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**Max Time : 2 hr** **Class = 12th Biology Test Max Marks : 50**

**Topic: Principle of inheritance & Variation,**

**Molecular basis of inheritance**

**Section – A [ 1 X 10 = 10 ]**

1. Inheritance of skin colour in humans is an example of

|  |  |  |  |
| --- | --- | --- | --- |
| a) Point mutation | b) Polygenic inheritance | c) co-dominance | d) Pleiotropy |

1. Person having genotype IA IB would show the blood group as AB. This is because of :

|  |  |  |  |
| --- | --- | --- | --- |
| a) pleiotropy | b) co-dominance | c) segregation | d) Incomplete dominance |

1. In a dihybrid cross, if you get 9 : 3 : 3 : 1 ratio it denotes that :

a) The alleles of two genes are interacting with each other

b) It is a multigenic inheritance

c) It is a case of multiple allelism

d) The alleles of two genes are segregating independently.

1. Occasionally, a single gene may express more than one effect. The phenomenon is called:

|  |  |  |  |
| --- | --- | --- | --- |
| a) multiple allelism | b) mosaicism | c) Pleiotropy | d) Polygeny |

1. In the F2 generation of a Mendelian dihybrid cross the number of phenotypes and genotypes are

|  |  |
| --- | --- |
| a) Phenotypes = 4 ; Genotypes = 16 | b) Phenotypes = 9 ; Genotypes = 4 |
| c) Phenotypes = 4 ; Genotypes = 8 | d) Phenotypes = 4 ; Genotypes = 9 |

1. Amino acid sequence, in protein synthesis is decided by the sequence of :

|  |  |  |  |
| --- | --- | --- | --- |
| a) r RNA | b) t RNA | c) m RNA | d) c RNA |

1. Polysomes is formed by :

a) a ribosome with several subunits.

b) Ribosomes attached to each other in a linear arrangement.

c) Several ribosomes attached to single mRNA.

d) Many ribosomes attached to a strand of endoplasmic reticulum

1. What is not true for genetic code :

a) it is nearly universal.

b) it is degenerate.

c) it is unambiguous

d) A codon in mRNA is read in non-contiguous fashion.

1. The promoter site and the terminator site for transcription are located at :

a) 3’ (downstream) end and 5’ (upstream) end , respectively of the transcription unit.

b) 5’ (upstream) end and 3’ (downstream) end , respectively of the transcription unit.

c) the 5’ (upstream) end

d) the 3’ (downstream) end

1. Which was the last human chromosome to be completely sequenced?

|  |  |  |  |
| --- | --- | --- | --- |
| a) Chromosome 1 | b) Chromosome 11 | c) Chromosome 21 | d) Chromosome X |

**Section – B [ 1 X 5 = 5 ]**

1. Give an example of a human disorder that is caused due to a single gene mutations.
2. State the chromosomal defect in individuals with Turner’s syndrome.
3. Mention two function of codon AUG.
4. Why hnRNA is required to undergo splicing.
5. Name the transcriptionally active region of chromatin in a nucleus.

Or

Define test cross.

**Section – C [ 2 X 5 = 10 ]**

1. (i) State cause and symptoms of colour-blindness in humans.

(ii) Statistical data has shown that 8% of the human males are colour-blind where as only o.4% of females are colour-blind. Explain giving reason how it is so.

1. Why is the human genome project called as a mega project?
2. Describe Frederick Griffith’s experiment on Streptococcus pneumoniae. Discuss the conclusion he arrived at.

Or

A DNA segment has a total of 2000 nucleotides, lout of which 520 are adenine containing nucleotides. How many purines bases this DNA segment possesses?

1. Differentiate between male heterogamy and female heterogamy with one example each.
2. Explain Mendel’s law of independent Assortment by taking a suitable example.

**Section – D [ 3 X 5 = 15 ]**

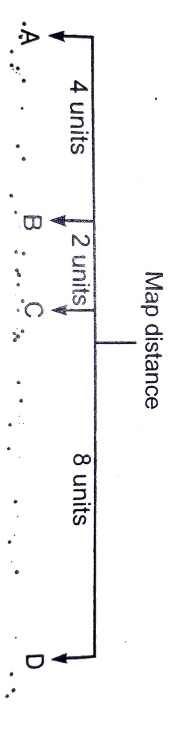
1. Describe how the Lac operon operates, both in the presence or absence of an inducer in E.coli.
2. Explain Incomplete dominance and co-dominance with one example of each.
3. Explain the steps of DNA fingerprinting that will help in processing of the two blood samples A and B picked from crime scene.
4. Draw a labelled sketch of replication fork of DNA. Explain the role of the enzymes involved in DNA replication.

Or

Describe the initiation , elongation and termination process of transcription in bacteria.

1. (i) Who had proposed the chromosomal theory of inheritance and what are the conclusion of this theory.

(ii) In the given figure which of the following gene pair will show more recombination frequency? Give reason in support of your answer.



**Section – E [ 5 X 2 = 10 ]**

1. Explain the process of translation and demonstrate the role of RNA, tRNA and ribosome on it.
2. (i) Comment on the statement that Linkage and crossing over of genes are alternative of each other. Justify with the help of an example

(ii) Name the kind of disorder and 3 symptoms that are likely to occur in human if mutation in the gene that code for an enzyme phenylalanine hydroxylase occurs.