Biology | NEET

Class 12 Biology - Molecular Basis of Inheritance

NEET track | Short Notes + 5 CBSE-based questions + 5 NEET PYQ-based questions with solutions

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Format: Quick revision + solved practice	Chapter scope: Class 12 Biology

1. Quick Short Notes

- DNA is a double-helical polymer made of nucleotide units containing sugar, phosphate and nitrogen base.
- Complementary base pairing: A pairs with T through two hydrogen bonds and G pairs with C through three hydrogen bonds.
- DNA strands are antiparallel. One strand runs 5' to 3' and the other 3' to 5'.
- DNA replication is semiconservative and is carried out by DNA polymerases.
- Replication is continuous on leading strand and discontinuous on lagging strand, forming Okazaki fragments.
- Transcription is the synthesis of RNA from DNA template by RNA polymerase.
- Translation occurs on ribosomes where codons on mRNA are read to synthesise proteins.
- Genetic code is triplet, degenerate, nearly universal and unambiguous. AUG acts as initiation codon.
- Lac operon is an inducible operon switched on in presence of lactose when repressor is inactivated.
- Board tip: write the central dogma clearly: DNA -> RNA -> Protein.

2. CBSE-based Board Practice

Q1. State any four features of the genetic code.

Solution: The genetic code is triplet, degenerate, unambiguous and nearly universal. It is also read in a continuous, non-overlapping manner.

Q2. Why is DNA replication called semiconservative? Mention the Meselson-Stahl evidence in one line.

Solution: It is called semiconservative because each daughter DNA molecule contains one parental strand and one newly synthesised strand. Meselson and Stahl proved this using N-15 labelled DNA in E. coli.

Q3. Differentiate between transcription and translation.

Solution: Transcription is synthesis of RNA from DNA template, while translation is synthesis of protein from mRNA sequence at ribosomes.

Q4. What is lac operon? When is it activated?

Solution: Lac operon is a set of genes controlling lactose metabolism in bacteria. It is activated in presence of lactose when the repressor is removed from operator region.

Q5. Why does RNA contain uracil in place of thymine?

Solution: Uracil performs pairing with adenine in RNA and is chemically simpler. DNA uses thymine for greater stability and repair accuracy.

3. NEET PYQ-based Practice

Q1. How many codons are present in the genetic code?

Solution: There are 64 codons in total.

Q2. What is the initiation codon in most organisms?

Solution: AUG is the initiation codon.

Q3. Okazaki fragments are formed on which strand during replication?

Solution: They are formed on the lagging strand.

Q4. DNA wrapped around histone octamer is called what?

Solution: It is called a nucleosome.

Q5. Which RNA carries anticodon?

Solution: tRNA carries the anticodon that pairs with mRNA codon.

Practice tip: First revise the short notes, then attempt CBSE board questions in written format, and finally solve the exam-specific section in timed mode.