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Class 12 – Biology

Chapter 5 – Molecular Basis of Inheritance

Very Short types question with answer

Q.1. State the function of histones in DNA packaging.

A.1.

- They play a role in gene regulation.
- They help the DNA to wind around it.
- The histones are positively charged proteins, which can easily bind to the negatively charged DNA.

Q.2. What is the difference between heterochromatin and euchromatin?

A.2.

Heterochromatin is a tightly packed DNA, which can be identified when stained in an extreme nuclear stain.

Euchromatin is a lightly packed DNA, which can be identified when stained in a less nuclear stain.

Q.3. Name any three viruses with RNA as the genetic material.

A.3. The viruses in which the genetic material is RNA is called the RNA virus.

The three examples of the RNA virus.

1. Influenza Virus.
2. Hepatitis C Virus.
3. Human Immunodeficiency Virus.

Q.4. Give a reason for the discontinuous synthesis of DNA on one of the parental strands?

A.4. The biological process of DNA synthesis naturally occurs in 5' to 3' direction. In the double-stranded DNA, the strands are parallel and antiparallel to each other. During the synthesis of DNA, both the strands act as templates and only one (3' to 5' direction) can synthesize the parallel strand in 5'→3' direction. The other strand 5' to 3' is synthesized in the opposite direction producing small stretches of DNA known as Okazaki fragments. This is the reason for the discontinuous synthesis of DNA on one of the parental strands.

Q.5. The sequence of the coding strand of DNA in a transcription unit is mentioned below.

3' AATGCAGCTATTAGG 5'

Write the sequence for:

- 1. Its complementary strand**
- 2. Its mRNA**

A.5.

- 1. The complementary strand is 5' TTACGTCGATAATCC 3'**
- 2. The mRNA is 5' AAU GCAGCUAUUAGG 3'**

Q.6. What is DNA polymorphism?

A.6. DNA's polymorphism is the variation in the DNA sequence arising due to mutation at non-coding sequences.

Q.7. Retroviruses do not follow central dogma. Comment on this statement

A.7. Retroviruses do not follow central dogma, because, they possess RNA as genetic material instead of the DNA, which is later converted into DNA by the enzyme reverse transcriptase.

Q.8. Sometimes, the young ones born have an extremely different set of eyes or limbs. Give a relevant explanation for the abnormality.

A.8. This abnormality is caused by many factors, including alcohol abuse by the mother during her pregnancy, medicine side effects or reactions caused to the womb, environmental factors, such as maternal exposure to the chemicals, radiations, virus, and it can also be due to the genes and non-coordination in the regulation of expression in the set of genes associated with the development of organs.

Q.9. Explain about the dual polymerase present in E.coli.

A.9. The DNA polymerase present in E.coli is a DNA dependent polymerase. This DNA polymerase helps in the:

1. Replication process.
2. Performs the 5' to 3' polymerase activity as well as 3' to 5' exonuclease activity.
3. The DNA polymerase III also has the ability to proofread the wrong nucleotides and substitutes it with the correct one.

Q.10. What are the functions of the :

1. **Methylated guanosine cap**
2. **Poly-A tail**

A.10.

1. Methylated guanosine cap plays a primary role in the attachment of the mRNA to the smaller sub-units of the ribosome during translation initiation.
2. The Poly-A tail functions by increasing the length of the mRNA and also provides longevity to the mRNA.

Q.11. Mention any two functions of AUG codon.

A.11. The AUG codon is also called the start codon. The two important functions of AUG codon include:

1. It codes for methionine.
2. It acts as an initiation codon for protein synthesis.

Q.12. What is the function of amino acyl t-RNA synthase?

A.12. Amino acyl t-RNA synthase plays a major role in the biosynthesis of proteins by attaching an appropriate amino acid on to the tRNA molecules.