SmartKalike

CBSE Class 12 · Biology

Biotechnology : Principles and Processes

10 most probable questions for Boards 2027

Q1. 0.5 marks · Very short answer

Name the bacterium from which the thermostable DNA polymerase used in PCR is obtained.

Answer

The thermostable DNA polymerase used in PCR is obtained from the bacterium Thermus aquaticus and remains active during high-temperature denaturation.

Q2. 1 mark · Multiple choice

Which statement best describes genetic engineering?
(A) It alters DNA or RNA and introduces it into a host organism to change its phenotype.
(B) It maintains sterile conditions during industrial manufacture.
(C) It removes all variation from a population through natural selection.
(D) It prevents DNA replication in host cells.

Answer

(A) It alters DNA or RNA and introduces it into a host organism to change its phenotype — genetic engineering changes the host organism's phenotype by introducing altered genetic material.

Q3. 1.5 marks · Short answer

What is bioprocess engineering? State what conditions it maintains and why.

Answer

Bioprocess engineering maintains a sterile (microbial contamination-free) ambience in chemical engineering processes, enabling only the desired microbe/eukaryotic cell to grow in large quantities for the manufacture of biotechnological products such as antibiotics, vaccines and enzymes.

Q4. 2 marks · Short answer

In the original restriction system, what does the restriction endonuclease do, and what does the other enzyme do to DNA?

Answer

In 1963, two enzymes responsible for restricting bacteriophage growth in Escherichia coli were isolated. The restriction endonuclease cut DNA, whereas the other enzyme added methyl groups to DNA.

Q5. 3 marks · Medium answer

Explain how genetic engineering can introduce selected genes without the undesirable genes that may accompany traditional hybridisation. Contrast the roles of asexual and sexual reproduction in preserving genetic information and producing variation.

Answer

1. Gene transfer — Traditional hybridisation often includes and multiplies undesirable genes with desired genes; genetic engineering creates recombinant DNA and uses gene cloning and gene transfer to introduce only desirable genes, without undesirable genes.
2. Genetic outcome — Asexual reproduction preserves genetic information; sexual reproduction permits variation and unique combinations of genetic setup, some beneficial to the organism and population.

Q6. 5 marks · Long answer

Explain how a restriction endonuclease recognises and cuts a palindromic DNA sequence. Using GAATTC/CTTAAG as an example, describe how cutting away from the centre of the palindrome can produce single-stranded sticky ends.

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

Q7. 8 marks · Very long answer

Describe continuous culture and explain how a stirred-tank bioreactor is designed to support large-scale cell growth. Include the vessel shape, the role of the stirrer and the alternative method of supplying air.

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

Q8. 1 mark · Multiple choice

Hind II recognises a specific sequence of how many base pairs?
(A) Four
(B) Five
(C) Six
(D) Eight

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Q9. 2 marks · Short answer

How do plasmids and bacteriophages replicate in bacterial cells, and how can foreign DNA linked to either be multiplied in a host?

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Q10. 3 marks · Medium answer

Explain the convention used to name restriction enzymes, including the meaning of the Roman numeral. Distinguish exonucleases from endonucleases.

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