SmartKalike

CBSE Class 12 · Biology

Biotechnology and its Applications

10 most probable questions for Boards 2027

Q1. 0.5 marks · Very short answer

State one benefit of genetically modified crops.

Answer

Genetically modified crops can reduce reliance on chemical pesticides by providing resistance to insect pests in fields.

Q2. 1 mark · Multiple choice

Which of the following best describes a genetically modified organism (GMO)?
(A) An organism whose genes have been altered by manipulation
(B) A plant grown only in sterile nutrient medium
(C) A plant produced by crossing two varieties without gene manipulation
(D) An organism whose genes have not been altered

Answer

(A) An organism whose genes have been altered by manipulation — this is the definition of a Genetically Modified Organism (GMO).

Q3. 2 marks · Short answer

What is totipotency? State the conditions under which a plant cell or explant can be grown to regenerate a whole plant.

Answer

Totipotency is the capacity to generate a whole plant from any cell or explant. An explant is grown in a test tube under sterile conditions in special nutrient media; scientists learnt this during the 1950s.

Q4. 3 marks · Medium answer

State the substances that a plant tissue-culture medium must provide. What is micro-propagation, and what is the genetic relationship of the plants it produces to the original plant?

Answer

1. The nutrient medium must provide a carbon source such as sucrose, inorganic salts, vitamins, amino acids and growth regulators like auxins and cytokinins.
2. Micro-propagation is the production of thousands of plants through tissue culture in very short durations.
3. Each plant produced is genetically identical to the original plant from which it was grown and is called a somaclone.

Q5. 5 marks · Long answer

Explain how meristem culture can produce virus-free plants. Then describe somatic hybridisation and state the outcome and commercial limitation of fusing tomato and potato protoplasts.

Answer

Plant tissue culture can produce healthy plants from diseased plants and can combine desirable characters through somatic hybridisation.
1. The apical and axillary meristems are free of virus, even when the plant is infected. The meristem can be removed and grown in vitro to obtain virus-free plants.
2. Plant cell walls can be digested to isolate naked protoplasts, which are surrounded by plasma membranes. Protoplasts from two different plant varieties, each having a desirable character, can be fused.
3. The fused protoplasts form hybrid protoplasts, which can be grown into a new plant. These hybrids are called somatic hybrids, and the process is called somatic hybridisation.
4. Fusion of tomato and potato protoplasts produced pomato, combining tomato and potato characteristics. However, pomato did not have all the desired combination of characteristics for commercial utilisation.
Meristem culture and somatic hybridisation are useful applications of plant tissue culture.

Q6. 1 mark · Multiple choice

Before human insulin was produced using recombinant DNA technology, insulin for diabetes was extracted from the pancreas of:
(A) Cattle and pigs
(B) Sheep and goats
(C) Horses and dogs
(D) Rabbits and mice

Full answer on SmartKalike: https://smartkalike.com/cbse/class-12/biology/biotechnology-and-its-applications

Q7. 2 marks · Short answer

Why could insulin obtained from animals cause allergic or other reactions in some patients?

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Q8. 3 marks · Medium answer

Describe the two polypeptide chains in insulin and how proinsulin is processed to form mature insulin.

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Q9. 5 marks · Long answer

Describe how Eli Lilly produced human insulin using recombinant DNA technology, including the separate production of the A and B chains and their assembly into insulin.

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Q10. 1 mark · Very short answer

Name the type of bonds linking the A and B chains of insulin.

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