

Biotechnology and Its Applications — Assignment 1

Class 12 Biology · Topic-wise question bank covering every concept of the chapter · Narayan Gurukul Academy

Instructions: (1) Attempt all questions. This worksheet walks through every concept of the chapter, topic by topic.
(2) The interactive MCQ version of these questions (with instant answer reveal) is available on the notes page.
(3) Universal values: $g = 10 \text{ m/s}^2$ unless stated. Give answers with correct SI units.

Scope of Biotechnology Applications

MCQ Questions (choose the correct option)

- Biotechnology applications include
 - agriculture and medicine
 - only agriculture
 - only medicine
 - only industry
- GM crops are developed to
 - improve yield and resistance
 - reduce yield
 - increase pests
 - reduce nutrients
- Golden rice is enriched with
 - beta-carotene
 - iron
 - protein
 - calcium
- Biotechnology in agriculture produces
 - GM crops
 - machines
 - fertilisers only
 - metals

1 Mark Questions

- What is the scope of biotechnology in agriculture?
- What is golden rice?

2 Mark Questions

- What is a genetically modified crop?
- Give one example of a GM crop.

3 Mark Questions

- Describe the scope of biotechnology applications.
- Explain the benefits of GM crops.

Agricultural Applications — Bt Crops

MCQ Questions (choose the correct option)

1. Bt cotton is made using
 - (A) *Bacillus thuringiensis*
 - (B) *E. coli*
 - (C) *Agrobacterium*
 - (D) *Rhizobium*
2. Bt toxin is a
 - (A) protoxin
 - (B) antibiotic
 - (C) hormone
 - (D) enzyme
3. Bt toxin becomes active in the
 - (A) alkaline gut
 - (B) acidic stomach
 - (C) blood
 - (D) soil
4. Bt toxin kills insects by forming
 - (A) pores
 - (B) crystals
 - (C) spores
 - (D) capsules

1 Mark Questions

1. Name the bacterium used to make Bt cotton.
2. What is Bt toxin?
3. Where does Bt toxin become active?

2 Mark Questions

1. How does Bt toxin kill insects?
2. Why is the Bt gene harmless to humans?

3 Mark Questions

1. Describe the production of Bt cotton and its action.
2. Explain how Bt toxin controls pests.

GM Crops and RNAi-Mediated Pest Resistance

MCQ Questions (choose the correct option)

1. RNA interference blocks
 - (A) translation of a target mRNA
 - (B) DNA replication
 - (C) transcription only
 - (D) protein folding
2. The nematode that infects tobacco plants is
 - (A) *Meloidogyne incognita*

- (B) Ascaris
 - (C) Wuchereria
 - (D) Plasmodium
3. RNAi was used to develop resistance against
- (A) nematodes
 - (B) bacteria
 - (C) fungi
 - (D) viruses
4. RNAi is a method of
- (A) gene silencing
 - (B) gene duplication
 - (C) gene mutation
 - (D) gene insertion

1 Mark Questions

1. What is RNA interference?
2. Name the nematode that infects tobacco plants.

2 Mark Questions

1. How does RNAi confer pest resistance?
2. Give one example of a GM crop.

3 Mark Questions

1. Describe RNAi-mediated pest resistance.
2. Explain the development of nematode-resistant tobacco.

Medical Applications — Recombinant Human Insulin

MCQ Questions (choose the correct option)

1. Human insulin is produced in
 - (A) E. coli
 - (B) yeast only
 - (C) plant cells
 - (D) animal cells only
2. Insulin is a
 - (A) hormone
 - (B) enzyme
 - (C) antibody
 - (D) vitamin
3. The human insulin gene is inserted into
 - (A) E. coli
 - (B) humans
 - (C) plants
 - (D) fungi
4. Recombinant insulin is used to treat

- (A) diabetes
- (B) malaria
- (C) typhoid
- (D) cancer only

1 Mark Questions

1. Which microbe produces recombinant human insulin?
2. What is insulin?
3. Which disease is treated with insulin?

2 Mark Questions

1. How is human insulin produced by genetic engineering?
2. Why is recombinant insulin better than animal insulin?

3 Mark Questions

1. Describe the production of human insulin by genetic engineering.
2. Explain the use of biotechnology in medicine.

Gene Therapy

MCQ Questions (choose the correct option)

1. Gene therapy corrects a defect by introducing
 - (A) a normal gene
 - (B) a virus only
 - (C) an antibiotic
 - (D) a protein
2. ADA deficiency is caused by the absence of
 - (A) adenosine deaminase
 - (B) insulin
 - (C) haemoglobin
 - (D) collagen
3. Gene therapy targets
 - (A) genetic disorders
 - (B) infections
 - (C) injuries
 - (D) deficiency diseases only
4. In gene therapy, the normal gene is delivered by
 - (A) a vector
 - (B) a drug
 - (C) a vitamin
 - (D) a hormone

1 Mark Questions

1. What is gene therapy?
2. Name a disease treated by gene therapy.

3. What is ADA deficiency?

2 Mark Questions

1. How is gene therapy used to treat ADA deficiency?
2. What is the role of a vector in gene therapy?

3 Mark Questions

1. Explain gene therapy with an example.
2. Describe the treatment of ADA deficiency.

Molecular Diagnostics and Transgenic Animals

MCQ Questions (choose the correct option)

1. PCR is used for
 - (A) DNA amplification
 - (B) protein synthesis
 - (C) staining
 - (D) centrifugation
2. ELISA detects
 - (A) antigens or antibodies
 - (B) DNA only
 - (C) RNA only
 - (D) lipids
3. Transgenic animals have
 - (A) a foreign gene
 - (B) no genes
 - (C) only plant genes
 - (D) only bacterial genes
4. Molecular diagnosis detects disease at the
 - (A) DNA/RNA or protein level
 - (B) organ level
 - (C) tissue level only
 - (D) cell level only

1 Mark Questions

1. What is PCR?
2. What is ELISA?
3. What are transgenic animals?

2 Mark Questions

1. How is PCR used in diagnosis?
2. Give one example of a transgenic animal.

3 Mark Questions

1. Describe the techniques of molecular diagnosis.
2. Explain the use of transgenic animals.

Ethical Issues and Bioethics

MCQ Questions (choose the correct option)

1. Biopiracy is the unauthorised use of
 - (A) biological resources
 - (B) machines
 - (C) metals
 - (D) fossil fuels
2. Ethical issues of genetic engineering include
 - (A) patenting of life forms
 - (B) crop yield
 - (C) soil health
 - (D) water use
3. Bioethics deals with
 - (A) ethical use of biotechnology
 - (B) chemical reactions
 - (C) machine design
 - (D) mining
4. Genetic engineering of humans raises
 - (A) ethical concerns
 - (B) no concerns
 - (C) only economic benefits
 - (D) only medical benefits

1 Mark Questions

1. What is biopiracy?
2. What is bioethics?
3. Why are GM organisms regulated?

2 Mark Questions

1. What are the ethical issues raised by genetic engineering?
2. Give one example of biopiracy.

3 Mark Questions

1. Discuss the ethical issues raised by genetic engineering.
2. Explain biopiracy with an example.