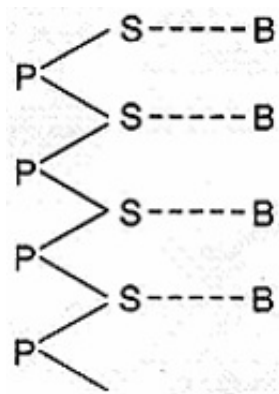


CBSE Test Paper 03
Ch-6 Molecular Basis of Inheritance

1. Typically DNA content of about 100000 cells or 1 microgram is required for fingerprinting. If the sample obtained is less it is increased by
 - a. Transcription of DNA in cells
 - b. Elimination of DNA in cells
 - c. Translation of DNA in cells
 - d. Polymerase chain reaction (PCR) by amplification process
2. Lac operon consists of
 - a. Only two regulator genes
 - b. Two regulator gene and two structural genes
 - c. One regulator and one structural gene
 - d. One regulator gene and three structural genes
3. Name the conjugated protein used as genetic material in living cells
 - a. Glycoprotein
 - b. Metalloprotein
 - c. Nucleoprotein
 - d. Lipoprotein
4. In the synthesis of which of the following, the DNA molecule is not directly involved?
 - a. mRNA molecule
 - b. another DNA molecule
 - c. t-RNA molecule
 - d. protein molecule
5. In human beings 99.9% of genome sequence are same in all individuals only 0.1% of genome differ that
 - a. Make every individual similar in phenotypic appearance
 - b. Make every individual genetically similar
 - c. Make every individual unique in phenotypic appearance
 - d. Make genetic variation for evolution
6. What are variable number of tandem repeats or VNTRs?
7. Refer to the following diagram and answer the given question



How many different types of B are in

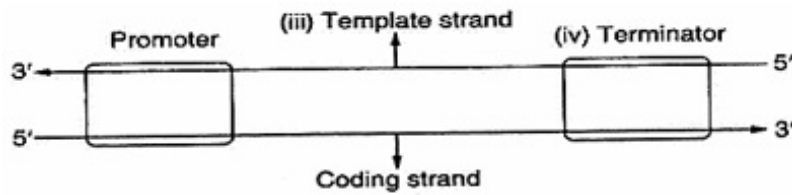
8. Name the inducer of the lac-operon concept?
9. What are the termination codon on mRNA?
10. Swati is dark skinned and children of her class tease her. Renu tries to help and explains her classmates that skin color is an inherited character, so they should stop teasing Swati. Name the type of inheritance involved in skin coloration of humans.
11. Name the category of virus that carries reverse transcriptase? What is the purpose of this enzyme.
12. Briefly describe the following:
 - a. Transcription
 - b. Polymorphism
 - c. Translation
 - d. Bioinformatics
13. Write the full form of VNTR? How is the VNTR different from 'probe'?
14. i. Draw a schematic representation of the structure of a transcription unit and show the following in it
 - a. The direction in which the transcription occurs
 - b. The polarity of the two strands involved
 - c. Template strand
 - d. Terminator gene
- ii. Mention the function of promoter gene in transcription.
15. Which property of DNA double helix led Watson and Crick to hypothesis semi-conservative mode of DNA replication? Explain.

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Answer

1. d. Polymerase chain reaction (PCR) by amplification process,
Explanation: Amplification is a mechanism leading to multiple copies of a chromosomal region within a chromosome arm.
The DNA amplification technique of the polymerase chain reaction (PCR) is a laboratory method for creating multiple copies of small segments of DNA.
2. d. One regulator gene and three structural genes, **Explanation:** Lac Operon consists of one regulator gene, i and three structural genes z, y and a. I gene code for repression of the lac Operon. Z gene code for beta-galactosidase, y code for permease and a gene code for transactylase.
3. c. Nucleoprotein, **Explanation:** Nucleoprotein, conjugated protein consisting of a protein linked to a nucleic acid, either DNA (deoxyribonucleic acid) or RNA (ribonucleic acid). The protein combined with DNA is commonly either histone or protamine; the resulting nucleoproteins are found in chromosomes.
4. d. protein molecule, **Explanation:** DNA molecules are not directly involved in synthesis of protein. In protein synthesis, DNA, first undergoes transcription process and produce m-RNA. Translation process takes place and produce protein.
5. c. Make every individual unique in phenotypic appearance,
Explanation: Genome variations are differences in the sequence of DNA from one person to the next.
In human's 99.9% of the base sequences of DNA are same & are referred as **Bulk genomic DNA**.
The difference lies in remaining 0.1%. It is these differences which make every individual unique in their phenotypic appearance. This DNA has small stretches of **repetitive sequences**. They are referred as Repetitive DNA.
6. These are short nucleotide repeats in DNA that vary in number from person to person, but are inherited.

-
7. Four (adenine, guanine, cytosine and thymine)
 8. Because a small inducer molecule is required, the increased expression of the target gene is called induction. The lactose operon which is inducer of lac-operon concept is one example of an inducible system.
 9. trinucleotide sequence (UAA, UGA, or UAG) that specifies the end of translation or transcription are termination codon on mRNA.
 10. Quantitative /Polygenic inheritance
Values
 - Sensitivity towards fellow beings.
 - Compassion.
 - Understanding
 11. Retroviruses carry reverse transcriptase. This enzyme catalyses the formation of DNA from RNA which integrates with DNA of host cell.
 12. (a) **Transcription** is the process of creating a RNA copy of DNA sequence.
(b) When different types of phenotype occur in the same species the situation is called **polymorphism** .
(c) **Translation** is the process of creating protein once the genetic code has been decoded by transcription.
(d) **Bioinformatics** is the fusion of information technology with molecular biology. The use of IT helps in faster analysis of data. Especially in genetics this is important as amount of data can be very huge.
 13. Variable Number Tandem Repeats VNTRs are the short nucleotide repeats in the DNA which are very specific in each individual and vary in number from person to person but are inherited whereas DNA probes are made in the laboratory which contains repeated sequences of bases complementary to those on VNTRs. DNA probes are made radioactive by labeling with radioactive isotopes.
 14. i.



A Transcription unit

(i) $5' \rightarrow 3'$ for (ii), (iii) and (iv) see figure.

ii. Promoter provides the site for the binding of RNA polymerase for transcription, it also defines the coding and template of DNA.

15. The Watson and Crick observed that the nitrogenous bases form complementary pair between the two polynucleotide chains of DNA. Based on the X-ray diffraction data, they proposed that DNA consisted of a double helix with two chains having sugar phosphate on the outside and nitrogen bases on the inner side. Further, they proposed that the two chains are antiparallel with 5'-3' orientation of the other. The two chains are twisted helically just as a rope ladder with rigid steps twisted into a spiral. This property of double helix model of DNA led them to hypothesize semi-conservative mode of DNA replication, where the two strands separate and act as a template for the synthesis of new complementary strand.