

QB365 Question Bank Software Study Materials

Zoology - Applications of Biotechnology Important 2 Marks Questions With Answers (Book Back and Creative)

12th Standard

Biology

Total Marks : 40

2 Marks

20 x 2 = 40

- 1) PCR is a useful tool for early diagnosis of an Infectious disease. Elaborate

Answer : (i) PCR is a very sensitive technique which enables the amplification of desired DNA from a limited amount of DNA template.

(ii) A technique can be also used for amplifications of RNA in which case it is referred to as reverse transcription PCR (RT-PCR). In this process the RNA molecules (mRNA) must be converted to complementary DNA by the enzyme reverse transcriptase (reverse transcription).

(iii) The cDNA then serves as the template for PCR.

(iv) The specificity and sensitivity of PCR is useful for the diagnosis of inherited disorders (genetic, viral; bacterial, diseases).

(v) Hence, it can detect the presence of an infectious organism in the infected patient at an early stage of infection (even before the infectious organism has multiplied into large number).

- 2) How has recombinant DNA technology helped in treating haemophilia?

Answer : (i) Clotting factor VIII isolated from blood of normal human being was used in the treatment of Haemophilia A.

(ii) Requirement of large quantities of blood for this purpose and the risk of transmission of infectious diseases like AIDS is a disadvantage.

(iii) Recombinant DNA technology was used to produce Recombinant Factor VIII in the Chinese Hamster ovary and in the baby Hamster kidney cells.

(iv) Recently a cell line of human origin has been used to produce Human blood, clotting factor VIII for the first time

- 3) What are Interferons?

Answer : Interferons are proteinaceous, antiviral, species specific substances produced by mammalian cells when infected with viruses.

- 4) Define molecular cloning.

Answer : Cloning in biotechnology refers to the process of creating copies of organisms or copies of cells or DNA fragments (molecular cloning).

- 5) What is bioethics?

Answer : **bioethics** is the study of the ethical issues emerging from the advances in biology and medicine. It is also a moral discernment as it relates to the medical policy and practice

- 6) What is Trademark?

Answer : Any specific symbol or words to identify a particular product or process of a company constitute trademark. This enables the public to distinguish between a trader's goods from similar goods of other traders.

- 7) Mention the manifestation of the disease - Haemophilia-A

Answer : Haemophilia A is a X-linked disease which is characterised by prolonged clotting time and internal bleeding

- 8) Define Interferons.

Answer : Interferons are proteinaceous, antiviral, species specific substances produced by mammalian cells when infected with viruses. They stimulate the cellular DNA to produce antiviral enzymes which inhibit viral replication and protect the cells

- 9) Point out four types of recombinant vaccines

- Answer :** (a) Subunit recombinant vaccines
(b) Attenuated recombinant vaccines
(c) Edible vaccines
(d) DNA vaccines

10) Name the two strategies involved in gene therapy

- Answer :** (a) Gene augmentation therapy.
(b) Gene inhibition therapy

11) Comment on SCID

Answer : ADA deficiency or SCID (Severe Combined Immuno Deficiency) is an autosomal recessive metabolic disorder. It is caused by the deletion or dysfunction of the gene coding for ADA enzyme. In these patients the nonfunctioning T-Lymphocytes cannot elicit immune responses against invading pathogens

12) Define the terms (a) Totipotency (b) Unipotency

Answer : **Totipotency** is the ability of a single cell to divide and produce all of the differentiated cells in an organism.
Unipotency refers to the ability of the stem cells to differentiate into only one cell type

13) What are the best sources of stem cells in mammals?

Answer : Placenta, Umbilical cord, amniotic sac, amniotic fluid

14) For which disease does the first clinical gene therapy was done? Who accomplished it?

Answer : The first clinical gene therapy was done for SCID. Severe Combined Immuno Deficiency disease is caused by ADA deficiency. It was done by French Anderson in 1990.

15) What are transgenic bacteria? Illustrate using any one example.

- Answer :** (i) Transgenic bacteria are the bacteria whose DNA has been manipulated to possess and express a foreign gene.
(ii) The E. coli bacterium in which the gene for human insulin is introduced is an example of a transgenic Bacterium.
(iii) Eli Lilly, an American company, synthesised two DNA sequence coding for the A and B polypeptide chains of human insulins.
(iv) These DNA sequences were introduced into the plasmids of E. Coli.
(v) Such an E.Coli cell is a transgenic bacterium, which contains genes for human insulin.
(vi) The bacterium produces insulin chains in the culture medicine.

16) How is recombinant DNA technology helping in detecting the presence of mutant genes in cancer patient?

- Answer :** (i) A single-stranded DNA or RNA is tagged with a radio action molecule and used as a probe.
(ii) It is allowed to hybridise with its complementary DNA in a clone of cells, followed by detection using autoradiography.
(iii) The clone having the mutant gene will not appear on the photographic film, because the probe will not be complement are with the mutated gene.

17) (a) Name the first transgenic cow developed.
(b) Explain the improvements in the quality of the product produced by it.

- Answer :** (a) Rosie is the first transgenic cow.
(b) The milk contained human protein, α -Lactalbumin (2.45 g per litre) which is nutritionally important for human base.

18) Extinction of a keystone species led to loss of biodiversity. Justify.

- Answer :** (i) Keystone species is a species whose loss from an ecosystem would cause a greater than average change in other species population or ecosystem process.
(ii) Eg. When a fish species which is a host for a number of parasites becomes extinct the parasite species which dependent on the host fish also become extinct.

19) What is Transgenesis?

Answer : Alpha lactalbumin is a protein composed of 123 amino acids. It is the most abundant protein in human milke

20) What are the Uses of Transgenesis (any 2)

Answer : Transgenesis is the process of introduction of foreign DNA (exogenous DNA) into the genome of the other organism to create and maintain stable heritable characters