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Std 10 (English)

Science And Technology - II

Date 30-09-20

Time 1HRS

Chapter 8.00

Marks 20

## Q.1 Multiple Choice Questions

2

- 1 Cytology includes
- structure, types and organelles of the cell
  - study of cell division
  - many other aspects of the cell
  - All of the above

Ans Option d.

- 2 Organs that cannot be donated during life time are all except
- Kidney
  - Liver
  - Eyes
  - Heart

Ans Option a.

## Q.2 Find co-related terms

2

- 1 ..... : Dwarfism : Factor VIII : Hemophilia

Ans **Somatostatin** : Dwarfism : Factor VIII : Hemophilia

- 2 White revolution : Dairy :: Blue revolution : .....

Ans White revolution : Dairy :: Blue revolution : **Fishery**.

## Q.3 State True or False

2

- 1 The Pseudomonas bacteria are useful for cleaning the hydrocarbon and oil pollutants from soil and water.

Ans True

- 2 "The disease related with the synthesis of insulin is heart disease."

Ans **False - "The disease related with the synthesis of insulin is diabetes."**

## Q.4 Write Short Notes (Any Two)

4

- 1 Write short note on organ transplantation.

Ans

- Various organs in the human body either become less efficient or completely functionless due to various reasons like aging, accidents, infections, disorders, etc.
- If a person gets the necessary organ under certain conditions, this is known as organ transplantation and thus the life can be saved.
- A living person can donate one kidney (if both his kidneys are functional), skin from certain parts of body, bone marrow whereas organs like liver, heart, eyes can be donated after death only

- 2 Write short note on biosensors.

Ans

> A biosensor is an analytical device, used for the detection of an analyte, that combines a biological component with a physicochemical detector. Applications of biosensors are in following fields

- Glucose monitoring
- Food analysis

- iii. DNA biosensors
- iv. Microbial biosensors
- v. Ozone biosensors
- vi. Metastatic cancer cells biosensors (ref: en.wikipedia.org)

**3** Write short note on Animal Husbandry.

- Ans**
- i. It is the branch of agriculture concerned with animals that are raised for meat, fibre, milk, eggs or other products.
  - ii. It helps to improve both, the quantity and quality of animal products. Two main methods as artificial insemination and embryo transfer are used in animal husbandry.
  - iii. Ex. Milk, meat, wool, etc. Similarly, animals with more strength have been developed for hard work. In India, animal husbandry is practised for milk and meat production and in farming operations.

**4** Write short note on 'Dolly'.



- Ans**
- i. A sheep 'Dolly' was born in Scotland by cloning technique on 5th July 1996.
  - ii. Nucleus from the udder cell of sheep of 'Finn Dorset' variety had been introduced into enucleated ovum of Scottish sheep.
  - iii. Then, the ovum was allowed to develop in the uterus of Scottish sheep and thereby the 'Dolly' had been born.
  - iv. It was showing the characters as per the chromosomes in nucleus and any character of Scottish sheep was not visible.

**Q.5 Distinguish between(Any One)**

**2**

**1** Pisciculture and Aquaculture

Pisciculture		Aquaculture
i.	Pisciculture is the process of growing fish in tanks or enclosures and selling it or using its products for domestic or commercial use.	Aquaculture is a process of growing any aquatic animals and aquatic plants like algae and other organisms, and selling them for commercial purposes.
ii.	Fish can be grown both in salt water or fresh water.	It involves breeding, feeding, harvesting and many other processes. The most popular ones grown under controlled environments are shrimps, crab, fish, lobster and few others. Aquaculture can also be franchised both in fresh water or salt water.

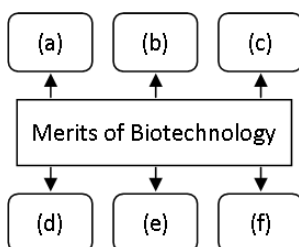
**2** Apiculture and Vermiculture

Ans	Apiculture	Vermiculture
i.	Beekeeping (or apiculture) is the maintenance of honey bee colonies, commonly in man-made hives, by humans.	Vermiculture is the process of using worms to decompose organic food waste, turning the waste into a nutrient-rich material capable of supplying necessary nutrients to help sustain plant growth.
ii.	A beekeeper (or apiarist) keeps bees in order to collect their honey and other products that the hive produces (including beeswax, flower pollen, bee pollen, and royal jelly, to pollinate crops, or to produce bees for sale to other beekeepers.	This provides tremendous source of nutrients for plants that improves the texture and fertility of soil; and freeboard valuable nutrients into the soil. like N,P,K.

**Q.6 Complete the table/ web/ flow chart**

3

1



**Ans Any 6**

- Crop Biotechnology (GM crops, hybrid seeds, biofertilizers)
- Environmental Biotechnology (Pollution control, sewage treatment, etc.)
- Animal husbandry
- Human health (vaccines, gene therapy, cloning, etc.)
- Forensic science (DNA fingerprinting, etc)
- Enhanced food production (Green revolution, White revolution, Blue revolution, etc.)
- Good biotechnology (Yoghurt, wine, bread, beer, cheese, etc.)
- Industrial products / White biotechnology

**Q.7 Answer the following in detail (Any One)**

5

1 Explain Biotechnology : Professional uses.

- Ans i. Crop Biotechnology** : Biotechnology is used in agricultural field to improve yield and variety.
- ii. **Hybrid Seeds** : Genes of two different crops are recombined to form hybrids of various crops. This is especially useful for fruits.
- Genetically Modified Crops** : Crops developed with desired characters by integrating foreign gene with their genome are called as genetically modified crops. High yielding varieties with resistance to diseases, alkalinity, weeds other stresses like cold and drought. Examples BT Cotton, BT Brinjal, Golden Rice, Herbicide tolerant plants
- iii. **Biofertilizers** : Due to use of biofertilizers instead of chemical fertilizers, nitrogen fixation and phosphate solubilization abilities of the plants are improved. Mainly the bacteria like Rhizobium, Azotobacter, Nostoc, Anabaena and plants like Azolla are used as biofertilizers.
- iv. **Tissue culture** : Genetic improvement of the plants has become possible due to tissue culture and besides, those characters inherited to next generation.
- v. **Animal Husbandry**: Two main methods as artificial insemination and embryo transfer are used in animal husbandry. It helps to improve both, the quantity and quality of animal products. Ex. Milk, meat, wool, etc. Similarly, animals with more strength have been developed for hard work.
- vi. animal husbandry. It helps to improve both, the quantity and quality of animal products. Ex. Milk, meat, wool, etc. Similarly, animals with more strength have been developed for hard work.

- vii. **Human Health** : Diagnosis and treatment of the diseases are two important aspects of the human health management. Biotechnology helps to identify the role of gene, if any, in disease of a person.
- viii. **Treatment** : Biotechnology is useful for production of hormones like insulin, somatotropin and blood clotting factors.
- Interferon** : This is a group of small sized protein molecule used in treatment of viral diseases.
- ix. These are produced in blood. Nowadays, with the help of biotechnology, transgenic E. coli are used for production of interferon.
- x. **Gene therapy** : Gene therapy to treat genetic disorders in somatic cells has become possible due to biotechnology. Ex. Phenylketonuria (PKT) arises due to genetic changes in hepatocytes (liver cells). It has become possible to treat it with gene therapy. This method is called as somatic cell gene therapy. All the cells except sperms and ova in the body are called as somatic cells.
- xi. **Cloning** : Production of replica of any cell or organ or entire organism is called cloning.
- Industrial Products / White Biotechnology** : Various industrial chemicals can be produced through less expensive processes. Example: Alcohol production from sugar molasses with the help of transgenic yeast.
- xiii. **Environment and Biotechnology** : It has become possible to solve environment related various problems with the help of biotechnology.
- xiv. **Food Biotechnology** : Food items like bread, cheese, wine, beer, yoghurt, vinegar are produced with the help of microorganisms. These food items are probably the oldest ones produced with the help of biotechnology.
- xv. **DNA fingerprinting** : It is mainly useful in forensic sciences to identify criminal with the help of any part of its body found at the site of crime; identity father of any child can be established. This research is performed in Center for DNA fingerprinting and Diagnostics, Hyderabad.

2 There are variable uses of biotechnology in the health sector.

- Ans** Diagnosis and treatment of the diseases are two important aspects of the human health management. Biotechnology helps to identify the role of gene, if any, in disease of a person.
- Diagnosis of diabetes and heart diseases has become possible even before the onset of symptoms,
- i. with the help of biotechnology. Diagnosis of the diseases like AIDS, dengue can be done within few minutes. Hence, treatment can be done at the earliest.
- Treatment : The hormone insulin is used in treatment of diabetes. Earlier, insulin was being collected from the pancreas of horses. Nowadays, due to biotechnology, insulin can be prepared with the help of bacteria. For this purpose, human insulin gene has been inserted into the genome of bacteria.
- ii. Various vaccines and antibiotics are also produced in the same way.
- Vaccines and Vaccination: Vaccine is the 'antigen' containing material given to acquire either permanent or temporary immunity against a specific pathogen or disease. Traditionally, vaccines were prepared with the help of pathogens. Completely or partially killed pathogens were used as
- iii. vaccines. However, due to this, there were chances of contracting the disease in case of some persons. Hence, as an alternative, scientists tried to artificially produce vaccines with the help of biotechnology. For this purpose, scientists produced the antigen in laboratory with the help of gene isolated from the pathogen and used it as vaccine. Thus, safer vaccines are being produced.
- iv. Treatment: Biotechnology is useful for production of hormones like insulin, somatotropin and blood clotting factors.
- Interferon: This is a group of small sized protein molecule used in treatment of viral diseases. These
- v. are produced in blood. Nowadays, with the help of biotechnology, transgenic E. coli are used for production of interferon.
- vi. Gene therapy: Gene therapy to treat genetic disorders in somatic cells has become possible due to biotechnology. Ex. Phenylketonuria (PKT) arises due to genetic changes in hepatocytes (liver cells).

It has become possible to treat it with gene therapy. This method is called as somatic cell gene therapy. All the cells except sperms and ova in the body are called as somatic cells.

vii. Cloning: Production of replica of any cell or organ or entire organism is called cloning. It is again of two types reproductive cloning and therapeutic cloning.