories – (i) *Agrobacterium - mediated* and (ii) direct gene transfers. *Agrobacterium tumefaciens* mediated transformation eliminates the need for regeneration from tissue explants.
- 16 **(b)**  
Production of value added products like nutrition supplements, pharmaceuticals, fuels, etc., using transgenic crop is called molecular farming
- 17 **(c)**  
A multicellular organism that carries a specific genetic change in each cell because of an intervention at the fertilised egg stage is a transgenic
- 18 **(a)**  
Polyethylene glycol (PEG) is a hydrocarbon solvent that attaches cell membranes and is widely used in the induction of cell fusion between plant protoplast and in the production of animal cell

hybridoma. It is used for are transfer without a vector.

19 **(b)**  
The site of production of adenosine deaminase in the body is lymphocytes

20 **(a)**  
*Bt* cotton is first genetically modified plant commercially released in India.

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

PE