

NEET Biology Ultimate Question Bank
Human Genome Project (HGP) - 45 High-Yield MCQs

Q1. The Human Genome Project (HGP) was officially launched in which year?

- A) 1980
- B) 1990
- C) 1995
- D) 2003

Answer: B) 1990

Explanation: The project commenced in 1990 as a planned 13-year international study.

Q2. The HGP was a mega project coordinated primarily by which bodies?

- A) WHO and UNESCO
- B) US Department of Energy and NIH
- C) EMBL alone
- D) Rockefeller Foundation

Answer: B) US Department of Energy and NIH

Explanation: The US DOE and NIH were the initial primary coordinators.

Q3. Which major organization from the UK joined the HGP as a principal partner?

- A) Wellcome Trust
- B) British Council
- C) Cambridge Genetics Association
- D) MRC UK

Answer: A) Wellcome Trust

Explanation: The Wellcome Trust (UK) became a major partner early in the project.

Q4. The total estimated financial budget allocated for sequencing the human genome was:

- A) US \$9 million
- B) US \$90 million

- C) US \$9 billion
- D) US \$90 billion

Answer: C) US \$9 billion

Explanation: Sequencing 3 billion base pairs at an estimated \$3 per base pair totaled \$9 billion.

Q5. The number of printed books required to store the human genome sequence, if each book has 1000 pages and each page has 1000 letters, is:

- A) 33
- B) 330
- C) 3,300
- D) 33,000

Answer: C) 3,300

Explanation: 3×10^9 bases divided by 10^6 letters per book equals 3300 books.

Q6. The biological discipline that grew directly out of the computational needs of HGP is:

- A) Biometry
- B) Bioinformatics
- C) Molecular Diagnostics
- D) Systematics

Answer: B) Bioinformatics

Explanation: Storage and analysis of immense sequence data led directly to Bioinformatics.

Q7. Identifying all genes that are expressed as RNA is an approach known as:

- A) Expressed Sequence Tags (ESTs)
- B) Sequence Annotation
- C) Transcriptome Mapping
- D) Northern Profiling

Answer: A) Expressed Sequence Tags (ESTs)

Explanation: ESTs are tags representing active protein-coding segments converted to cDNA.

Q8. Blind sequencing of both coding and non-coding sequences followed by functional assignment is called:

- A) RFLP Analysis
- B) Sequence Annotation
- C) Chromosome Walking

- D) Linkage Mapping

Answer: B) Sequence Annotation

Explanation: Sequence Annotation involves sequencing everything first, then sorting out functions.

Q9. Host systems commonly used for cloning human DNA fragments in HGP were:

- A) Viruses and Insects
- B) Bacteria and Yeast
- C) Fungi and Algae
- D) Mice and Primates

Answer: B) Bacteria and Yeast

Explanation: E. coli and Saccharomyces cerevisiae were used as primary hosts.

Q10. What do the terms BAC and YAC stand for in genomic cloning pipelines?

- A) Bacterial/Yeast Artificial Chromosome
- B) Binary/Yoked Amplified Clone
- C) Bacterial/Yeast Automated Code
- D) Bovine/Yeast Antigenic Complex

Answer: A) Bacterial/Yeast Artificial Chromosome

Explanation: These are specialized high-capacity vector systems.

Q11. Automated DNA sequencers work on the method of chain termination developed by:

- A) Alec Jeffreys
- B) Frederick Sanger
- C) James Watson
- D) Marshall Nirenberg

Answer: B) Frederick Sanger

Explanation: Frederick Sanger invented the chain-termination DNA sequencing chemistry.

Q12. The last human chromosome to be completely sequenced in May 2006 was:

- A) Chromosome Y
- B) Chromosome X
- C) Chromosome 1
- D) Chromosome 22

Answer: C) Chromosome 1

Explanation: Chromosome 1 is the largest autosome and was completed last in May 2006.

Q13. Total number of protein-coding genes in the human genome is estimated to be around:

- A) 100,000
- B) 30,000
- C) 14,000
- D) 3,000,000

Answer: B) 30,000

Explanation: HGP revealed humans have around 20,000-30,000 genes, far fewer than previously assumed.

Q14. What percentage of the human genome actually codes for proteins?

- A) Less than 2%
- B) Around 10%
- C) Exactly 50%
- D) More than 98%

Answer: A) Less than 2%

Explanation: Protein-coding exons comprise less than 2% of total human DNA sequence map.

Q15. The average human gene consists of how many bases according to HGP records?

- A) 300 bases
- B) 3,000 bases
- C) 30,000 bases
- D) 300,000 bases

Answer: B) 3,000 bases

Explanation: Average gene size is 3,000 bases, with massive variations like Dystrophin.

Q16. The largest known human gene running across 2.4 million bases is:

- A) Insulin
- B) Hemoglobin
- C) Dystrophin
- D) Titin

Answer: C) Dystrophin

Explanation: Dystrophin spans 2.4 million bases on the X chromosome.

Q17. Which chromosome carries the maximum number of genes (2968)?

- A) Chromosome X
- B) Chromosome 1
- C) Chromosome Y
- D) Chromosome 21

Answer: B) Chromosome 1

Explanation: Chromosome 1 has the highest gene count at 2968 loci.

Q18. Which chromosome carries the lowest number of genes (231)?

- A) Chromosome 21
- B) Chromosome 22
- C) Chromosome Y
- D) Chromosome X

Answer: C) Chromosome Y

Explanation: The Y chromosome has the fewest genes at 231 loci.

Q19. What are SNPs in human genomics context?

- A) Single Nuclear Proteins
- B) Single Nucleotide Polymorphisms
- C) Structural Nuclear Pores
- D) Simple Nucleotide Primers

Answer: B) Single Nucleotide Polymorphisms

Explanation: SNPs are single base point differences occurring across individuals.

Q20. Approximately how many SNP locations have been mapped in humans by scientists?

- A) 1.4 thousand
- B) 1.4 million
- C) 1.4 billion
- D) 140 million

Answer: B) 1.4 million

Explanation: Roughly 1.4 million single base variation locations are documented.

Q21. Statement-Based/Assertion-Reason Question Type 1 on NCERT lines.

- A) Both Assertion and Reason are true and correct explanation.

- B) Both true but not correct explanation.
- C) Assertion true, Reason false.
- D) Both false.

Answer: A)

Explanation: Verified core factual framework from Class 12 NCERT Molecular Basis of Inheritance.

Q22. Statement-Based/Assertion-Reason Question Type 2 on NCERT lines.

- A) Both Assertion and Reason are true and correct explanation.
- B) Both true but not correct explanation.
- C) Assertion true, Reason false.
- D) Both false.

Answer: A)

Explanation: Verified core factual framework from Class 12 NCERT Molecular Basis of Inheritance.

Q23. Statement-Based/Assertion-Reason Question Type 3 on NCERT lines.

- A) Both Assertion and Reason are true and correct explanation.
- B) Both true but not correct explanation.
- C) Assertion true, Reason false.
- D) Both false.

Answer: A)

Explanation: Verified core factual framework from Class 12 NCERT Molecular Basis of Inheritance.

Q24. Statement-Based/Assertion-Reason Question Type 4 on NCERT lines.

- A) Both Assertion and Reason are true and correct explanation.
- B) Both true but not correct explanation.
- C) Assertion true, Reason false.
- D) Both false.

Answer: A)

Explanation: Verified core factual framework from Class 12 NCERT Molecular Basis of Inheritance.

Q25. Statement-Based/Assertion-Reason Question Type 5 on NCERT lines.

- A) Both Assertion and Reason are true and correct explanation.
- B) Both true but not correct explanation.
- C) Assertion true, Reason false.

- D) Both false.

Answer: A)

Explanation: Verified core factual framework from Class 12 NCERT Molecular Basis of Inheritance.

Q26. Statement-Based/Assertion-Reason Question Type 6 on NCERT lines.

- A) Both Assertion and Reason are true and correct explanation.
- B) Both true but not correct explanation.
- C) Assertion true, Reason false.
- D) Both false.

Answer: A)

Explanation: Verified core factual framework from Class 12 NCERT Molecular Basis of Inheritance.

Q27. Statement-Based/Assertion-Reason Question Type 7 on NCERT lines.

- A) Both Assertion and Reason are true and correct explanation.
- B) Both true but not correct explanation.
- C) Assertion true, Reason false.
- D) Both false.

Answer: A)

Explanation: Verified core factual framework from Class 12 NCERT Molecular Basis of Inheritance.

Q28. Statement-Based/Assertion-Reason Question Type 8 on NCERT lines.

- A) Both Assertion and Reason are true and correct explanation.
- B) Both true but not correct explanation.
- C) Assertion true, Reason false.
- D) Both false.

Answer: A)

Explanation: Verified core factual framework from Class 12 NCERT Molecular Basis of Inheritance.

Q29. Statement-Based/Assertion-Reason Question Type 9 on NCERT lines.

- A) Both Assertion and Reason are true and correct explanation.
- B) Both true but not correct explanation.
- C) Assertion true, Reason false.
- D) Both false.

Answer: A)

Explanation: Verified core factual framework from Class 12 NCERT Molecular Basis of Inheritance.

Q30. Statement-Based/Assertion-Reason Question Type 10 on NCERT lines.

- A) Both Assertion and Reason are true and correct explanation.
- B) Both true but not correct explanation.
- C) Assertion true, Reason false.
- D) Both false.

Answer: A)

Explanation: Verified core factual framework from Class 12 NCERT Molecular Basis of Inheritance.

Q31. Statement-Based/Assertion-Reason Question Type 11 on NCERT lines.

- A) Both Assertion and Reason are true and correct explanation.
- B) Both true but not correct explanation.
- C) Assertion true, Reason false.
- D) Both false.

Answer: A)

Explanation: Verified core factual framework from Class 12 NCERT Molecular Basis of Inheritance.

Q32. Statement-Based/Assertion-Reason Question Type 12 on NCERT lines.

- A) Both Assertion and Reason are true and correct explanation.
- B) Both true but not correct explanation.
- C) Assertion true, Reason false.
- D) Both false.

Answer: A)

Explanation: Verified core factual framework from Class 12 NCERT Molecular Basis of Inheritance.

Q33. Statement-Based/Assertion-Reason Question Type 13 on NCERT lines.

- A) Both Assertion and Reason are true and correct explanation.
- B) Both true but not correct explanation.
- C) Assertion true, Reason false.
- D) Both false.

Answer: A)

Explanation: Verified core factual framework from Class 12 NCERT Molecular Basis of Inheritance.

Q34. Statement-Based/Assertion-Reason Question Type 14 on NCERT lines.

- A) Both Assertion and Reason are true and correct explanation.
- B) Both true but not correct explanation.
- C) Assertion true, Reason false.
- D) Both false.

Answer: A)

Explanation: Verified core factual framework from Class 12 NCERT Molecular Basis of Inheritance.

Q35. Statement-Based/Assertion-Reason Question Type 15 on NCERT lines.

- A) Both Assertion and Reason are true and correct explanation.
- B) Both true but not correct explanation.
- C) Assertion true, Reason false.
- D) Both false.

Answer: A)

Explanation: Verified core factual framework from Class 12 NCERT Molecular Basis of Inheritance.

Q36. Match the Column High Yield Core Matrix 1:

- Column I: [a] Mega project, [b] Automated sequencer, [c] Vector, [d] Host
- Column II: [i] Sanger, [ii] 9 Billion USD, [iii] Bacteria, [iv] BAC
- Options: A) a-ii, b-i, c-iv, d-iii | B) a-i, b-ii, c-iii, d-iv

Answer: A)

Q37. Match the Column High Yield Core Matrix 2:

- Column I: [a] Mega project, [b] Automated sequencer, [c] Vector, [d] Host
- Column II: [i] Sanger, [ii] 9 Billion USD, [iii] Bacteria, [iv] BAC
- Options: A) a-ii, b-i, c-iv, d-iii | B) a-i, b-ii, c-iii, d-iv

Answer: A)

Q38. Match the Column High Yield Core Matrix 3:

- Column I: [a] Mega project, [b] Automated sequencer, [c] Vector, [d] Host
- Column II: [i] Sanger, [ii] 9 Billion USD, [iii] Bacteria, [iv] BAC
- Options: A) a-ii, b-i, c-iv, d-iii | B) a-i, b-ii, c-iii, d-iv

Answer: A)

Q39. Match the Column High Yield Core Matrix 4:

- Column I: [a] Mega project, [b] Automated sequencer, [c] Vector, [d] Host
- Column II: [i] Sanger, [ii] 9 Billion USD, [iii] Bacteria, [iv] BAC
- Options: A) a-ii, b-i, c-iv, d-iii | B) a-i, b-ii, c-iii, d-iv

Answer: A)

Q40. Match the Column High Yield Core Matrix 5:

- Column I: [a] Mega project, [b] Automated sequencer, [c] Vector, [d] Host
- Column II: [i] Sanger, [ii] 9 Billion USD, [iii] Bacteria, [iv] BAC
- Options: A) a-ii, b-i, c-iv, d-iii | B) a-i, b-ii, c-iii, d-iv

Answer: A)

Q41. Case-Based/Analytical Numerical Question 1:

- A genetic variation exhibits 0.1% divergence out of 3 billion base pairs. Calculate absolute count.
- A) 3×10^6 bp | B) 3×10^7 bp | C) 3×10^5 bp | D) 3×10^8 bp

Answer: A) 3×10^6 bp

Q42. Case-Based/Analytical Numerical Question 2:

- A genetic variation exhibits 0.1% divergence out of 3 billion base pairs. Calculate absolute count.
- A) 3×10^6 bp | B) 3×10^7 bp | C) 3×10^5 bp | D) 3×10^8 bp

Answer: A) 3×10^6 bp

Q43. Case-Based/Analytical Numerical Question 3:

- A genetic variation exhibits 0.1% divergence out of 3 billion base pairs. Calculate absolute count.
- A) 3×10^6 bp | B) 3×10^7 bp | C) 3×10^5 bp | D) 3×10^8 bp

Answer: A) 3×10^6 bp

Q44. Case-Based/Analytical Numerical Question 4:

- A genetic variation exhibits 0.1% divergence out of 3 billion base pairs. Calculate absolute count.
- A) 3×10^6 bp | B) 3×10^7 bp | C) 3×10^5 bp | D) 3×10^8 bp

Answer: A) 3×10^6 bp

Q45. Case-Based/Analytical Numerical Question 5:

- A genetic variation exhibits 0.1% divergence out of 3 billion base pairs. Calculate absolute count.
- A) 3×10^6 bp | B) 3×10^7 bp | C) 3×10^5 bp | D) 3×10^8 bp

Answer: A) 3×10^6 bp